LEARNING STYLES: IMPLICATIONS FOR HIGHER EDUCATION

by

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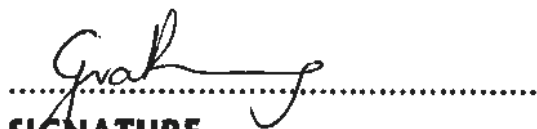
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DECLARATION

I declare that **LEARNING STYLES: IMPLICATIONS FOR HIGHER EDUCATION** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

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SIGNATURE   **DATE**

(GH VAN RENSBURG)

SUMMARY

Significant changes have taken place in higher education over the past ten years. Learners are more liberated and want to be acknowledged as individuals with differences, and not expected to adapt their individual characteristics to fit in with the specific environment of the learning situation. A new emphasis is placed upon creating and sustaining learning environments that accommodate learner needs and the process of effective learning. Learners' individual needs include their need to learn *how* to learn and an acceptance of their individual differences as expressed in *learning styles*.

Active learner participation in the learning process is necessary for effective learning to take place. Only then can the desired outcome be reached. For a learner to actively participate in the learning process, the learner must know *how* to learn, and how to function as an independent learner. To reach these goals, sound knowledge of individual differences in learning styles is necessary.

The impact of individual differences on education and the way they affect educational practice, future learning and academic achievement places the emphasis even more strongly on constant awareness, updating or change, improvement and development of the educational environment. The educator, as one of the role players in the educational environment, is the facilitator of learning, and should be empowered with a strong knowledge base regarding individual differences among both learners and educators, thus becoming more innovative and creative.

Qualitative non-empirical research was undertaken. The aim of this research was to analyse and explore the concept *learning style* as well as to promote learning style awareness through assessment of learning styles, and to provide an organised frame of reference to guide the learning process and provide for systematic education.

Based on insight and knowledge gained through inductive and deductive reasoning, the *Learning Style Assessment Tool* and a *model for learning style promotion in higher education* were constructed. The instrument enables learners and educators to assess their own learning styles and identify their learning characteristics and preferences. The model can serve as a basis for acknowledging and accommodating learning styles in higher education. The desired outcome of this research is effective learning and quality education.

Key terms:
Learning styles, learning style assessment, learning process, learning environment, Kolb model of experiential learning, academic achievement, adult learner, learning theories, dimensions of learning, learning approaches, learning activities, educational environment, educator, teaching styles, educational instruction, higher education.

ACKNOWLEDGEMENTS

Dedicated to:

ANDRE, RUDI AND HEINRICH with love

and to

my father, JAN DE LANGE with whom I would have loved to share this

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List of abbreviations

AC   abstract conceptualisation

ACCE   abstract conceptualisation and concrete experience dimension

AE   active experimentation

AERO   active experimentation and reflective observation dimension

CE   concrete experience

LSAT   Learning Style Assessment Tool

RO   reflective observation

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CHAPTER 1

INTRODUCTION AND ORIENTATION TO THE RESEARCH

1.1   INTRODUCTION

Individuals of all ages and intellectual capacities learn in ways that differ dramatically. Individuals, or more specifically learners, and learning cannot be separated. Learners have a need to be valued as individuals with their own individual characteristics and differences. All individuals deserve to be taught in a way that best suits their needs. Individual differences in the learning process are a reality (Gregorc & Butler 1984:27). This assumption is a challenge for educators, and is important for those educators who recognise, accept and take into account the individual differences of learners. The consequence of these individual differences among learners is that learners have preferences for and achieve academically through selected educational methods (Dunn & Dunn 1979:238; Griggs, Griggs, Dunn & Ingham 1994:41). The innovative, creative approaches of modern education enhance learners' ability to learn more efficiently and effectively. Providing high quality education therefore requires the acceptance of individual differences among learners.

Education should be aimed at promoting learning. In order to do so, educators should incorporate diversity into their model of education or style of teaching. Educators need to be aware of their learners' individual differences as expressed in learning styles, as well as their own, so that they can adapt their particular way of facilitating learning to complement the learner group.

1.2   BACKGROUND TO THE RESEARCH PROBLEM

There are numerous theories regarding the way learners achieve academically. Each of these contributes a partial insight into the learning process and none provides a totally accurate explanation of how individuals "gain and retain" knowledge (Dunn & Dunn 1979:238). The concept of individual differences in the learning process is, however, widely accepted (Dunn & Dunn 1979:238; Griggs et al 1994:41; Newstead 1992:299).

Individual differences in the learning process are expressed in learning styles. These differences are the result of natural qualities of an individual's mind. The acknowledgment of individual differences

in mental development and abilities dates back to the time of the ancient Greek philosophers, and even predates their writings. It was believed that individual differences were developed after birth as a result of different amounts of mental exercise (Bigge & Hunt 1980:415).

Learners approach learning situations differently. Although this is common knowledge among many experienced educators, they nevertheless continue to educate an entire group at the same time, in the same way and in the way they as educators prefer to learn (Carroll 1992:117). Educators are faced with situations where they have to change their approaches to the educational process, move away from the safe traditional practices, and become facilitators of learning in a more flexible way. The key to change is the understanding of diversity among individuals (educators and learners). The challenge thus lies in the acceptance of individuality, not only among learners but also among educators.

In accepting individual differences one also has to accept the existence of the concept *learning style*. Learning styles address the process of data handling, which is the *how* of learning. It is an individual process of perceiving, thinking, problem-solving and interaction with others. Learning styles remain fairly constant throughout a person's life and are not amenable to major change (Keane 1993:215; Reilly & Oermann 1992:36; Wells & Higgs 1990:388). Ramsden (1992:45) describes the understanding of *how* individuals learn as very important for the educator. The implications of this knowledge are reflected in the way educators should facilitate learning.

An awareness that different learner characteristics influence the exchange of information will assist in maximising learning experiences. The understanding of differences in each individual promotes the development of alternative, effective and individualised learning strategies (Ismeurt, Ismeurt & Miller 1992:41; Reilly & Oermann 1992:36). Knowledge of the concept *learning style* is of particular significance in promoting learning and learning experiences (Reilly & Oermann 1992:36). Furthermore, to promote learning, individuals must be provided with a variety of learning experiences to develop their individual learning to meet their own learning styles.

When an individual is admitted to higher education, the institution has a moral obligation to assist that individual to obtain the academic skills necessary for success. Learners need to be developed and supported to reach the goal of academic excellence. The role of the educator in the attainment of this goal is of the utmost importance. Each educational institution has a philosophy about how

individuals learn and educators facilitate learning or teach. A philosophy appropriately serves as a value base from which to select empirically testable concepts and principles for placement within an educational framework. If learning style awareness within the model of education is applied to curriculum and teaching style, it can help in understanding and enhancing learners' attitude towards and performance in the learning environment.

An academic mission should foster a commitment among educators and learners to develop individual potential to the full. The implication of learning styles for higher education can be an improvement in educator-learner interaction during the professional preparation of individuals (Matthews & Jones 1994:234). It is therefore believed that one should accommodate learning styles in higher education and that a curriculum should be developed to emphasise learning style assessment (Rakoczy & Money 1995:171). No learning environment should be oriented towards just one or some of the learning styles (Stutsky & Laschinger 1995:151). Individuality expressed in learning style is thus an indispensable part of higher education and the education and learning process.

The value of the concept *learning style* is that it is learner-focused, not educator-focused. The educator becomes the secondary focus. Only after the focus is directed towards the learner and how he or she learns, does the emphasis shift to how the educator can use teaching styles to accommodate learner needs (Carroll 1992:115). Extensive research done by Dunn and Dunn (1979:239) revealed that those individuals who were taught through methods that complemented their learning characteristics and preferences, expressed in learning styles, became increasingly motivated and achieved better academically.

A learner may experience either a match or a mismatch with a given learning environment, depending upon the degree of congruence between the strengths of the learner's preferred learning style and the nature of the demands of the specific learning environment. According to various researchers (Forney 1994:337; Presland 1994:181), learning environments that match learning styles will influence variables such as self-esteem and motivation to learn positively, which will again produce successful learning experiences.

Mockford and Denton (1998:13) maintain that a degradation in the learning experience can take place if an individual's learning style is not taken into consideration in deeper learning. Deep learning is a learning approach that is characterised by an active search for meaning, starting with the intention of

understanding the meaning of a concept, questioning and reasoning the issues, and then relating them to both previous knowledge and personal experience (Gravett 1995:34; Sadler-Smith 1997:54). If deep learning is not promoted, opportunities for creative thinking can be reduced or even lost. The focus of learning should not only be on assessment and achievement of certain goals but should be on a deep approach to learning. In other words, learners should be allowed the opportunity to explore and be guided through a reflective exploration, with necessary guidelines on what performance is required to reach learning outcomes, and eventually achieve academically.

If educators are made aware of the differences in learning styles, the information can be used in curriculum planning and development. Individualised learning activities or learning options based on different learning styles could be created. Assistance could also be given to learners to make adjustments to educational approaches or teaching strategies that are less consistent with their learning styles. On the other hand, it is also possible that forcing someone to use a non-preferred learning style can lead to more active restructuring of the material to be learned, which can in itself lead to better learning (Presland 1994:182). Presland (1994:179) states, however, that extensive research on the use of learning styles to promote effective learning, produced more negative results than positive results. He does admit that some learning styles are better for learning in general, that better learning can sometimes be obtained by matching methods of learning to individual learning styles, that some learning styles might be better for different kinds of study or tasks, and that learning can be improved by making learners more aware of their learning styles. Furthermore, according to Carroll (1992:115), enhanced learning takes place if learners and educators have compatible learning and teaching styles. More learning takes place, learning time is reduced, and learners retain information longer when these styles are matched. On the contrary, when these styles are mismatched, learning time increases and retention decreases. The possibility is raised that teaching by methods deliberately mismatched to learning styles could also have value and that mismatching can increase the mobility and range of learning styles used (Presland 1994:180, 182). Mismatches should then be deliberate and oriented towards clear outcomes. Understanding learning styles can help both learner and educator to develop a more constructive, successful relationship. This understanding could assist educators in maximising the educational environment, thereby facilitating learners' educational goal attainment (Linares 1999:409).

Recognition of learner differences and the ability to educate individual learners are important components of successful education. Educators who take into account learners' individual learning

styles will be stimulated to introduce knowledge, content and subject matter by using a variety of teaching methods. Each learner's abilities and strengths should be used to enrich a curriculum. Learners who need more support in a specific thinking or information processing skill can be helped to change a weakness or less strong ability into a learning strength.

Educators need to recognise their responsibility to a diverse learner corps. They must be aware of their own strengths and weaknesses within the context of learning styles in order to be able to recognise the existence of differentiation in learning styles. This implies that learning styles must be assessed effectively, accepted as existing, and applied to the educational environment in order to prepare individuals as independent learners and thinkers (Caudill 1998:25).

The need to understand the nature and effect of the knowledge explosion worldwide is linked to the needs of learners to develop their skills to understand the changes (Du Plooy 2000:2). From this the need to *learn how to learn* arises. In higher education learning should be maximised as quickly and efficiently as possible. Learners have to adopt an increasingly mature and productive style of working to prepare them for employment, where skills of independent thinking, taking responsibility and time management are highly valued. Accordingly, knowledge of learning styles and the acknowledgment of these identifiable, qualitative distinctions in learners become particularly important to educators and learners.

Many educational institutions in South Africa are currently developing distance education programmes, which may entail the education of learners by educators with little or no specific training in distance education practices, the enrolment of learners who do not fit into the framework of this method of education and certain problems for the institutions in the areas of course design and staff development. Outdated correspondence (distance) educational structures and practices with very little emphasis on active learner participation and support, reflective learning and facilitation are still used by educational institutions in general (Fraser & Nieman 1996:185).

Learners from culturally diverse backgrounds enrol in educational programmes. Meeting the needs of these learners offers educators both an opportunity and a challenge. The development of an appreciation of, sensitivity to and understanding of the cultural background and values of the culturally diverse learner is an important first step. The linguistically diverse learners are particularly at risk for academic failure (Femea, Gaines, Brathwaite & Abdur-Rahman 1995:25). According to

Femea et al (1995:25), academic achievement can be influenced positively when a learner is empowered with the presence of academic support and educational facilitation, which includes learning style diversity. Educators must be able to recognise the specific characteristics of the culturally and linguistically diverse learners. Learners must be able to express themselves in their first language or a language they feel comfortable with. If this is not possible, special attention must be given to ensure that academic support and educational facilitation is made as user-friendly as possible. For the purpose of this research, cultural diversity will not be explored.

Slabbert (1993:38) claims that curricula are overloaded with content. He further suggests that the focus of educational change is on content, in that new content is added, current content changed, while content of any kind is seldom removed. Focusing on content leads to a conclusion that it is the content in a curriculum that will enable a learner to comprehend and survive as a professional. In an information-laden world this is not true. No learner can comprehend at the pace at which information is published. The importance therefore is to prepare learners for a rapidly changing world by ensuring educational practices that will serve all learners well. The instructional process includes the guidance, accompaniment and support of learning (Gravett 1995:34). Instruction is not the imparting of authoritative knowledge, but the creation of a context favourable to the process of shared knowledge construction. The approach is in essence learning and learner centred, requiring empowerment of the learner.

DeYoung (1990:63) focuses on the needs of the individual rather than on a group of learners in general when she discusses the aspect of how classes are conducted. According to this author much is written about individuality in learning but relatively little has been put into practice. This statement supports this research in identifying the need for confidence in the practicality and the value of attending to individual learning styles. By presenting an explanation of the concept *learning style*, developing a *learning style instrument*, and developing a *conceptual model* for learning styles awareness in higher education, educators will have the opportunity to implement an individualised approach to teaching and learning. This approach can be used in a group as well as on an individual basis.

Numerous studies have been done to assess the learning styles of individuals (Beyler & Schmeck 1992; Billings 1994; Keane 1993; Kizilay 1991; Van Rensburg 1995; Wells & Higgs 1990), but the question remains whether educators really take these individual differences into consideration in the

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teaching-learning process. Furthermore, if educators are aware of the existence of these individual differences, what do they do with this awareness. What are the implications of the awareness for the educational process?

However, not many research studies demonstrate the usefulness of knowledge and the acknowledgement of learning styles in higher education. Sternberg (1997:155) describes individual learning styles as being part of the psychological world, but states that they have not yet been part of a central area of endeavour for psychology. He also states that many educational institutions buy into systems for assessing learners' learning styles, but are then not able to implement the results owing to a lack of quality research.

There is a definite need for research on how to apply the results of learning style research in education. The research should be neither too cognitively-oriented nor too personality-oriented. A sound cognitive basis is necessary when applying the results in higher education. This information and application have immediate implications for various aspects of life such as the teaching-learning process and the employment of adults (Sternberg 1997:154).

The following results of a previous research (Van Rensburg 1995:164-165) are potentially useful for educators in higher education, as well as for health sciences educators:

- Learner individuality expressed in learning styles is a reality. It is thus strongly recommended that all educators recognise, accept and take into account the fact that individuals learn differently.
- No learning style is either better or worse than another. A learner must not be labelled or stigmatised because he or she has a particular learning style. Learning styles are not linked to different intelligence ranges (Dunn, Beaudry & Klavas 1989:56).
- How the learner learns, is important to the educator.
- For an educator to understand the individual differences in learning styles, he or she also has to know what his or her own learning style is. The educator's own predominant learning style will influence the educational process, for example, in the selection and presentation of learning material, and the choice of teaching strategies. Staff development of educators is therefore recommended in the areas of knowledge and understanding of own learning styles as well as the learning styles of others.

- The use of learning style instruments in admission procedures is a first step towards encouraging educators to become more sensitive to learners' individuality. Such a questionnaire may also help educators to identify learning gaps.

- Educators should take a critical look at the ways in which learners have been taught. They should come to understand that there is no single right way to learn or best way to teach.

- Educators should find ways to enhance their sensitivity to individual learning styles and to consider how best these can be addressed by compiling flexible learning material and by the deployment of a variety of teaching strategies. Provision should be made in the didactic design of curricula to accommodate the diverse learning styles of individuals.

The shift during the past five years towards an educational paradigm that is more open and flexible (South Africa 1997a; South Africa 1997b; South Africa 2000; South Africa 2001) is paving the way for a more accountable educational philosophy in higher education institutions. With the emphasis on flexibility, new demands are placed on learners' appreciation of reality, their knowledge accessing modes and expected measures of accountability. This shift also implies a flexibility in terms of thinking. Learners have to be supported, educated, and given the opportunity to match their thinking to the complexity of the learning task or process. Furthermore, there is an increasing commitment to accountability with regard to the success of higher education programmes, including health sciences education programmes (Warrener 1998:24). Learning style analysis contributes to higher education in that it develops learners' awareness of their own learning styles, permits some flexibility in instructional procedures, and gradually improves resources for different learners. Learners will benefit by utilising an instrument to identify learner-specific criteria. Learner-specific education is the individual's awareness of unique learning styles and needs. Learning style awareness is therefore necessary to prepare a systematic, tailored, education plan that best addresses the individual's needs.

1.3   STATEMENT OF THE RESEARCH PROBLEM

For effective learning to take place, active learner participation in the learning process is necessary, and only then can the desired outcome be reached. Learning is defined by Kolb (1984:38) as a "process whereby knowledge is created through the transformation of experience". He emphasises learning as being a combination of experience, perception, cognition and behaviour. He rejects the notion that learning should be defined on the basis of outcomes alone. For a learner to actively participate in the learning process, the learner must know how to learn, and how to function as an

independent, autonomous learner. To reach these goals, sound knowledge of individual differences in learners is necessary.

Higher education must provide for diversity in individual learning styles by meeting the needs of a wider range of learners with diverse learning styles. In order to accommodate individual differences and to establish an awareness of learning as an individual process, educators as well as learners must plan and organise a learning environment that will eventually enhance the learning experience. The learning environment should encourage participation and promote self-reliance on the part of the learner.

The aim of higher education should be to provide a learning environment that will give learners the opportunity to experience a variety of learning styles. This aim leads to learning style promotion in higher education. In such an educational environment learners would have various options regarding how they approach and process the learning material.

This research focuses on individual differences among learners as expressed in learning styles and on how they can be accommodated in the learning process and learning environment, and more specifically promoted in higher education. The researcher is guided by the following questions:

- What is the educational importance of learning styles?
- How can learners and educators be made aware of their individual learning styles?
- How can different learning styles be promoted in the learning process and learning environment of higher education?

1.4 AIM OF THE RESEARCH

The aim of the research is to present an analysis and exploration of the concept *learning style*, and to develop a learning style instrument and a conceptual model that address the implications of the concept in higher education. The aim of exploring the concept is to encourage educators as well as learners to identify their learning styles before entering the learning environment. The construction of a learning style instrument addresses the specific linguistic needs of a diverse learner population in that it is written in clear language and contains understandable items to ensure that someone who has to complete the instrument in a language other than his or her first language will be able to do so.

The use of learning style instruments in admission procedures for new learners will help to identify their specific strengths as well as learning gaps, in that learning characteristics and preferences are identified. For the educator this can have the advantage of revealing his or her own learning style. The aim of the conceptual model is to provide an organised frame of reference that not only guides all other aspects of the learning process but provides for systematic teaching as well. The model utilises three components, namely the learner, the context and the concept. For the purpose of this research the learner is the adult learner; the context is a place of higher education (wherever the model is applied) and the concept is the knowledge base of learning styles. The conceptual model accommodates individual differences within the learning process in any learning environment for higher education. When explanations are applied to the practical field of higher education, some explanations are given within the context of health sciences education (which is a part of the higher education system). For this aim to be realised, it is important that educators should be willing to change their thinking and methods within the educational process. By constructing a learning style instrument for self-assessment and a conceptual model, educators are granted the opportunity and support to contribute to learning style promotion in higher education.

The objectives of the research are to:

- analyse the concept *learning style*
- explore the literature (through theoretical analysis) regarding models that promote individual differences expressed in learning styles
- analyse the practice of higher education in order to indicate whether the acknowledgement of individual learning styles is required
- construct a learning style instrument which is used and analysed by the learner and educator
- construct a conceptual model which promotes individuality expressed in learning styles in adult learners
- present the new learning style instrument and conceptual model for evaluation by experts

1.5   SIGNIFICANCE OF THE RESEARCH

Contemporary trends in higher education and course design towards the accommodation of diverse and heterogeneous individual learning styles justify this research. The implementation of innovative educational approaches should lead to insight into why some learners are more successful with a

particular teaching method or set of materials than others with essentially similar characteristics. By fostering the individuality of adult learners, a learning environment should be created where a learner can become a self-actualised, mature, effective and independent learner. Knowledge of personal dominant characteristics can make the educator more aware of natural tendencies and suggest other educational approaches that could be added.

If learning styles are routinely assessed when learners enrol for a course or educational programme, they could be encouraged to select those learning activities that are most consistent with their dominant learning preferences and characteristics and develop the less dominant learning characteristics and preferences so that eventually they reach a level of optimal learning.

It is believed that this research provides knowledge that leads towards a deeper understanding of learning style individuality among both learners and educators. It can serve as a support to educators to become successful facilitators of the learning process and innovative educational practitioners. By exploring the implications of learning styles for higher education, researchers can stimulate and create an awareness and application of a flexible and innovative higher education learning environment.

1.6   ASSUMPTIONS

An assumption is a proposition used as a premise in a logical argument (McLeod 1986a:46). Research assumptions refer to basic principles that are assumed to be true without verification or proof and that form the cornerstone of scientific research. They are accepted as a necessary starting point for research (Neuman 2000:44; Polit & Hungler 1995:431). All concepts contain assumptions, namely statements about the nature of things that are not necessarily observable or testable (Neuman 2000:44). Therefore, identifying assumptions on which a concept is based, deepens one's understanding of that concept.

Certain assumptions are made in order to deepen the understanding of the concept *learning style* and the implications it has for higher education. The following assumptions serve as basic underlying truths from which the theoretical reasoning proceeds:

- Educational programmes do not specifically accommodate different learning styles.

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- Learning styles are largely determined by inherited characteristics, but are also influenced by the way a person is socialised in the home, community and at work.

- The adoption of teaching methods and styles to accommodate learners' learning styles improves learner satisfaction and motivation to learn.

1.7 THEORETICAL FRAMEWORK

A theory is an abstract generalisation that presents a systematic explanation of relationships between phenomena. It includes principles for explaining, predicting and controlling phenomena (Neuman 2000:59; Streubert & Carpenter 1999:8). A theory can also be defined as a systematic abstraction of reality that is deliberately designed and created for a specific purpose (Chinn & Kramer 1995:20). A theoretical framework (also called a conceptual framework, model or paradigm) provides collections of assumptions, concepts, and forms of explanation. The purpose of an existing model to describe the concept *learning style* is to organise learning styles in a systematic pattern to represent the perceptual experiences of individual properties, and to make the concept more meaningful.

The Kolb model of experiential learning (1984) provides a perspective on learning that extends beyond the lecture room and integrates broadly based ideas about development as a learner. The model is particularly useful in explaining individual differences in learning (Brudenell & Carpenter 1990:81). The challenge to educators is to utilise teaching methodologies that allow each learner to be successful in learning. This research aims to assist educators and learners to meet this challenge.

The researcher has a long-standing involvement with the Kolb model of experiential learning as a previous research was undertaken where this model was used (Van Rensburg 1995). This model was once again selected as the theoretical framework to describe learning styles, because the model provides a perspective that extends beyond the classroom. It can be applied to all higher education learning environments as well as in the professional field or practical setting. It has also been used extensively in research in all the health sciences professions (Kolb 1984).

1.8 ETHICAL CONSIDERATIONS

Ethics is a set of moral principles which refers to the quality of research procedures with regard to

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their adherence to professional, legal and social obligations to the research subjects (Strydom 1998:24; Polit & Hungler 1995:353). Babbie and Mouton (2001:528) emphasise the importance of the management of these ethical principles which describe acceptable and unacceptable behaviour in research. Researcher integrity is of great importance in qualitative research, the research approach used in this research (Streubert & Carpenter 1999:37).

The procedures followed in this research adhere to all the ethical requirements that are necessary to ensure ethical responsibility. Ethically guided decision making serves as the standard and the basis for this research. The research is aimed at contributing to the body of knowledge on higher education and is therefore financially justifiable.

To ensure that the research meets the ethical requirements, the following ethical principles are adhered to:

- conducting the research competently within recognised parameters as the researcher is an experienced researcher
- consulting experts in the field of research to ensure a scientific research process
- using both recent and classical sources to analyse and describe the phenomena
- consulting as many as possible primary sources
- referring to the sources used where necessary
- obtaining appropriate approval from host institutions that are involved in the qualitative evaluation of the instrument that is developed (where learners are involved)
- entering into an informed agreement with participants used in the qualitative evaluation of the instrument and the conceptual model
- assuring anonymity where possible
- assuring confidentiality if anonymity is not possible
- ensuring that no physical, emotional or social harm is done to participants
- informing participants of further use of the personally identified data during the evaluation of the instrument through the inclusion of an explanation of the learning characteristics and preferences of their identified learning styles
- not interfering with, manipulating or fabricating any data to suit the researcher
- providing an opportunity for obtaining appropriate information about the nature, results and

conclusions of the research by the reporting of the research process and findings in the form of a thesis

1.9   RESEARCH DESIGN AND METHOD

A qualitative research approach is used to determine the nature of the phenomena under study by using a multi-perspective approach that aims to analyse and describe phenomena and explore their meanings. A descriptive analytical study of the literature (theoretical analysis) is carried out because it is considered an essential exercise in order to come to a proper understanding of the phenomena under study. Multiple referents are used to draw conclusions about what constitutes the true nature (meaning and explanation) of the phenomena under study. The research is a non-empirical study aimed at constructing a learning style instrument and a conceptual model to assess and explain the phenomena of interest.

The research is done in four phases. To achieve the objectives the researcher does a theoretical analysis and exploration to gain insight into the concept under study (phase 1). A learning style instrument is constructed through a process of adaptation and development (phase 2). The next phase of the research is the construction of a conceptual model (phase 3). The final phase (phase 4) entails the evaluation of the new learning style instrument and the conceptual model in order to refine both. The instrument and the model are evaluated concurrently.

1.10   DEFINITIONS AND DESCRIPTION OF TERMINOLOGY

The following explanations of concepts are provided to clarify the terminology used in this research.

1.10.1 Learning style

A learning style is the way in which an individual perceives or observes information and previous experiences, and processes and organises it to gain meaning (Van Rensburg 1995:17). It reflects the unique way each individual gathers and processes information.

1.10.2 Learner

A learner is any person, ranging from early childhood development to the adult education phases, who is involved in any kind of formal or non-formal education and training activity. This term replaces the terms "pupil" and "student" (Mothata 2000:94). A student is a person pursuing a diploma or degree course at an institution of higher learning and this term is often used interchangeably with learner (Mothata 2000:166).

Not all adults entering the educational setting are pursuing a diploma or degree. When an adult enters the educational setting, an additional role of learner is added to other full-time, multiple roles of adulthood, such as employer, worker or employee, spouse, or parent. Although their involvement in education may not be a direct extension of those roles, the multiple-role involvement of adults is a significant aspect in any adult educational setting (Gravett 2001:6).

The term "student" is thus not completely inclusive of all adult learners, and therefore the term "learner" is used in this research when referring to an adult learner.

1.10.3 Education

Education is the act or process of imparting knowledge to an individual. It is the theory of teaching and learning, which entails a particular kind of instruction or training (Gravett 2001:ix; McLeod 1986a:270). Education is also described as a process where an individual becomes capable of responding to or benefiting from a given educational programme (Mothata 2000:53). Education is the development of the mind, including theoretical understanding as well as the systematic development of skills required by an individual to reach a particular level of competency or operative efficiency. The term "education" includes teaching, training, instruction and the facilitation of learning. Teaching in the context of higher education is more than merely classroom teaching, and means to promote, assist and advance learning. Training refers to the systematic development of skill patterns. Instruction is a process or act of conveying knowledge. Facilitation of learning includes meanings such as promote, make easier, assist, advance and enable. All these terms are part of the higher education process.

1.10.4 Educator

An educator is any person who teaches, educates, facilitates the process of learning, or trains or instructs other people at an educational institution. The term means more than being a teacher (a person who actually teaches at classroom or clinical level). An educator is a person who may not be directly teaching in a classroom but rather holding office at a higher level which includes conducting research. The educator also fulfils the role of facilitator (a person who assists and guides in taking the knowledge and learning forward without being directly involved in the learning process).

1.10.5 Higher education

Higher education is education leading to qualifications higher than that of a 12-year school programme or its equivalent, provided (on full-time, part-time and/or distance basis) by higher education institutions (usually universities, technikons or colleges) which are established, declared, accredited or registered as a higher education institution in terms of legislation.

In South Africa, higher education is explained as "all learning programmes leading to qualifications higher than grade 12 or its equivalent in terms of the National Qualifications Framework as contemplated in the South African Qualifications Authority Act, 1995 (Act No.58 of 1995), and includes tertiary education as contemplated in Schedule 4 of the Constitution" (South Africa 1997b:section 1).

The purpose of higher education includes to:

• 	inspire and enable individuals to develop their capabilities, so that they can grow intellectually, are well equipped for a profession or work, can contribute effectively to society and achieve personal fulfilment

• 	increase knowledge and understanding for their own sake as well as the application thereof to the benefit of a profession and society

• 	serve the needs of an adaptable, sustainable, and knowledge-based profession and the economy at local, regional and national levels

• 	play a major role in shaping an individual to become part of a society (Wallace 1999:153)

Higher education must create a learning environment that affords opportunities to advance, develop and enrich individuals, both intellectually and in society (South Africa 2001). The emphasis is on learning rather than teaching (learner-centred approach) and on outcomes (what the learner becomes and understands).

1.10.6 Health sciences education

Health sciences education refers to the education of individuals to prepare them as practitioners for the field of health sciences. This education takes place in the context of higher education. The prime aim of professional education is to produce competent and confident practitioners, able to take responsibility for their own personal and professional actions and development (Phillips 1994:217). As in other professions, learners in the field of health sciences education are being prepared to function independently.

Health sciences education is rendered at a university, technikon or college, which are all classified as higher education institutions. These institutions all provide education that falls within the provisions of the Higher Education Act (South Africa 1997b).

1.10.7 Model

A model is the way in which a researcher or scientist views and presents his or her material within a particular paradigm (De Vos, Schurink & Strydom 1998:12). It describes a concept, structure or process, but is not a fixed, unadaptable structure. It has flexibility and adaptability in describing and representing a concept or system and the interrelationship between variables (Joyce, Weil & Showers 1992:391).

A conceptual model is thus a presentation of a concept, structure or process that can be applied to a context for which it has been developed, in this case the higher educational environment or setting.

1.10.8 The Kolb model of experiential learning

The Kolb model of experiential learning is a four-stage cycle involving four modes of learning on two bipolar dimensions. The cycle requires four different kinds of learning abilities which are concrete

experience, reflective observation, abstract conceptualisation and active experimentation. Abstract conceptualisation is the polar opposite of concrete experience and active experimentation is the polar opposite of reflective observation (Kolb 1984:40-41). A detailed discussion is given in chapter 3, section 3.5.2.1.

1.10.9 Teaching style

Teaching style refers to the teacher's or educator's consistent personal approach to teaching, irrespective of the media or method used (Lemmer & Squelch 1993:62).

1.10.10 Instructional mode

An instructional mode refers to a process, act or way of imparting knowledge, through education. The instructional mode entails careful planning and organising of a set of actions or methods which are intended to attain certain educational goals and desired outcomes. The implementation of an instructional mode involves art and skill on the part of the educator. The term "instructional mode" includes teaching method (such as distance teaching or classroom teaching) and teaching strategies (such as lecture or role play) (Claxton & Murrell 1987:46; Schott 1994:38).

For the purpose of this research, instructional mode thus refers to the endeavours for learning in the planned setting/context of higher education with the intention that a learner will reach a certain educational goal.

1.10.11 Learning style instrument

A learning style instrument refers to a measuring instrument that assesses individual learning styles. The word "instrument" is regarded as synonymous with inventory, questionnaire, delineator, indicator, and tool, when used in the context of measuring learning styles.

1.11   OUTLINE OF THE THESIS

The thesis, including this chapter, is structured as follows:

Chapter 1:   Introduction and orientation to the research

Chapter 2:   Research design and methodology

Chapter 3:   Learning style theories

Chapter 4:   Learning in higher education

Chapter 5:   Educational importance of learning styles

Chapter 6:   Construction of an instrument for learning style assessment

Chapter 7:   A conceptual model for learning style promotion in higher education

Chapter 8:   Evaluation of the learning style instrument and the conceptual model

Chapter 9:   Summary of findings, conclusions, limitations, implications and recommendations

1.12   CONCLUSION

Educators are still overwhelmed with and confused by the complexity of their learners when it comes to individual differences expressed in learning styles. In order to change higher education to a learner-centred approach and to enhance lifelong learning, the learning environment must create the opportunity to equip learners to develop as individual learners, which will eventually position them as successful employees in a profession. By acknowledging individual differences, the learning process becomes an individualised process that accommodates different learning styles.

In this chapter an introduction and orientation to the research was given, in which the background to the research, problem statement, aim of the research, significance and assumptions, were explained. The theoretical framework, ethical considerations and an overview of the research design and method were given. Lastly, definitions and a description of terminology used in this research as well as an outline of the thesis were included.

The following chapter focuses on the research methodology, explained according to the phases in which it took place.

CHAPTER 2

RESEARCH DESIGN AND METHODOLOGY

2.1 INTRODUCTION

Chapter 1 provided an introduction and orientation to the research on the implications of learning styles in higher education. The background to the problem was outlined and the aim and significance of the research were explained. An overview of the research problem, a theoretical framework for the research, and an introduction to the research methodology were given. The terminology used was defined and described. Lastly, an outline of how the thesis is structured was given.

In chapter 2 the methodological dimension of the research is discussed, in other words how the research was planned, structured and executed. The research methodology used in this research is explained in order to clarify the way in which the aim and objectives, stated in the introductory chapter, were achieved.

2.2 RESEARCH DESIGN

The research design is the plan of procedures for data collection and analysis that are undertaken to evaluate the particular theoretical perspective (Guy, Edgley, Arafat & Allen 1987:92). A research design therefore refers to the type of research that is to be done.

A qualitative research approach is used to determine the nature of the phenomena under study by using a multi-perspective approach that aims to analyse and describe phenomena and explore their meanings. It entails more than a set of data-gathering methods. Qualitative research is a way of approaching phenomena through understanding rather than explanation, naturalistic observation rather than controlled measurement, and an exploration of reality from an emic perspective of enquiry (Schurink 1998a:243; Tesch 1990:4). Significant characteristics of qualitative research also include a belief in multiple realities and a commitment to others' viewpoint (Streubert & Carpenter 1999:15). These viewpoints help to shape the final analysis and description (Sapsford & Abbott 1992:119).

In qualitative research certain commitments are implied, such as a sensitivity to the phenomena being studied. Theoretical sensitivity refers to a personal quality within the researcher that indicates awareness of the subtleness of meanings of data, understanding and the ability to separate the relevant from the irrelevant. Such understanding emanates from a study of the literature, and professional and personal experience. The literature includes readings on theories, research articles and policy documents, which forms a rich background of information that sensitises the researcher to the nature of the phenomena under study. Professional experience is gained throughout a long-standing involvement though practice in a field, and during professional activities. Personal experience is gained by having gone through a certain experience (De Vos & Van Zyl 1998:268-269). Theoretical sensitivity is applied to gain insight into and give meaning to data, and is used in conceptual rather than concrete terms. The research is based on an existing sensitivity to the concept *learning style* that emanates from a long-standing involvement with this concept, gaining experiences through all three of the routes mentioned above. Knowledge through literature was gained in previous research and the current research, as well as from reading out of interest; professional experience was gained through years of experience as an educator in higher education; and personal experience was gained through being a learner in higher education for many years.

Non-empirical research was conducted, aimed at developing an instrument and a conceptual model to explain the phenomena related to learning styles. Mouton (2001:144) describes conceptual studies, philosophical analyses, as well as theory and model building as non-empirical research. The research questions for non-empirical research include questions of meaning and explanation, of theoretical linkages and coherence between theoretical propositions, questions related to the explanatory and predictive potential or conceptual models. The typical use of this design is in theoretical and conceptual studies aimed at developing new models and theories or refining existing ones. The mode of reasoning is through inductive and deductive strategies. The purpose of theoretical inquiry or analysis into learning styles is to critique learning style theories and research, and construct a learning style instrument by means of which the essential nature and structure of individual differences within the learning process can be made distinct and applicable to higher education by using a conceptual model. The strengths of model-building research include the importance of this kind of research in scientific progress through the explanation of phenomena. Predictions can be made under certain conditions, bringing conceptual coherence to the domain of science, and simplifying the understanding and meaning of phenomena. Claims that are not verifiable, vague, conceptually incoherent, inconsistent or confusing, may be a limitation in non-empirical

research. Sources of error in model-building include association with very abstract formulations that are too far from reality so that no empirical validation is possible (Mouton 2001:176-177). Learning styles are a reality and can be identified or determined by using a learning style instrument.

Although this was a qualitative research, a quantitative method was used during the evaluation of the learning style instrument. The Cronbach's Alpha coefficient was applied to support the reliability of the items used in the new learning style instrument.

Supporting the validity of qualitative research approaches is concerned with analytical rather than detailed induction, and inferences are made to demonstrate theoretical principles rather than to make generalisations about a total population. In turn, the validity of the analysis depends on an appropriate theoretical framework (Cayne 1997:23). Scientific validity was obtained through systematic collection and interpretation of data, and not by generalising findings. Learning styles, adult learning and the educational process all have the same underlying principles, which are included in the Kolb model of experiential learning (Kolb1984).

2.3   RESEARCH METHODOLOGY

Research methodology refers to the logical process which is followed during the application of scientific methods and techniques during the investigation of particular phenomena, in other words the theory of correct scientific decisions and how the research was structured (Babbie & Mouton 2001:75; Mouton & Marais 1994:16).

This section deals with a discussion of the research methodology, research context, sampling, and data collection and data analysis. Although Mouton (2001:146) states that it is not appropriate to discuss sampling, data collection and data analysis in non-empirical designs, these steps are explained for purposes of clarification. The logical process used in this research contained four phases that are depicted in figure 2.1. The first three phases did not occur separately, but were in fact interrelated, in other words dynamic. The fourth phase took place after the first three phases and encompassed the evaluation of the new learning style instrument and the conceptual model, after which both the instrument and the model were finalised.

Phase 1

✦ Analysis of concepts

✦ Exploration of conceptual models

✦ Analysis of the learning and educational environment

Phase 2

✦ Analysis of learning style instruments

✦ Construction of learning style instrument

Phase 4

✦ Evaluation of instrument

✦ Evaluation of model

Phase 3

✦ Construction of conceptual model

QUALITATIVE RESEARCH

Non-empirical study
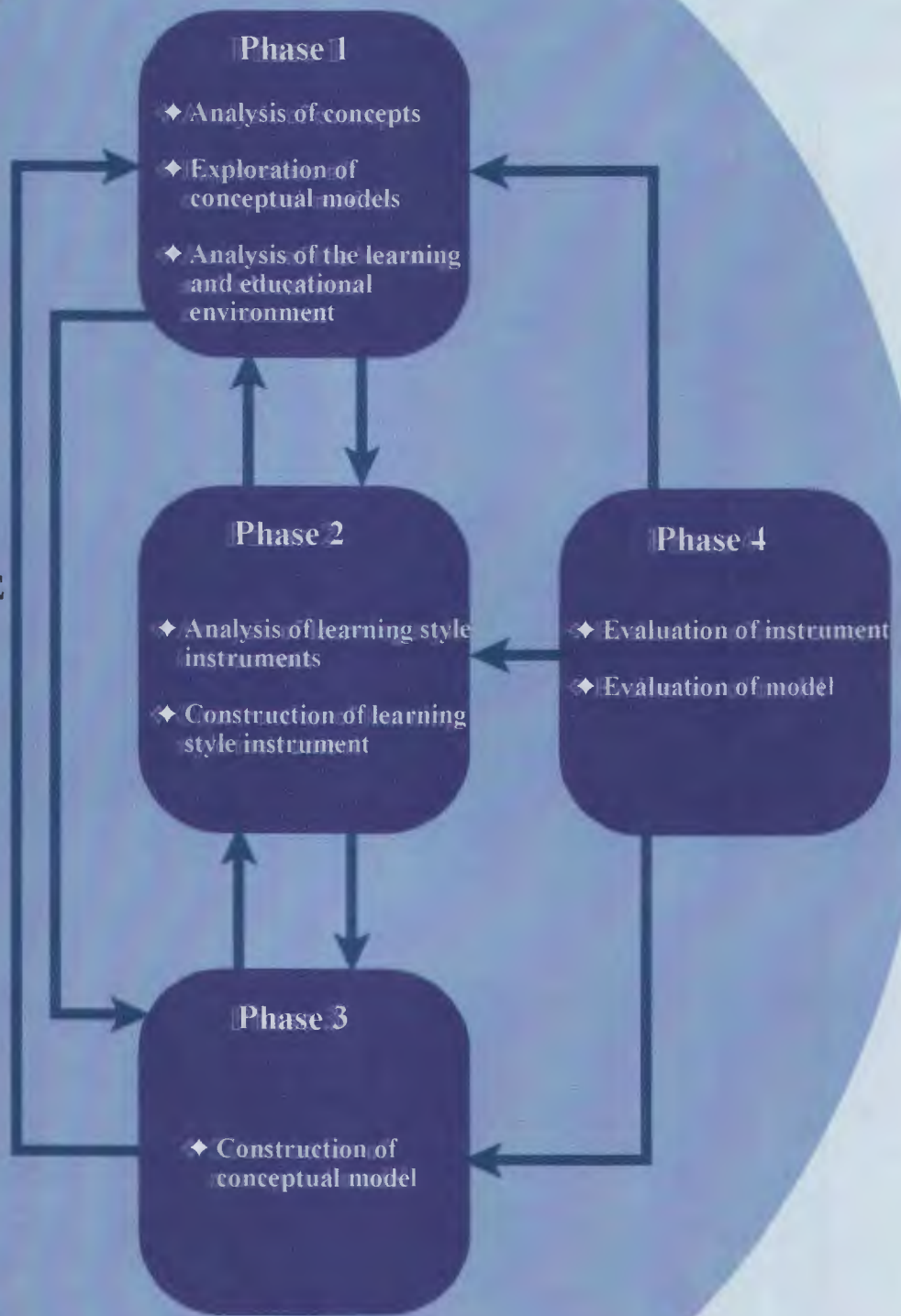
Figure 2.1
Phases of the research process

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A theoretical analysis was done because it is an essential exercise in order to come to a proper understanding of the phenomena related to learning styles. Multiple referents were used to draw conclusions about what constitutes the true nature (meaning and explanation) of the phenomena under study, after which the instrument and model were constructed. The process addressed the following:

- an analysis of the concept *learning style*

- the exploration of the literature regarding models that promote individual differences expressed in learning styles

- linkages and coherence between theoretical propositions of learning styles in the educational environment through an analysis of the practice of higher education

- analysis of existing learning style instruments

- the construction of a learning style instrument for both learners and educators to sensitise them to the existence of individual differences

- the construction of a conceptual model that promotes individual differences expressed in learning styles

- the evaluation of the new learning style instrument and conceptual model by experts

An elaboration of the four phases followed in this research, to attain the overall aim of the research, namely to recognise and promote learning styles in higher education, is given in the next section. There was a constant movement between the first three phases.

2.3.1   Phase 1

In phase 1 an analysis of the meaning of concepts was done through the clarification of the meaning of these words, concepts and phenomena as related to learning styles, by clarification and elaboration of the different dimensions of meaning. The meaning of the concepts and linkages was explored through classification and categorisation of these concepts. The process of arriving at a classification and categorisation is conceptualisation and the result is called a concept. Conceptualisation was done through exploration.

Concepts are described as a complex mental formulation of experience, both concrete and abstract (Chinn & Kramer 1995:58). A concept can also be described as an idea expressed as a symbol or in

words (Neuman 2000:42). Concepts are explored to link theories with research. Accordingly, an important aspect of this research was to clarify and refine concepts (such as learning styles, learning, educational environment), within the overall aim of this research.

A conceptual model contains many concepts, their definitions and assumptions. More specifically, a model depicts how concepts relate to one another and explains why the relationship or linkages exist. Furthermore, a model makes propositions, which are theoretical statements that specify the linkage between two or more variables. A conceptual model thus contains concepts, relationships between concepts (phenomena), and reasons for the relationships. A process of development of conceptual meanings is necessary in order to develop a conceptual model.

2.3.1.1 Method

A systematic method of exploration of the concepts and phenomena under study was followed by using both inductive and deductive reasoning. Both reasoning strategies were important in this research to discover and develop knowledge. Inductive reasoning was used to explore concepts and identify relationships. Deductive reasoning was used to support the findings of the analysis. The purpose of this theoretical inquiry was to make the concepts, phenomena and the processes involved clear. The literature and the researcher's existing sensitivity to the concept *learning style*, were used as sources.

The purpose of this phase was to do an analysis of the concept, to explore the literature regarding models that promote individual differences expressed in learning styles, and to form linkages and coherence between theoretical propositions of learning styles in the educational environment through an analysis of the practice of higher education.

2.3.1.2 Sampling

In qualitative research sampling is undertaken to include those sources of information that have relevance to the research topic rather than simply those that are representative (Neuman 2000:196).

For the first phase of the research theoretical sampling was used to systematically collect and analyse data. Schurink (1998b:254) describes theoretical sampling as the process by which the researcher

jointly collects, records, codes and analyses data and constantly decides what data should be collected and where the data should be collected until theoretical saturation is reached. Streubert and Carpenter (1999:22) describe theoretical sampling as a type of purposive sampling where the researcher is concerned with the proven theoretical relevance of data. Theoretical sampling was therefore done on the basis of concepts that have proven theoretical relevance to the evolving conceptual model.

A systematic process of data collection and analysis was followed until no new or relevant information emerged from the literature. The sampling was aimed at the specific concepts of interest until no new data were obtained that could contribute to the construction of the learning style instrument and the conceptual model, and the data were well established and validated.

2.3.1.3 Data collection and analysis

During phase 1, the source of the data was the literature. The literature was explored and analysed to collect data. Data collection and analysis were carried out concurrently. Interpretive analysis of the phenomenon of individual differences in the learning process was done in order to understand and interpret the meanings and relationships that underlie these human actions. It must be noted that the research was not aimed at explaining human behaviour in terms of universally valid laws or generalisations. Streubert and Carpenter (1999:54) explain the interpretive process as a series of analytical steps, whereby the researcher first becomes familiar with the text, then formulates thoughts about its meaning for further analysis, where after a structural analysis follows. Patterns of meaningful connections are then identified, and this is followed by interpretation of the interrelationships as a whole.

A wealth of literature was studied to collect data. Sources included primary and secondary sources such as research reports, journal articles, theses and dissertations as well as books on the various relevant phenomena. Where possible recent sources were used but classical sources were also included. Although it is important that a literature review should be topical and not dated, classical sources and seminal studies are accepted in human science disciplines (Mouton 2001:91). In this research classical sources and both recent and less recent research reports were included. as the concept (learning style) is not a general topic for research. Learning styles have received less attention than they merit. The concept is often discussed together with more popular concepts such

as intelligence and memory. Serious research on the topic is still lacking. Many of the literature sources are less recent sources, and are often limited to explanations of how learning styles are determined and do not necessarily deal with the application of the results in higher education. Sternberg (1997:156) maintains that "serious talk" about learning styles is a relatively recent development and that there has not yet been enough time for the area to develop as fully as it should have. Hence, the reason for inclusion of less recent sources of research on this concept and the application thereof in higher education. An ongoing electronic search of national and international sources was done to identify more recent sources.

Data were collected in a naturalistic way, where naturalistic inquiry presumes a heavy reliance on human beings as the instrument (Lincoln & Guba 1985:250). The researcher was the major data collection instrument and was fully committed to becoming thoroughly acquainted with the field of study.

Data were analysed through intellectual analysis by the researcher becoming deeply immersed in the data. An approach of full commitment to understanding what the data were saying was used, which required a significant dedication to reading, intuiting, analysing, synthesising, and reporting the findings.

In qualitative research the changing and developing interaction between the researcher and what is studied is important. This relationship between researcher and data is a growing, evolving process. Although the researcher has a longstanding relationship with the concept under study, interaction with other researchers was of the utmost importance. In order to ensure that the data collection and analysis were consistent, constant member checks were done to ensure that the interpretation of data reflected the true measures of the relevant phenomena. Data were presented to expert researchers who were appointed as promoters of this research, as well as to critical readers.

2.3.2   Phase 2

In order to achieve the overall aim of learning style promotion in higher education, some form of assessment of learning styles must exist. Assessment can only be done by using an instrument for measurement. Using existing instruments has certain advantages, the obvious benefits being financial reasons and time-saving. As instruments, such as learning style instruments, are regarded as being

sophisticated, development of a valid and reliable instrument is difficult.

The need for a new learning style instrument became clear during the long-standing involvement with the concept under study. No instrument that is valid, reliable, convenient, and specifically designed to meet the needs of a diverse learner population was available. A need to find an instrument that could be adapted to construct a new learning style instrument was identified.

2.3.2.1 Method

The first step was to do a theoretical analysis of existing instruments to determine their uses, strengths, weaknesses, applicability, validity, and reliability. Specific needs, especially linguistic needs and methods of assessment, were identified in an attempt to find a suitable instrument to adapt, change or use for the purpose of this research. The linguistic specifications include the level of difficulty of the language used in items, as well as the meaning and understanding of words, phrases and sentences used. During the analysis of instruments, aspects such as applicability to the research context (higher education) and length of an instrument were also important. Not all existing instruments are readily available as copyright often prohibits one from using them without permission and the rates of payment are often high.

The process of analysis of existing instruments was used to explore the possibility of adapting, changing or using the instrument as is. The research context and the specific characteristics of a diverse population that would use the instrument were important guidelines.

2.3.2.2 Sampling

During this phase the researcher also made use of theoretical sampling to systematically collect and analyse data on existing learning style instruments (see section 2.3.1.2). Primary sources on the instruments and the instruments themselves were not readily accessible and the researcher had to rely on secondary sources in some instances. The researcher was limited by aspects such as accessibility of data sources because not all sources are computerised or catalogued. Access to data is sometimes controlled by copyright because of proprietary, secrecy or competitive considerations.

2.3.2.3 Data collection and analysis

A number of existing learning style instruments were analysed, in order to determine the necessity of a new learning style instrument. This process included an analysis of an instrument used in a previous research. During the thorough analysis of existing instruments, the appropriateness of each instrument was considered. The terms and concepts used in the instruments had to comply with the specific needs of a learning style instrument, as identified by the researcher. The instrument had to address diverse linguistic characteristics, which meant that it had to be written in understandable language. Another specification for the instrument was that it should be a self-assessment instrument, which empowers the user to personally identify his or her learning style.

Psychometric characteristics such as validity and reliability of the instruments were also important. Validity and reliability are central issues in all measurement. Both concern how concrete measures are related to concepts. In this research validity and reliability are both salient because the concepts in the instruments are often not directly observable. Although complete validity and reliability are not possible, the researcher strove to achieve optimum results.

• **Validity** suggests truthfulness and refers to how a researcher conceptualises an idea and a measure (Neuman 2000:164). It is the extent to which an empirical measure (instrument) adequately reflects the real meaning of the concept under study (Babbie & Mouton 2001:122).

Face validity refers to how others judge and agree on the meaning concerning a particular concept (Neuman 2000:168). De Vos and Fouche (1998:84) claim that face validity is not technically a form of validation, since it does not refer to what an instrument actually measures, but rather to what it appears to measure. However, face validity is an important criterion as it may cause resistance on the part of the users of an instrument, which may in turn adversely affect the results obtained. Therefore, it is important that an instrument appears to be relevant to the concepts it measures.

Criterion-related validity refers to the approach in which a relationship between the results of the instrument and other external variables are determined. The main purpose of this type of validity is not to determine how well the instrument is measuring a concept but whether

it corresponds to results on the other external variables (Polit & Hungler 1995:250).

Construct validity determines the degree to which an instrument successfully measures the concept of interest. This type of validity is concerned with the meaning of the instrument, what it is measuring, and how and why it measures the way it does (De Vos & Fouche 1998:85). It is concerned with the logical relationship between variables (Babbie & Mouton 2001:123). In construct validity the validity of the instrument is not the only issue but the underlying theory is also important. The meaning of the concepts and the propositions that the underlying theory makes about the relationships between them and other concepts must be clear.

Content validity refers to how representative the content is of the concept (De Vos & Fouche 1998:84). To determine content validity it must be established whether the instrument really measured the concept it was meant to do. Content validity captures the entire meaning of a concept (Neuman 2000:167). Determining this type of validity is often a judgmental process where the researcher relies on the judgement of others (often experts) to establish its content validity.

To determine the validity of existing instruments, the following question was asked: "Does the instrument really measure what it claims to measure?" In this instance it was important that the instrument really measured learning styles in the context of higher education.

- **Reliability** refers to the dependability or consistency of an instrument (Neuman 2000:164). It refers to the consistency with which the instrument measures certain attributes (concepts or characteristics), and suggests that the same results recur under identical or very similar conditions. Instruments that are reliable measure the concepts or attributes of interest in a consistent manner. Therefore, an instrument is reliable to the extent that it provides consistent measures across subjects and is stable over time.

To determine whether a minimal level of reliability is constituted in an instrument, one has to be assured that the same results/findings will be obtained each time the instrument is used.

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Stability reliability refers to reliability across time. It addresses the question of whether the same answers will be delivered when the instrument is applied in different time periods. The test-retest method can be applied to determine this type of reliability, in other words the same results should be obtained each time (Neuman 2000:164).

Representative reliability is reliability across groups of people. It addresses the question of whether the same answers will be delivered when the instrument is applied to different groups (Neuman 2000:165). High representative reliability exists if an instrument delivers the same results for a concept when applied to groups that differ in age, gender, culture, first language and living area.

Equivalence reliability applies when multiple indicators are used to measure a concept (Neuman 2000:165). This type of reliability addresses the question of whether the same consistent results will be delivered when answering several items in the instrument that all measure the same concept. A special type of equivalence reliability, intercoder reliability, arises when there are several observers, raters, or coders of information. All these observers, raters or coders must agree with each other to ensure intercoder reliability.

After the process of analysing existing learning style instruments, a new instrument was constructed by adapting existing instruments and developing a new instrument. Adaptations were made where problems were identified with the validity and reliability of the instruments. Adaptation means the process of producing something that is changed or modified to suit new conditions or a different purpose (McLeod 1986a:9). A new self-assessment instrument, the *Learning Style Assessment Tool*, was developed as part of this research. Development means that a product has grown from a fact or an event, that changes a situation (McLeod 1986a:233). A tool is something used as a means of achieving an end. It is also described as a medium, and addendum or supplement to one's profession (McLeod 1986a:913).

2.3.3 Phase 3

A model provides a structural framework for guiding and developing particular activities and environments (Reigeluth 1983:21). It comprises concepts related to one another to form a whole (Chinn & Kramer 1995:219). This whole forms a blueprint that indicates the different ways in which

aspects can be organised to guide activities in a particular environment. A model can be either theoretical and abstract or more practical. Lancy (1993:218) describes a conceptual model for education as a "flow-chart of cognitive processes". Chinn and Kramer (1995:37) describe conceptual models as midrange theories that are developed by using the same processes as in theory development.

Different approaches to the construction of a conceptual model exist. Mouton (2001:177) describes the process of development as a process of inductive and deductive reasoning. Assumptions are first made from an analysis of the literature or field to determine relevant concepts through inductive reasoning. To present the concepts in a graphical or schematic form, a deductive approach is followed.

Chinn and Kramer (1995:91-92) describe a process of structuring and contextualising to develop a theory. These processes bring about systematic linkages between and among concepts, resulting in a structure. The approaches to the processes include the following steps:

- identifying and defining the concepts to clarify the meaning of these important concepts
- identifying assumptions to clarify the basic underlying truths from and within which reasoning flows
- clarifying the context within which the model is placed to enable the application of the model
- compiling relationship statements between and among the concepts of the model

Both these processes suggested by Mouton (2001:177) and Chinn and Kramer (1995:91-92) were considered and applied in constructing the model. The researcher used the following steps:

- formulating theoretical assumptions
- describing the context of the model
- explaining the structure of the model
- defining the concepts, related concepts and their relationships

In phase 3, a conceptual model for the promotion of learning styles in higher education was developed. The aim is to provide educators in higher education with a framework for applying knowledge of the individual differences among learners and themselves to the learning environment.

2.3.4 Phase 4

During the final phase of the research, the new learning style instrument and the model were evaluated. The evaluation took place simultaneously as it could only be done after phase 3, because the first three phases were interrelated and did not take place separately.

The purpose of the evaluation of the learning style instrument was to determine its validity. Reliability of the items used in the instrument was measured applying the Cronbach's Alpha coefficient, but more reliability tests have to be done as it has to take place over a period of time, in more than one research project, and be compared with results of another reliable instrument. The purpose of the evaluation of the model was mainly to determine its significance and value.

Evaluation of an instrument serves the purpose of clarifying the psychometric characteristics (validity and reliability). Validity refers to face, criterion-related, construct and content validity. Reliability refers to stability, representative and equivalence reliability. These aspects were discussed in section 2.3.2.3.

Reigeluth (1983:26) and Chinn and Kramer (1995:135-136) set criteria for the analysis and evaluation of a theory but they are also applicable to evaluating a model. Parse (1987:5-9) identifies criteria for evaluation such as semantic integrity, logic, and practical implication and application.

Criteria for analysis and evaluation are guided by the following questions:

- How clear is the model?
- How understandable is the model?
- How extensive is the model?
- How accessible is the model?
- How important is the model?
- How relevant is the model?

From the above sources, components for the process of analysis and evaluation were compiled, which are the:

- analysis of assumptions
- recognition of concepts
- understanding of relationships between concepts, and between concepts and propositions
- logical congruence
- social consideration (practical implications)
- contribution to the field of higher education

2.3.4.1 Method

The new learning style instrument, known as the *Learning Style Assessment Tool*, was distributed to key participants (learners), and general participants (various categories of experts) for evaluation to enable the researcher to refine and finalise the instrument. Experts included educators in higher education, health sciences education, educational, research and cognitive psychologists, a statistician, and a linguist. In order to empower individuals with knowledge of their individual learning styles and to enable them to use the learning style instrument, an accompanying description of important information on the learning characteristics and preferences of each learning style was included. The instrument was distributed to the participants personally, with an accompanying questionnaire (questionnaire 1 for the key participants and questionnaire 2 for the general participants) that had to be completed. The participants were requested to complete the learning style instrument, analyse it and determine their learning styles. After completion, they had to complete the questionnaire. The learning style instrument is contained in annexure A and the questionnaires are contained in annexure B. Both quantitative and qualitative evaluation were requested in order to get a clear picture of how users experienced the instrument.

The model was distributed to participants who were identified as experts. Experts included educators in the field of higher education and a graphic designer. An accompanying questionnaire (questionnaire 3) included open-ended questions, formulated according to the identified components. The questionnaire is contained in annexure C.

Participants in both the evaluations were given a period of one week to evaluate either the instrument or the model, after which the researcher allowed an opportunity for discussion.

2.3.4.2 Sampling

A purposive sampling technique was used to select the participants. Purposive sampling refers to the sampling method where the researcher purposely selects those participants that are particularly knowledgeable about the relevant phenomena (Streubert & Carpenter 1999:22, 79; Strydom & De Vos 1998:198). The researcher used her own judgment to select the participants who had the most characteristic attributes and represented the different categories as indicated in section 2.3.4.1 to evaluate the instrument and model. Although this is a subjective method of sampling, it was necessary to include both learners and experts to do the evaluation. Participants who were sampled fitted particular criteria, namely:

- learners in higher education (only for the instrument)
- experts in the field of health sciences education who were registered as (nurse) educators with the South African Nursing Council
- health sciences educators who are employed as such in a higher education institution
- educators practising in the field of higher education
- psychologists, either registered as educational, research or cognitive psychologists (including a statistician for the instrument)
- a graphic designer (who had to evaluate the logical and graphic flow of the model)
- a linguist (who had to certify the editing for meaning and language of the instrument)

The reason for including a linguist for the evaluation of the instrument was to ensure that an expert in language determined the validity of the items. The linguist also needed a technical knowledge of the principles involved in developing instruments.

2.3.4.3 Data collection and analysis

Data were collected by using questionnaires with both closed-ended and open-ended questions. Questionnaire 1 was designed for the key participants (learners) and questionnaire 2 was designed for the general participants (experts). These two questionnaires only differed on the biographic data, and were both intended for the purpose of evaluating the learning style instrument. Questionnaire 3 was designed for the evaluation of the model. Biographic data that were gathered gave an indication of the professional status of the experts, and the level of training of the learners. These

data were necessary to ensure that all categories of participants were included. The other questions in the questionnaires contained questions that were specifically asked to address the identified components necessary for the evaluations.

Three questionnaires were distributed, questionnaire 1 and questionnaire 2 for evaluation of the instrument and questionnaire 3 for the evaluation of the model. The completed questionnaires were received by the researcher personally.

Data were analysed both quantitatively (closed-ended questions) and qualitatively (open-ended questions). Quantitative data were presented in tables, with accompanying discussions. Qualitative data were presented in discussions. The results are discussed in chapter 8.

2.4   RESEARCH CONTEXT

In qualitative research the preferred method is to use concepts and understand meanings and events, actions and processes in their context or setting. The context confers meaning on the events concerned, which is necessary to form an understanding (Babbie & Mouton 2001:272). The aim of this research was to analyse, describe and understand the concept of learning style and events within the concrete and natural context of higher education. To clarify the context of higher education within which the concept is described in some instances, the descriptions were applied to health sciences education. The educational approach to health sciences education is in fact a higher education approach. The application was done to enhance understanding and clarity. Although the research was not aimed at generalisation of results, the context can be applied to a specific higher education learning situation, such as that of health sciences education, without generalising to all education.

2.5   ETHICAL CONSIDERATIONS

The ethical responsibilities applicable to this research were explained in chapter 1, section 1.8. Ethically guided decision making served as a standard and basis upon which the research was conducted.

2.6   TRUSTWORTHINESS OF THE RESEARCH

The aim of scientific research is to generate truthful (valid and reliable) explanations, models and theories (Mouton 2001:138). Although research findings are not absolutely true, they must be episteme (truthful knowledge). The researcher must persuade the audience (readers of the report) that the findings are worth paying attention to, and worth taking account of (Lincoln & Guba 1985:290).

Lincoln and Guba (1985:289-331) use a model for assessing qualitative data (Guba's model) which is widely used internationally. The model was developed to demonstrate the trustworthiness of inquiry guided by the naturalistic paradigm and was also used to ensure data quality in this research. It was used in this research because a naturalistic paradigm, where there is heavy reliance on a human instrument, was adopted. The model (Lincoln & Guba 1985:290) consists of four criteria, namely:

- truth value, where the researcher has to establish confidence in the truth of the findings within the context of the research
- applicability, which refers to the extent to which the findings of specific research are applicable to other contexts
- consistency, which determines whether the findings of a particular study would be repeated if the study were to be replicated
- neutrality, where the biases, interests, motivations and perspective of the researcher are excluded

A naturalistic paradigm was followed in this research. The researcher used personal analysis, exploration and interpretation to give meaning to the data. This implied that the researcher had to ensure neutrality in the processes of giving meaning to the data. Truth value had to be increased by presenting the data to experts in the field.

The model identifies terms to describe operational techniques (strategies) supporting their criteria, namely credibility, dependability, confirmability and transferability (Streubert & Carpenter 1999:29).

2.6.1 Credibility

Credibility refers to the activities that increase the probability that credible findings and interpretations will be produced. Credibility can be attained through prolonged engagement with the relevant phenomena (Lincoln & Guba 1985:301).

A long-standing involvement with the phenomena under study included a previous research for a master's degree. Sufficient time was invested in this research as the researcher has read widely on this phenomena for the purpose of this research as well as for personal interest reasons. An acquaintance with the research context as an educator in higher education for various years contributed to credibility. Possible bias was addressed by exploring the literature extensively, using different types of sources. The research was presented to expert researchers (promoters) continuously. Both the instrument and the model were presented to experts for evaluation.

2.6.2 Dependability

Dependability can only be attained once credibility has been established. It does not have to be demonstrated separately. It refers to the way the researcher can adapt to the changing circumstances in the research context (Lincoln & Guba 1985:317).

The research process consisted of different phases. There was a continuous movement between the phases, which indicated the researcher's ability to be flexible. Participants in the fourth phase were selected on the basis of their expert knowledge to gain maximal critique from them. Furthermore, two expert researchers and educators in higher education acted as promoters.

2.6.3 Confirmability

Confirmability refers to the strategy that ensures neutrality. It ensures that the findings are based solely on data analysis of that research and do not come from other biases, motivations and perspectives (Lincoln & Guba 1985:319).

During the three interrelated phases of the research, the researcher constantly checked that the emerging instrument and model were based on the theoretical analysis, findings and conclusions of

CHAPTER 3

LEARNING STYLE THEORIES

3.1   INTRODUCTION

Learning styles refer to individual differences in the learning process. For educators to be able to assist learners to meet accepted criteria for successful academic development, individuality in the learning process, expressed in learning styles, must be accepted. *Learning style* is the fundamental concept in this research.

In the previous chapter, the research process followed in this research was described. The first phase comprised an analysis and exploration of the concept, including an analysis of the learning and educational environment. The following three chapters deal with this part of the process. The aim of this chapter is to arrive at a more thorough understanding of the concept by doing a theoretical analysis. The first step of phase 1 is thus to explore and analyse the concept *learning style*.

Learning styles derive from generalised differences in learning orientations based on different approaches (modes) to the learning process, which are expressed in patterns of behaviour in the learning process. To understand the concept *learning style*, one has to accept individuality within the learning process.

The overall aim of the research was to construct a conceptual model which provides an organised frame of reference for learning style promotion in higher education. A further aim was to encourage both the educator and the learner to identify their learning styles before entering the learning environment. Wicks (1991:9) explains the process of identifying and acknowledging one's learning style as a process of *valuing* individual differences and embracing them as *insight*. To assist educators in developing an understanding of what differences in learning styles entail and to enable them to use this understanding in developing quality education, an analytical discussion of the various learning style theories is provided.

3.2   HISTORICAL DEVELOPMENT

More that 2 500 years ago the idea that people learn differently already existed. It was the practice then to classify people as active or passive, and emotional or thoughtful. The ancient Hindus proposed that people needed four basic ways of practising religion, based on these four elements (Claxton & Murrell 1987:3). This way of thinking shows a clear similarity to modern views. Several strands in the evolution of the study of learning styles were identified as cognitive styles, psychological types, consistent patterns in individuals, and haptic and visual types of individuals. Incongruence between teacher and learner was also identified and formed part of the evolution. (Claxton & Murrell 1987:3). Grasha (1984:46) explains studies of individual differences as an objective contribution to the improvement of the quality of life. Early studies clearly recognised that individual learners have their own preferred learning styles and that educators have some responsibility for gearing up their teaching style to fit the preferred learning styles of the learners. Emphasis must be placed on differences between individual learners as well as between groups of learners.

During the late forties of the twentieth century a movement which was interested in understanding how individuals typically receive and process information commenced systematic research into learning styles. The New Look movement attempted to re-establish a focus on the individual, with specific interest in personal and social factors in perception (Joughin 1992:4). Their idea was that learning styles could provide a bridge between the study of cognition (eg. how one perceives, learns and thinks) and the study of personality (Sternberg 1997:134). The main focus was to understand how individuals typically receive and process information. The basis for many subsequent research projects was formed through these interests.

3.3   ESSENCE OF LEARNING STYLES

The notion of learning styles is a recognition of individuality. Learning, and more specifically adult learning, has a strong tradition of respect for the uniqueness of each learner. Differences between learners in terms of their learning styles are important in the learning process and are therefore of considerable relevance to all educators. Learning styles have generally been described as attributes of an individual who interacts with instructional circumstances in such a way as to produce differential learning outcomes. Newstrom and Lengnick-Hall (1999:46) suggest a contingency

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approach to education in which there is a move away from characterising learners as homologous adult learners who require a uniform and single approach towards an approach in which the heterogeneity of learners requires a variety of approaches depending on individual differences. Therefore, the early recognition of learning styles is a significant phenomenon for adult educators. Ramsden (1993:95) explains it as being a professional approach taken to improve the quality of learning. The issue before educators is determining how they can personalise their teaching based on these observed differences. The identification of individual learning styles could lead to modifications in the planning of educational programmes, learning environments and administrative strategies (Joughin 1992:6). Understanding concepts beyond traditional knowledge in an educational programme can be a challenge for educators. An attempt must be made to approximate and match learning styles to conducive learning environments. Educators, managers and learners must be made aware of the importance of planned/unplanned and formal/informal learning experiences (Sadler-Smith 1996:29).

Individual differences in learning may be approached in a wide variety of ways. The large number of learning style models described by various educators and researchers indicates how considerable the implications of learning styles for learning would seem to be. The need to accommodate individual differences in higher education increases as a learning activity or task becomes more conceptual, requires more problem solving, necessitates more higher level reasoning and critical thinking, needs more creative answers, seeks long-term retention, and requires more application of what is learned (Johnson & Johnson 1992:122).

The question is often asked why the contribution of learning styles to education has been so limited and difficult to implement (Joughin 1992:4). Often research is limited to a description of learning styles rather than an explication of their significance. As early as the eighties evidence was produced that learners who were offered a "learning how to learn" course would perform better during tests (Davis 1990:406). In this research, the outcomes of learning style research for adult learning and the learning process in higher education are explored. Learning styles were applied to practice by exploring their educational importance and not merely to serve as a trigger for self-reflection.

The concept of learning style has received considerable attention by researchers not only in education but also in fields such as psychology, human resources development, and management. Four main aspects of the study of individual learning styles emerged, namely learning style preferences, cognitive

styles, response styles, and thinking styles.

3.3.1 Learning style preferences

Learning style preferences are one aspect of learning styles, and relate to the likes and dislikes that individuals have for certain sensory modes and conditions of learning as well as learning strategies or instructional techniques (Linares 1999:407; Sadler-Smith 1997:52). The degree to which a person favours particular stages of the learning cycle indicates his or her learning style preferences (Merritt 1983:368). Learning style preferences are based on the premise that individuals develop preferred ways of learning because of personality, personal goals, intelligence, biological rhythms or the learning environment. These differences will bring about differences in preferences for learning atmospheres, types of educators and modes of teaching. Differences become pliable between different subjects or different fields of study (Fraser & Nieman 1996:186). Pliability is based on the assumption that intelligence is a composite of human traits, one of them being the capacity to acquire new capacity. When learning a certain preferred way or when using the preferred style, learners may feel more comfortable and may learn more or more effectively (DeYoung 1990:64).

3.3.2 Cognitive style

A cognitive style refers to the stylistic aspects of cognitive functioning and personality or social functioning, and is interwoven with affective, temperamental and motivational structures as part of the total personality (Messick 1984:59). This functioning has implications for education as well as human development.

Cognitive styles are individuals' preferred methods of obtaining and assimilating information from the environment (Hart 2000:31). A cognitive style refers to consistent ways in which an individual organises and processes information from the environment and includes ways of thinking, perceiving, and remembering. The way in which a learner deals with incoming stimuli has implications for how learners learn and how educators teach (DeYoung 1990:69).

The terms "learning style" and "cognitive style" are often used interchangeably in the literature. In some instances a distinction is made between the two terms. When either of these terms are used, there is reference to the individual differences in the learning process. For the purpose of this

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research the term "learning style" is used. Views of other researchers and authors on the use of the terms are explained as well (see section 3.4).

3.3.3 Response style

A response style refers to an aspect of learning styles and can be described as a way in which learners behave and interact in the classroom (DeYoung 1990:69; Partridge 1983:246). Child (1997:327) refers to this aspect of learning styles as an affective style and describes the characteristics as motivational and temperamental characteristics which influence problem-solving. He also stresses that affective styles should not be related to intelligence. They refer to the mode in which a person prefers to approach a problem and are unrelated to level of capacity, level of cognitive complexity or management competency (Child 1997:328).

Educators and psychologists have developed various models to describe learners' response styles. The Mann model categorises learners into eight response types, namely compliant learners, anxious-dependent learners, discouraged workers, independent learners, heroes, snipers, attention seekers, and silent learners. The Grasha-Riechmann model focuses on learners' attitudes towards learning, classroom procedures, educators and peers. Six response styles on three bipolar continua are described in this model: independent-dependent, those learners who prefer to work alone and who are confident and self-directed versus those learners who exhibit little intellectual curiosity and prefer an authority figure to provide structure and guidance; collaborative-competitive, those learners who enjoy working cooperatively with others versus those who compete with their peers for rewards; and participant-avoidant, those learners who willingly take part in learning activities and classroom interactions versus those who demonstrate little interest in learning course material or interaction in the classroom (DeYoung 1990:69; Partridge 1983:246). The Stern model is based on three categories of learners, namely authoritarian learners, antiauthoritarian learners, and rational learners (Partridge 1983:246-247).

A response style is therefore the way in which a learner reacts to another response, such as responses in the learning environment (learning content, educator). Although often stimulated or influenced by affective responses, the term "response style" refers mainly to behavioural aspects of learning styles.

3.3.4 Thinking style

Cullingford (1990:137) describes a thinking style as a choice to apply the mind, as a distinct skill, which is not dependent on subject matter or on memory. Sternberg (1997:19) describes thinking styles in the same way as learning styles are described. He refers to thinking styles as the way in which one thinks, the *how* of thinking. He states that understanding thinking styles and learning styles can help people prevent misunderstandings and misconceptions, and come to a better understanding of the situation and oneself. A style is a preferred way of learning. It is not an ability, but rather the application of the abilities one has. An individual's style is conceptually independent of cognitive capacity, success, cognitive strategies, and coping behaviour (Sadler-Smith 1997:55). People with similar abilities may have very different learning styles. But, people with equal abilities are often not judged as equals. Rather, their abilities are judged on whether their learning styles match those expected in certain situations. The danger of this is that if an attribution is made that the learner does not have the abilities to complete a certain task, that learner typically does not have a chance to change the approach to the task. Learners may perform well in a learning situation that best suits their needs and as a result they may be judged as learners with high levels of abilities. This is not necessarily the case. There may be a good fit between learning styles and the tasks they are confronting. Thus, understanding learning styles contributes to a better understanding of why some tasks and learning situations fit some learners better than others. An awareness of individual differences in learning styles is part of the process of learning.

3.4 DEFINITIONS OF LEARNING STYLE

Although widespread agreement supports the existence of individual differences, learning style researchers define the concept differently. A variety of characterisations of learning styles have been proposed, sometimes causing confusion. Fortunately, the different conceptions, although distinct, are overlapping, rather than mutually exclusive. A systematic analysis and exploration was done to highlight the main criteria in order to reach a proper understanding of the core meaning of the concept *learning style*.

3.4.1 Analysis of definitions

The concept *learning style* is defined in many different ways. It is a comprehensive term, referring

to the internal organisation and perception of information, as well as to external factors influencing learning, such as socialisation and training within professional environments (Cavanagh, Hogan & Ramgopal 1994:38; Kolb 1984:66).

Kolb (1984:61-62) made an important pioneering contribution by developing a model of learning styles. He describes the learning process as a complex interaction of processes with distinctive individual patterns. These patterns, whose uniqueness and individuality are highly prized, are called learning styles. Learning styles are individualised ways of going about acquiring knowledge (Chickering 1981:102).

Merritt (1990:64) defines learning styles as the way learners prefer to engage and participate in learning. The emphasis is on how a person prefers to learn. Learning styles are furthermore described as relatively stable behaviours that indicate how learners perceive, interact with and respond to the learning environment, and are determined by environmental and psychological or sociological factors that are external to the learner. A cognitive style is described as the way an individual prefers to internally process information. This author explains the term "learning style" as a more comprehensive and descriptive term than the term "cognitive style" (Merritt 1989:1).

Engelbrecht (1986:5-7) classifies learning styles as cognitive factors, cognitive styles as the way or style in which a learner perceives, learns, thinks or observes. No clear distinction is made between the terms "cognitive and learning style".

Learning styles are characteristics of and preferences for learning. All individuals feel, reflect, think and act, but linger at different times along the way. These patterns form our learning style preferences (Poon Teng Fatt 2000:32). A learning style is the consistent way in which a learner responds to and uses stimuli in the context of learning (Matthews 1991:228). Broadly defined, learning styles refer to cognitive, affective, and physiological behaviours that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment, and are further described as a tendency to adopt a particular strategy in learning. Cognitive styles more specifically refer to the information processing habits representing the learner's typical mode of perceiving, thinking, problem solving, and remembering (Poon Teng Fatt 2000:31, 34).

Laschinger and Boss (1984:375) define learning styles as the way in which an individual organises information and experience. Davis (1990:407) furthermore states that learning styles are "derived from a variety of previous learning experiences, which can be modified with suitable interventions and guidance by the teachers". Moelwyn-Hughes and Sayed (1993:14) define a learning style as "the particular way that an individual approaches a learning task, on one occasion". They also maintain that "a tendency to use one type of strategy constantly is a learning style". According to Miller, Alway and McKinley (1987:399), learning styles are more than just study skills. They define learning styles as fairly stable, consistent approaches to learning across a variety of learning activities.

Sadler-Smith (1996:31, 32) defines a learning style as a "distinctive and habitual manner of acquiring knowledge, skills or attitudes through study or experience" and a cognitive style as a "distinctive and habitual manner of organising and processing information". He bases his definitions and explanations of the terms mainly on the Honey and Mumford learning style model.

Different views on whether learning styles can be changed or modified also exist. Davis (1990:406) maintains that learners can acquire or modify learning styles. Matthews and Jones (1994:235) explain learning styles as fairly stable, consistent ways of learning across a variety of activities within a context. They state that learning style preference develops as a consequence of hereditary factors, life cycle experiences and the demands of the present environment. Talarczyk (1989:265) also views learning styles as being stable, consistent, individual differences in ways of organising and processing information and experience. Although an individual has a predominant preferred learning style, he or she can also function with other learning styles at different times in different situations by adapting to the learning activities and tasks (Poon Teng Fatt 2000:32).

Fransman (1991:73) claims that, once a learning style has been adopted by an individual, that learning style is generally perpetuated in higher education. Modification of the acquired learning style can only be in favour of a more meaningful learning style. Like Kolb (1984:64), Moelwyn-Hughes & Sayed (1993:14) accept that people develop preferences for different learning styles in the same way that they develop any other kind of style.

Cranston and McCort (1985:136) suggest that there is a slight difference between cognitive and learning styles. A cognitive style is defined as the preferred way of receiving information or gaining meaning from the environment. A learning style, on the other hand, is defined as a learner's attitude

towards learning, educators, teaching method and peer relationships. Sternberg (1997:134, 145) also differentiates slightly between cognitive styles and learning styles. He explains cognitive styles as somewhat closer to cognition than to personality, and learning styles as "how people like to learn".

Woolfolk (1995:126) differentiates between cognitive and learning styles, defining cognitive styles as "different ways of perceiving and organising information" and learning styles as "individual differences that affect classroom learning". Cognitive styles are described as something falling between mental abilities and personality traits. Because they are styles of *thinking*, they influence cognitive ability and are influenced by cognitive ability. Social relationships and personal qualities are also affected by these preferred ways of dealing with the world. Different individuals have different styles for processing and organising information and for responding to environmental stimuli. Learning styles, on the other hand, include preferences for where, when, with whom or with what (lighting, food or music) you like to study (Woolfolk 1995:128).

Blagg (1985:90) describes a cognitive style as the characteristic spontaneous manner in which an individual conceptually organises the environment and a learning style as the preferred learning mode of individuals.

Learning styles are about ways of approaching learning rather than ability as such (Joughin 1992:5). Swart and Van Vuuren (1998:24) have a strong view that learning styles do not focus on the ability of an individual, but are approaches to processing information. Colucciello (1999:295) considers learning styles in the context of the ability of adults to learn and locus of control. Placing learning styles in the context of ability is, however, somewhat misleading. Identifying learning styles is not a shift from the classic intelligence-test-based education to an analysis of learning styles, but refers to individuals' modes of making sense of and dealing with knowledge. A learning style is a preferred or habitual pattern of mental functioning and dealing with new information (Worthington & Clay 1995:96). Joyce et al (1992:391) explain learning styles as the education-relevant expressions of the uniqueness of an individual. These styles are not fixed, but are also unlikely to change or grow.

Adult learning styles are described as being moderately strong habits rather than intractable attributes, and can therefore be modified and extended (Harrison 1992:33). Child (1997:326) describes learning styles as those human attributes which help to determine and characterise a person's preferred approach to problem-solving. The human attributes are described as being "response sets" that

involve personality and motivation as well as thinking tactics that are used in solving problems.

A well-known model of learning styles is Witkin's field dependence-field independence model which describes the learning styles on a bipolar continuum of ways in which people approach their environment. The approaches refer to consistent ways of organising and processing information from the environment and individual ways of perceiving, thinking and remembering (Witkin, Moore, Goodenough & Cox 1977:2). The Witkin model does not differentiate between cognitive and learning styles and also refers to them as thinking styles.

A common element in learning styles and cognitive styles is that they can be described as the way people perceive problems and the effect this might have on the paths to be taken to reach a solution. Learning styles are furthermore described as being ways in which we organise cognitions about the world in order to make sense of the world (Sternberg 1997:150). They are bipolar, non-pejorative and non-evaluative, and are also related to numerous traits of personality that appear early in life and are temporally stable (Sadler-Smith 1997:55).

Partridge (1983:247) describes integrated models of learning styles, that are derived from an eclectic approach which includes learning theory, individual development and personality types. Partridge (1983:247) classifies the Kolb model of experiential learning and the Myers-Briggs model as being integrated models of learning styles. The Myers-Briggs model is based on Jung's theories of behaviour, which identify two ways of perceiving (sensing or intuition) and two ways of judging (thinking or feeling). With any of these processes, there will be an accompanying preference for extroversion or introversion.

Another eclectic approach to what learning styles entail is described by Stahl (1999:29). No clear definition is given, but rather an explanation of how individuals use their preferences to approach the learning situation. Learners are described as being either "visual" and "auditory" learners or "global" and "analytical" learners. He further proposes that learners vary not only in perceptual styles but on a host of different dimensions; for example, learners may be either two- or three-dimensional, simultaneous or sequential, connecting or compartmentalising, inventing or reproducing, reflective or impulsive, and field-dependent or field-independent. Some of these dimensions are *learning preferences*, in other words how an individual chooses to work. These preferences include whether a person wants to work in silence or with music playing, in bright light or dim light, with another

person or alone, or in a warm room or a cool room. He refers to cognitive styles when the learner makes a choice between reflection or learning impulsively, or when a learner focuses on detail or prefers to see the bigger picture.

Learning styles may occur in variable combinations in any individual but there will be a stronger preference for one style (Moelwyn-Hughes & Sayed 1993:15). However, one learning style cannot be regarded as correct and another one as incorrect, and thus one learning style cannot be valued more than others (Fraser & Nieman 1996:186). Each individual develops a unique combination of learning skills, attitudes towards learning, and approaches to learning. A knowledge of these will assist the learner in building strengths for the learning process.

A comprehensive explanation of learning styles was derived from the above analysis. A number of criteria that constitute this explanation emerged.

3.4.2   Identifying the main criteria for the concept *learning style*

After an analysis and exploration of the concept *learning style*, criteria were identified that explain a learning style as being the way in which an individual perceives or observes information and previous experiences, and processes and organises them to derive meaning. The characteristics that are measured when determining learning styles differ, depending on the model that is used to define preferred learning modes. These characteristics and preferences are measured according to the identified criteria.

The criteria that emerged from the analysis of the various definitions of learning styles are:

- Learning styles are individual differences.
- Learning styles are unique ways of perceiving information.
- Learning styles are processes of organising information and learning experiences.
- Learning styles can be consistent or changeable, depending on the situation.
- Learning styles are approaches to learning or ways of engaging in learning.
- Learning styles involve attitude towards the learning situation and material.
- Learning styles demonstrate cognitive processes.

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- Learning styles determine the ways of problem-solving.

- Learning styles are ways of processing information.

Learning styles are not merely study skills but can be seen as higher-order cognition such as:

- planning

- monitoring

- checking

- revising

- self-testing

Learning styles are therefore described as attributes, characteristics and qualities of individuals that interact with instructional circumstances in such a way as to produce differential learning achievements. Learners are categorised in terms of the educational conditions under which they are most likely to learn and the amount of structure they require for learning to occur. The concept of learning style encompasses sensory partiality, perceptual preferences and the environmental factors that are most conducive to learning. A clear explanation of what a specific learning style entails would have to be based on the learning style model that is adopted.

3.5 THEORIES AND MODELS OF LEARNING STYLES

There are many approaches to categorising learning styles on different levels. Theorists explain the different models of learning styles, by referring to the layers of an onion (Claxton & Murrell 1987:7). The core of the onion indicates basic characteristics of personality; the second layer indicates information-processing characteristics which describe how people take in and process information; the third layer indicates social-interaction characteristics which deal with the way in which learners tend to interact and behave in the learning environment; and the fourth layer indicates the preferences for instruction and learning environment. Each of the levels has an influence on the next. Personality, as the core of the learning style topology, is often not included as one of the four levels of preferences (Marshall 1987:419). It is the most stable level and is least influenced by intervention or changes in the learning situation. As the levels proceed outwards, they become less stable. Figure 3.1 gives a graphic presentation of the different models of learning styles represented in the learning style topology.
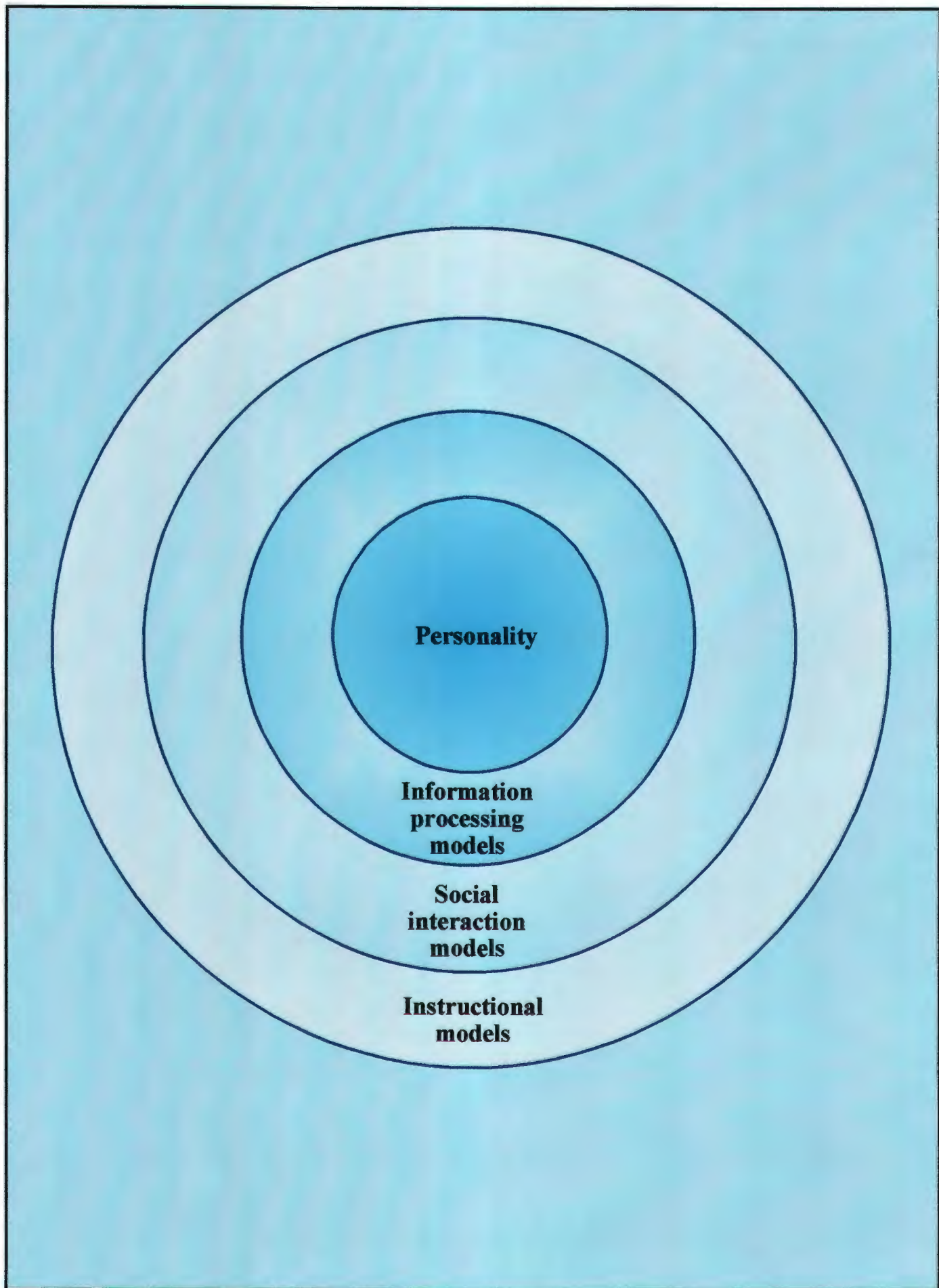
Figure 3.1
Models of learning styles
(Adapted from Claxton & Murrell 1987:7)

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Another approach to categorising learning styles is a two-level category. This category describes two fundamental orientations in learning which include those learners who tend to analyse information logically and break it down into smaller parts, and those learners who tend to look for patterns and relationships between the parts (Claxton & Murrell 1987:iii).

Extensive content analysis was done by Curry (1983) on models of learning styles in an attempt to provide a meaningful and systematic framework for understanding and examining the various models being used to determine how people prefer to learn. A conceptual framework was then proposed for organising the models into three correlative strata, namely instructional preference models, information processing models and cognitive personality style models (Merritt 1989:3).

Curry's framework suggests that an educator chooses a model for assessing learning styles based on the use to which the information will be put. The question should be asked whether one is concerned with modifying the learning environment to account for instructional preferences or whether one is concerned with using teaching-learning strategies that influence the ways people assimilate information (Merritt 1989:5). When designing an educational programme, educators are faced with making many decisions about the programme of study and teaching methodology.

One practical application of learning style theory is that once the educators know an individual's learning style, they can use that information not only in educating but also in learner counselling. Problems with study skills can be addressed very specifically and learners can be directed to study methods most suited to their learning styles (DeYoung 1990:70).

The following discussion explains the three-strata framework proposed by Curry.

3.5.1 Instructional preference models

The instructional preference models deal with direct assessment of the ways people prefer to learn, such as preference for structure, working at a particular pace, and relationships with educators and peers. These models attend to the conditions and modes of learning present in the teaching-learning environment and are described as not very stable processes (Dunn & Dunn 1979:239-240; Merritt 1989:5; Sadler-Smith 1996:30). Individuals are interacting directly with their environment. Thus, a model represents an individual's preferential learning modes within specific situations. Because of

the situational dependence it is described as not being very stable.

Various learning style models which can be classified as belonging to the instruction preferences stratum exist.

3.5.1.1 Dunn model of learning styles

Dunn (1987:44) explains learning styles in terms of individual learner reactions to 23 elements of instructional environments, including the immediate environment (temperature, noise level, lighting), emotional involvement (motivational strategies, level of responsibility and structure), social support (working alone or with others, with the teacher's direction or not), physical characteristics (time of day, visual versus auditory or tactile materials), and psychological inclinations (impulsive or reflective, global or analytic). According to the Dunn model, learning may not occur unless the environment, resources and/or instructional approaches respond to the individuals' characteristic learning styles. Dunn (1987:48) also suggests that an instructional model with the correct combination of elements will influence learner achievement. This model is much used in research on the environmental elements of learning styles. On the basis of studies described by Dunn and Dunn (1979:238-239; 1987:50), it is indicated that learners are likely to improve their academic achievement if they respond well to their environments.

The Dunn model measures the learner' preferences that commonly influence instructional situations and reflects the way individuals prefer to learn through evaluation of different stimuli. The model has a comprehensive approach to the diagnosis of an individual's learning style. According to Dunn and Dunn (1979:239), there are basic elements that constitute one's learning style. These basic elements are divided into five groups of stimuli. *Environmental stimuli* include sound, temperature, light and design elements. The response to the environment is a unique experience, and aspects such as age, socioeconomic status, ability or achievement levels do not play a role. *Emotional stimuli* include persistence, motivation, responsibility and a need for structure elements. Although the emotional status of the learner in terms of motivation, sense of responsibility and persistence makes a difference to how learners approach a learning situation, observations verify that educators do try to facilitate both groups of learners in exactly the same way. *Sociological stimuli* such as self, peers, team, adults, pair and various social elements contribute to how learners respond to other people as well as to the selection of a teaching method through which they are likely to achieve. Although learners

can gain knowledge in a variety of sociological patterns such as working alone, working with peers, with an adult (where the learner is a child), or in some combination of patterns, some learners can function only when permitted to learn through specific relationships. *Physical stimuli* include elements such as perceptual strengths, time, intake and mobility. Differences in these elements often result in mistakenly labelling learners as being hyperactive when they are in fact light-sensitive or require a great deal of mobility (Dunn & Dunn 1979:239-240; Merritt 1989:5; Sternberg 1997:146). *Psychological elements* include brain dominance, analytical global and impulsive-reflective elements. This group of elements (not stimuli) is not always included in the explanation of the Dunn model of learning styles. Psychological elements are, however, found to be a crucial factor in understanding brain functioning in that both sides of the brain reason, but by different strategies. Thus, whether an individual is right or left brain dominant, a global or analytic thinker, reasons inductively or deductively, that individual is capable of mastering identical information or skills if he or she is guided through instructional methods or resources that compliment their hemispheric style (Dunn, Sklar, Beaudry & Bruno 1990:284).

The preferences/stimuli identified by this model refer more to elements that affect an individual's ability to learn than to ways of learning in themselves. It is not clear why these preferences are called learning styles.

3.5.1.2 *Canfield model of learning styles*

The Canfield model of learning styles is based on components of the theories of Maslow's hierarchy of needs and McClelland's notion of achievement motivation (Matthews & Jones 1994:235). According to this model, learning styles refer to the affective component of the educational experience that motivates a learner to choose, attend to, and perform well in a course or training exercise. It focuses on the attitudinal values of individuals towards the teaching-learning situation (Merritt & Marshall 1984:79).

The model describes learner preferences for various conditions of learning, modes of learning, content or subject matter of greater interest to respondents, and expectations for success. *Conditions of learning* include affiliation (desire for friendly relationships with peers and educators), structure (desire for orderly and well-designed course structure and detailed information relative to requirements), achievement (desire for freedom to set one's own goals and work independently in

a study situation), and eminence (desire for opportunities to compare one's performance with that of others). *Modes of learning* encompass reading (desire to learn through examining print media), listening (desire to learn through hearing content presented), direct experiences (desire to learn through handling content-related material or active participation in exercises), and iconic presentations (desire to learn through viewing content presented in media such as slides and films) (Merritt 1983:368). *Content preferences* are measured in the areas of numeric, qualitative, inanimate and people. *Expectations for success* are defined as the level of performance anticipated (Merritt 1989:6).

Merritt and Marshall (1984:84) suggest a refinement of the model to an eight factor model rather than a twelve factor model. The distinguishing factor structure that they suggest is: *conditions of learning* (affiliation, structure, achievement, eminence) and *modes of learning* (listening, reading, iconics, direct experience).

3.5.1.3 Riechmann and Grasha model

Riechmann and Grasha (1974) identified three learning preference styles or types (Sadler-Smith 1996:30; Sadler-Smith 1997:52). Firstly they describe *dependent learners* who prefer educator-directed, highly structured programmes with explicit assignments set and assessed by the educator. The second learning preference style includes learners who are *collaborative learners*, that is who are discussion orientated and favour group projects, collaborative assignments and social interaction. The third style includes *independent learners* who prefer to exercise an influence on the content and structure of learning programmes within which the educator is a resource.

When information is needed to design and prescribe specific teaching-learning situations for individual learners, educators may find the instructional preference models appealing. Because the elements defined in these models are predominantly oriented towards measuring instructional preferences, careful review and selection should be done before choosing a model, based on the purpose for which it will be used.

3.5.2 Information processing models

The information processing models describe preferences for specific aspects of information

processing such as the use of concrete experience, an orientation towards data analysis and critical questioning of content. The models deal with intellectual approaches to the assimilation of information, for example concrete versus abstract. These preferences are described as relatively stable processes (Merritt 1989:3). At this level of learning styles, the individual is independent of the actual learning environment. Thus, learning styles can be described as being more stable than the instructional preference level.

3.5.2.1 Kolb model of experiential learning

Kolb (1984:38, 40) proposed an experiential learning model with the advantages of combining experience, perception, cognition and behaviour. This model is based on an integration of behavioural and cognitive theories.

Kolb (1984:41) defines learning as the process whereby knowledge is created through the transformation of experience. Kolb (1984:21) states that "learning is seen best to be facilitated by an integrated process that begins with here-and-now experiences followed by collections of data and observations about that experience. The data are then analysed and the conclusions of the analysis are fed back to the actors in their experience for their use in the modification of their behaviour and choice of new experiences".

The underlying principles of his definition are that:

• the emphasis is on process rather than content or outcome
• knowledge is being created and recreated through transformation
• learning is both objective and subjective

Learning is a core process of human development and not merely readjustment to change. The development results from learning that takes place through experience. Learning takes place in a cycle, which is known as the experiential learning cycle or model. The phases of the cycle are concrete experience, reflective observation, abstract conceptualisation, and active experimentation. Ideally, individuals should be oriented towards using all four phases of the experiential learning cycle. However, individuals still have distinct preferences for using specific phases more than others.

The Kolb model of experiential learning is described by Baker, Wallace, Bryans and Klapthor (1985:1496) as an "elegantly simple experiential learning model". It is also seen as an exceptionally easy model for self-test. It has been praised for its "dynamic properties" and therefore used in numerous studies and in corporate research and development. Some South African higher educational institutions also strongly support the Kolb model of experiential learning (Welman & Huysamen 1994:258). Sternberg (1997:145) maintains that this model is intended primarily for application in school settings. This has, however, been proven incorrect as it has been applied in numerous studies on higher education and adult learners, as discussed throughout this thesis.

(a)   Kolb's experiential learning cycle

Kolb (1984:6) describes a learning theory which explains how it is that people generate from their experiences the concepts, rules and principles that act as guidelines in situations and how concepts are modified to improve their effectiveness. He stresses the fact that people learn from their previous experiences. There are two reasons why learning is called an experience: firstly it has an intellectual origin and secondly it emphasises the central role that experience plays in the learning process (Kolb 1984:20).

The Kolb model of experiential learning is based on work done by Dewey, Lewin and Piaget, who have been described as the foremost intellectual ancestors of experiential learning (Kolb 1984:15).

Kolb (1984:40-41) describes the process of experiential learning as a four-stage cycle involving four adaptive learning modes, namely concrete experience, reflective observation, abstract conceptualisation and active experimentation. The model is graphically represented in figure 3.2.

The learning modes are arranged in two orthogonal bipolar dimensions, with abstract conceptualisation the polar opposite of concrete experience (ACCE), and active experimentation the polar opposite of reflective observation (AERO). Thus, concrete experience and abstract conceptualisation are represented as two dialectically opposed adaptive orientations. Active experimentation and reflective observation are another two dialectically opposed adaptive orientations.
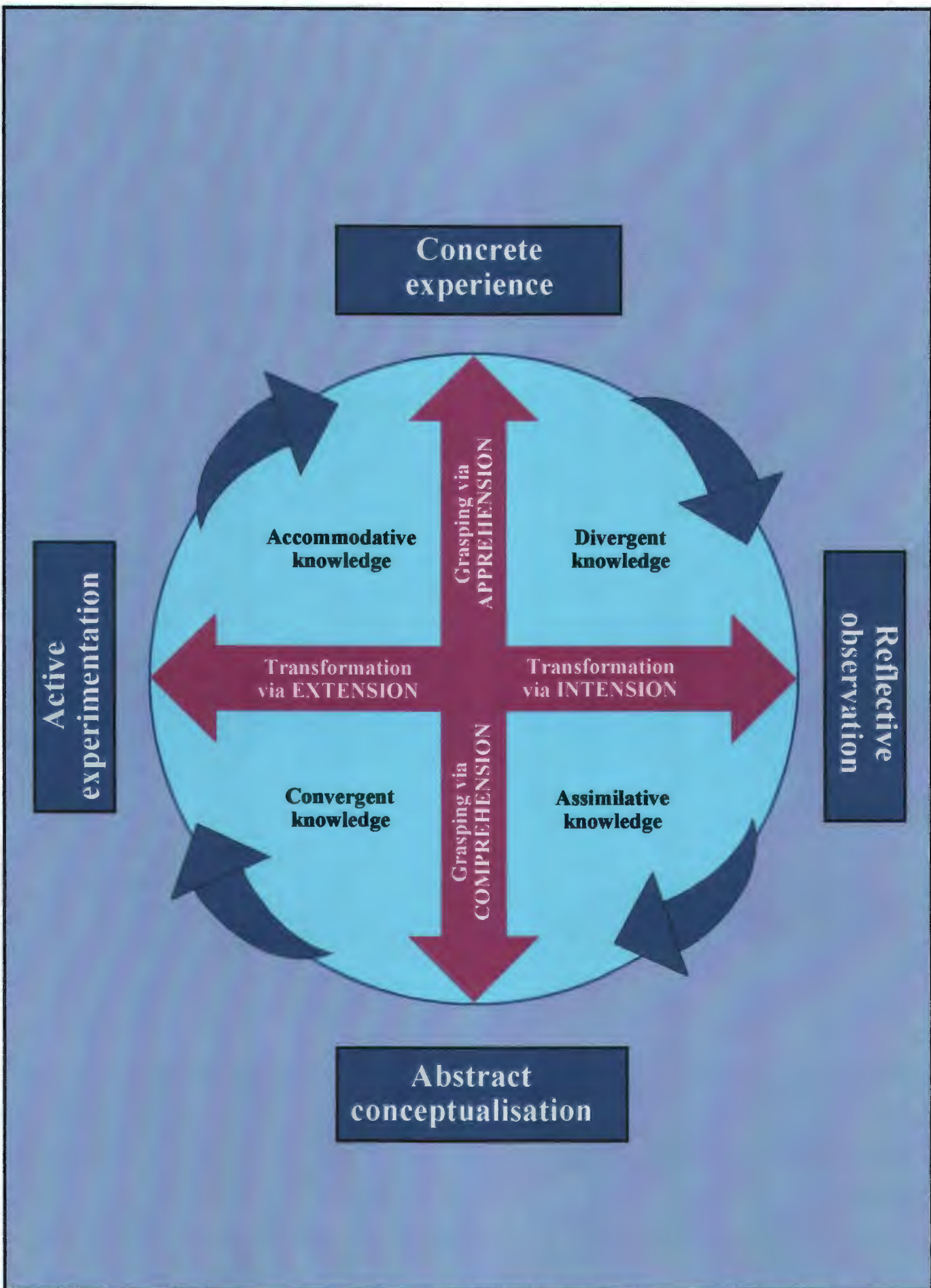
Figure 3.2
Kolb model of experiential learning
(Kolb 1984:42)

The active-reflective dimension ranges from direct participation to separate observation. The abstract-concrete dimension ranges from dealing with tangible objects to dealing with theoretical concepts. These polar extremes are used to define the four-stage cycle of learning. An individual's score combination on the grasping (ACCE) and transforming (AERO) dimensions reflects his or her preferred learning style for processing information (Kolb 1984).

The structural bases of the learning process lie in the transactions of experiences among these four learning modes and the way in which these experiences are resolved. Therefore, learning is the process whereby knowledge is created through the transformation of experience. To enable these experiences to generate knowledge, it is important that the experiential learning cycle be completed (Kolb 1984:40-42).

Kolb (1984:132) explains the experiential learning cycle as a spiral, and not as a circle. This means that each episode of experience has the potential for movement from prior doing to a life of choice and purpose. The learning cycle thus brings about development. For learning to be effective the learner has to move through the cycle of experiences (see figure 3.2), which are:

- concrete experience
- observation and reflection
- the formation of abstract concepts and generalisations
- hypotheses to be tested in future action (Kolb 1984:68)

The "ideal" learner will have the ability to operate with equal facility at all four stages. Such "ideal" learners are rare, and most individuals have a preference for one or more stages in the cycle.

The experiential learning cycle includes the following steps, namely:

- *Experiencing.* When activities generate knowledge, the experiences have the potential for learning. These experiences can be used in the inductive learning process.
- *Sharing perceptions from experience.* Sharing and verbalising what one saw or felt during an activity broadens and deepens the experience.
- *Making sense of the experience.* During this step one clarifies and interprets what the meaning of the experience is. It can be seen as the key step in which a systematic examination

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of the experience is made. Uses for the generated information may also be realised or identified.

- *Abstracting concepts, generalisations and principles.* During this stage certain experiences can be selected and applied to reality.

- *Applying concepts, generalisations and principles.* The learner now has to implement the selected experiences and apply them to future activities. Individual goals and specific action plans may enhance this process (Kolb 1984:68-69).

The four different kinds of adaptive abilities or learning modes, which are required by the four-stage cycle, are:

✦ Concrete experience (CE)

This orientation emphasises feeling as opposed to thinking. It focuses on being involved in human situations in a personal way. The involvement in new experiences is open and without bias. The uniqueness and complexity of present reality is of concern as opposed to theories and generalisations. People with concrete experience orientation are often good intuitive decision makers, function well in unstructured situations, enjoy others and are good at relating to others. They have an open-minded approach, value interpersonal relations and prefer being involved in real situations (Kolb 1984:68). Learning takes place through taking hold of tangible experiences with events (Marshall 1987:420).

✦ Reflective observation (RO)

This orientation emphasises understanding as opposed to practical application. It focuses on understanding the meaning of ideas and situations. Careful observation of what is true and how things happen is important. People with a reflective orientation look at things from different perspectives and appreciate different points of view. They form their own opinions by relying on their own feelings and thoughts (Kolb 1984:68). Learning takes place by the transformation of experiences through the intellectualisation of information (Marshall 1987:420).

✦ Abstract conceptualisation (AC)

This orientation emphasises thinking as opposed to feeling. It focuses on using ideas and concepts which are logical. A scientific approach to building general theories is important. People with an abstract conceptualisation orientation are good at quantitative analysis, systematic planning and manipulation of abstract symbols. Concepts are created that combine observations in such a way that logical and plausible theories about relevant phenomena are derived. They value precision, the discipline of analysing ideas and the aesthetic quality of a neat conceptual system (Kolb 1984:69). Learning takes place through the grasping of experiences by reliance on symbolic representation of events (Marshall 1987:420).

✦ Active experimentation (AE)

This orientation emphasises practical application as opposed to reflective understanding. It focuses on changing situations and actively influencing others. Doing rather than observing and a pragmatic concern with what works are important. This orientation involves the use of existing theories to solve problems. People with an active experimentation orientation are good at getting things done, although it might mean taking some risks in order to achieve a goal. They like to see results around them which have an influence on the environment (Kolb 1984:69). Learning takes place by the transformation of experiences through the behavioural extension of information (Marshall 1987:420).

Four different elementary forms of knowing, namely convergence, divergence, assimilation and accommodation are derived from the two bipolar dimensions formed by the opposing learning modes, abstract-concrete (ACCE) and active-reflective (AERO) (Kolb 1984:76).

(b)   Kolb's four learning styles

This learning style model has been described as being representative of the information processing level of the learning style topology. Learning is a cyclic and lifelong process of adaptation by the learner in a changing environment. Through the complex structure of learning, the individual is allowed to develop individual and unique processing structures or learning styles. According to Kolb (1984:76), the individual style of learning is the underlying structure of the learning process. Most people develop individual styles of learning that emphasis some learning abilities over others. Kolb

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(1984:95) describes learning styles as adaptive orientations that achieve stability through consistent patterns of transaction with the world, and explains it in this way:

> ... *my active orientation helps me perform well in active tasks, and since I am rewarded for this performance, I choose more active tasks, which further improves my active skills ...* (Kolb 1984:97-98).

Kolb (1984:77) describes four basic learning styles in his model of experiential learning. Figure 3.3 is a graphic representation of the Kolb learning style model.

◆ **The convergent learning style**

A converger processes information by grasping it through symbolic representation and transforms it through behavioural extension. This learning style relies on the dominant learning abilities of abstract conceptualisation and active experimentation. Problem-solving, decision-making and the practical application of ideas are great strengths of this style. The converger does best in situations where there is a single correct answer or solution to a question or problem. Convergers organise their knowledge in such a way that it can be focused on specific problems through hypothetical-deductive reasoning. They prefer to deal with technical tasks and problems, rather than social and interpersonal issues. They are people who are controlled in their expression of emotion (Kolb 1984:77). Convergent thinking is described as logical and analytical with a narrow focus on practical thinking (Poon Teng Fatt 2000:34).

◆ **The divergent learning style**

These learners have the opposite strengths from convergers, grasping information through tangible experiences and transforming it through intellectualisation. Concrete experience and reflective observation are the divergers' dominant learning abilities. Their imaginative abilities and awareness of meaning and values are their great strengths. Their adaptive ability is to view concrete situations from many perspectives and then organise the many relationships into a meaningful *gestalt*. They therefore adapt by observation rather than action.
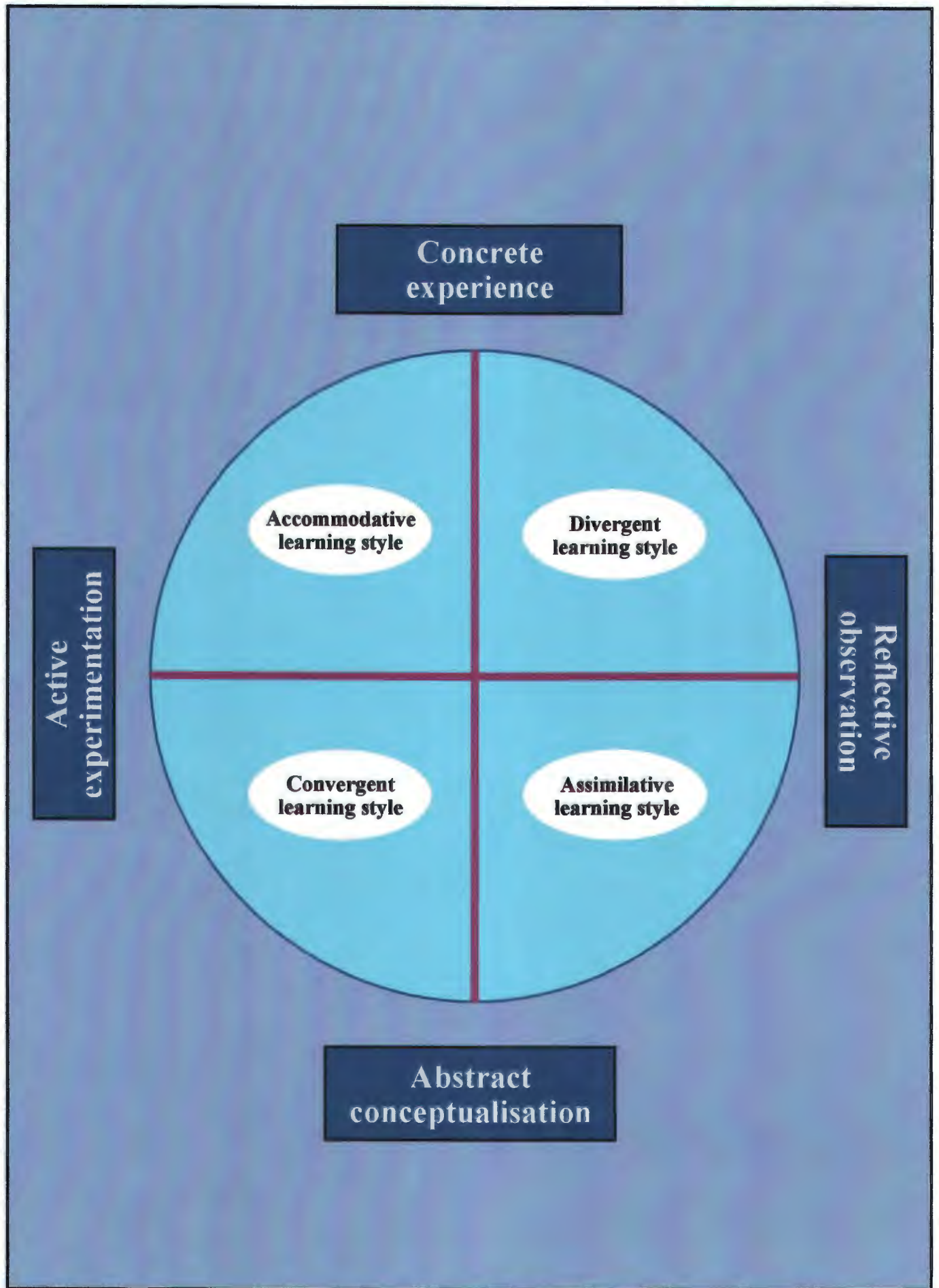
Figure 3.3
Kolb learning style model
(Kolb 1984:81)

The diverger performs better in situations where alternative ideas and implications are generated, such as group discussions and brainstorming sessions. The diverger is also interested in people and tends to be creative and emotion-oriented (Kolb 1984:77-78). Divergent thinking is described as lateral thinking that is productive or imaginative. This way of thinking allows emotions and intellect the freedom to explore possibilities. Individuals who are creative are higher in divergent thinking abilities (Poon Teng Fatt 2000:34).

✦   **The assimilative learning style**

The assimilator processes information through symbolic representation and intellectualisation. The dominant abilities of these learners are abstract conceptualisation and reflective observation. Assimilators' greatest strength lies in their ability to reason inductively and create theoretical models. They can also assimilate disparate observations into an integrated explanation. Assimilators, like convergers, are less focussed on people and more concerned with ideas and abstract concepts. Their concern with ideas is related more to their logical soundness and precision than to their practical value (Kolb 1984:78).

✦   **The accommodative learning style**

These learners have the opposite strengths from assimilators, grasping information through tangible experiences and transforming it through behavioural extension. Accommodators emphasise concrete experience and active experimentation. Doing things, carrying out tasks and plans and getting involved in new experiences are their greatest strengths. The adaptive emphasis of this group is seeking opportunities and taking action and risks. Situations where one must adapt oneself to changing immediate circumstances are best suited to the accommodators. Theory or plans that do not fit the facts will most likely be discarded by this group of learners. Assimilators, the group with the opposite learning style, are more likely to disregard or reexamine the facts. Problem-solving will be approached in an intuitive trial-and-error manner, while relying on others for information, rather than on their own analytical ability. Although accommodators are seen as persons who are at ease with people, they can be seen as impatient and bold or aggressive (Kolb 1984:78).

By introducing or supporting preferred ways of learning, the learning process can be promoted. Kolb (1984:7) is, however, concerned about the attitude of educators who are more interested in *what*

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learners learn than *how* learners learn.

The Kolb learning style model is one of the most widely and successfully understood and used models. The model also forms the basis of the explanation of learning styles in this research.

3.5.2.2 *Jungian description of learning styles*

Jung believes there are clear preferences for how learners perceive incoming data. Learners are classified as either sensing or intuiting perceivers, and thinkers and feelers. This is not a classification of learning styles that has widely been discussed but it can play an important role where decision making skills are being developed.

Sensing perceivers use their senses to attend to data. These learners take accurate and detailed notes during lectures. They focus on the incoming data and correctly record them, without ascribing meaning to or organising the data. The majority of adult learners are sensing perceivers of information. To make sense of or organise the data, these learners prefer an outline of the learning material or content with key point highlighted ahead of time (Dobbin 2001:4-5).

Intuiting perceivers are learners who consider the patterns or meaning of data they receive. They consider the significance of the information being presented, without taking notes. These learners have to be kept engaged and attending to the detail, and be challenged to support their understanding with facts, not just general statements based on a broad understanding (Dobbin 2001:5).

Learners who are classified as thinkers tend to make decisions on weighing the facts and considering the evidence. A logical decision-making process and ethical decision making are important to them, and they incorporate these skills in discussions. Reinforcing the logic behind decisions can reinforce thinking decisions. It is, however, important not to neglect the role that feeling or value-based decisions have in a profession such as a health care profession (Dobbin 2001:5).

Learners who are classified as feelers base their decisions on values and on previous decisions that worked for them in the past. They also view a logical decision-making process and ethical decision-making as important. It is, however, important to develop thinking decision-making skills, because thinking-based practice is highly valued in a profession (for example, in any health care profession).

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The presentation of challenging case studies and explanation of how decisions were made can be a good exercise (Dobbin 2001:5).

3.5.2.3 *Honey and Mumford learning style model*

The Honey and Mumford model identifies four basic learning styles, namely the activist, reflector, theorist and pragmatist. They may occur in variable combinations but each individual develops a preference for one of these styles. The aim of this model is to give practical guidance to develop learning abilities and help educators support learners in the learning process (Moelwyn-Hughes & Sayed 1993:15; Mumford 1986:7-8).

Research done by Honey and Mumford was in the field of management education. The objective was to promote effective learning by the understanding and use of individual learning styles. According to these researchers learning styles are part of the total learning context, and are influenced by the environment in which learning takes place. Their work, as well as their questionnaire, the Honey and Mumford Learning Style Questionnaire, was based on Kolb's theory of experiential learning (Moelwyn-Hughes & Sayed 1993:14; Mumford 1986:7).

The four learning styles of the Honey and Mumford learning style model are graphically represented in figure 3.4.

• *Activists* are learners who involve themselves in new experiences without thinking much of the consequences, tackling problems by brainstorming, and moving from one task to the next as the excitement fades. They enjoy the here and now, and tend to thrive on the short term crisis. These learners prefer to be involved with other learners, bouncing ideas off them, and solving problems as part of a team (Dux 1989:188; Moelwyn-Hughes & Sayed 1993:17; Presland 1994:180; Sadler-Smith 1996:31). Learning activities they will learn least from are those that involve a passive role (lectures, reading, watching), and where they are required to assimilate, analyse and interpret data (Moelwyn-Hughes & Sayed 1993:17).

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Activist

Pragmatist

Reflector

Theorist
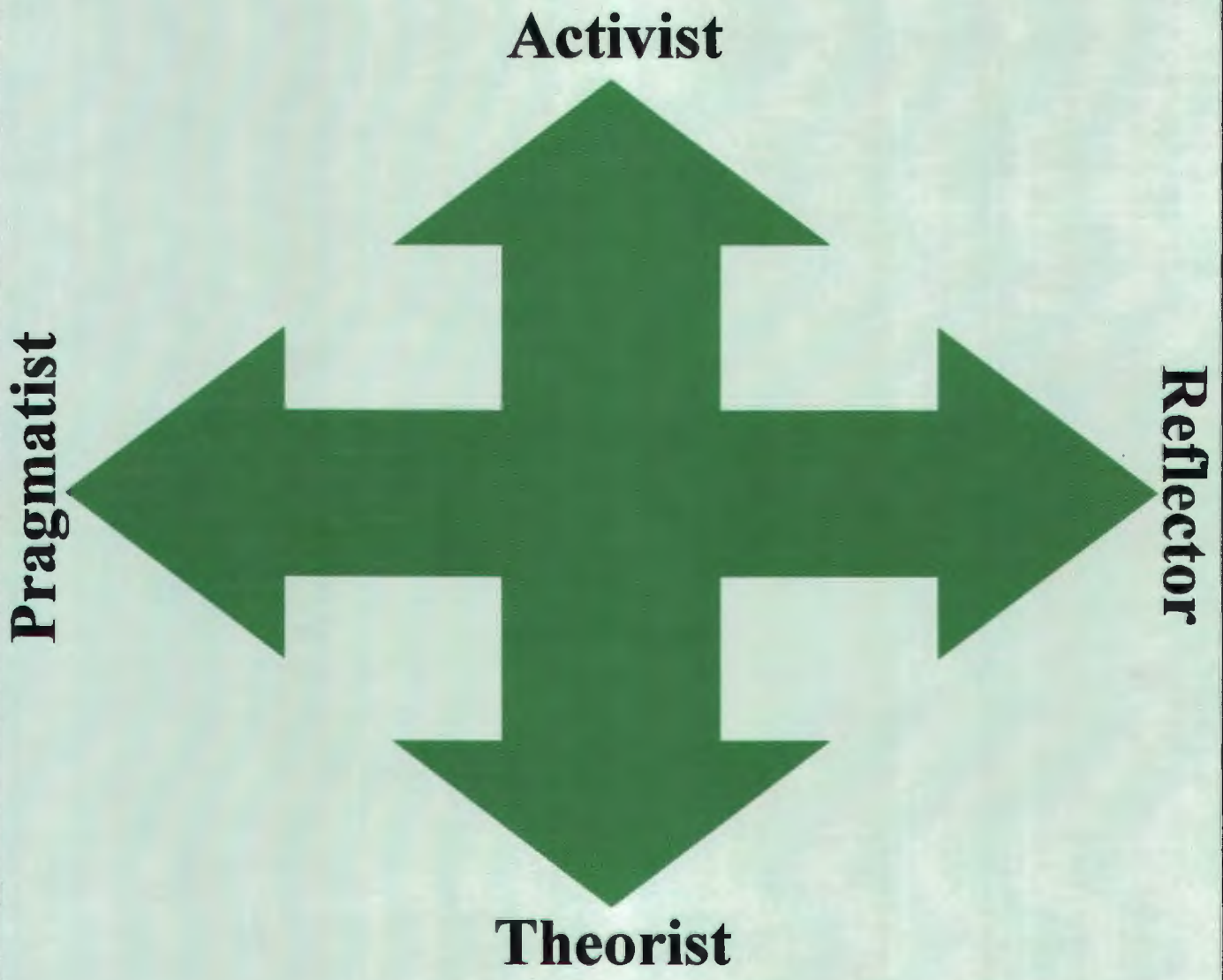
Figure 3.4
Honey and Mumford learning style model
(Mumford 1986:8)

- *Reflectors* are cautious and thoughtful learners who prefer to consider all the possible options before making any decisions and whose actions are based on observation and reflection. They like to stand back and ponder on experience or observe a group at work. These learners allow themselves to think before acting, to assimilate before commenting, thus taking time to prepare (Dux 1989:188; Moelwyn-Hughes & Sayed 1993:17; Presland 1994:180; Sadler-Smith 1996:31). Learning activities they will learn least from are those where they are forced into the foreground and have to act as a group or team leader, and where they are required to act without planning (Moelwyn-Hughes & Sayed 1993:17).

- *Theorists* are learners who integrate their observations into logical models based on analysis and objectivity. They are keen on basic assumptions, principles, theories, models and systems thinking. These learners appreciate rationality and logic, thus learning activities that are offered as part of a system, model, concept or theory. Being tested in a tutorial session is intellectually stimulating (Dux 1989:188; Moelwyn-Hughes & Sayed 1993:17; Presland 1994:180; Sadler-Smith 1996:31). Learning activities they will learn least from are those where they have to do an activity without a context or apparent purpose, and where they are required to be involved in unstructured activities in which ambiguity and uncertainty are high, such as open-ended problems (Moelwyn-Hughes & Sayed 1993:17).

- *Pragmatists* are learners who are practical and prefer to apply new ideas immediately, and get impatient with an overemphasis on reflection. They take the first opportunity to experiment. For these learners there is an obvious link between the subject matter and a problem (Dux 1989:188; Moelwyn-Hughes & Sayed 1993:17; Presland 1994:180; Sadler-Smith 1996:31). Learning activities they will learn least from are those where organisers of the learning seem distant from reality (theory and general principles), and where they have no clear guidelines on how to do activities (Moelwyn-Hughes & Sayed 1993:17).

According to this model the ideal learner would be the one who has the abilities characteristic of all four styles. Such ideal learners are rare. The learners who use reflective observation may predominate, with the other learning styles being used to varying but lesser degrees. However, no one particular style is better than the others but high levels of proficiency for all four styles are desirable (Sadler-Smith 1996:32).

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3.5.2.4 Gregorc learning style theory

Gregorc (1984:51) has provided a phenomenological definition of learning styles in which they are explained as consisting of distinctive behaviours which serve as indicators of how a person learns from and adapts to his or her environment. It also provides clues to the functioning of people's minds and how they relate to the world (Dunn, DeBello, Brennan, Krimsky & Murrain 1981:375; Marshall 1987:418).

Together with Kolb and Witkin's learning style theories, the Gregorc learning style theory is one of the most widely used theories. This theory is based on the Mediation Ability Theory which states that the human mind has four distinct channels through which it receives and expresses information most efficiently and effectively. Four distinct mind mediation channels are described, namely concrete sequential, abstract sequential, abstract random and concrete random (Carroll 1992:116; Duncan 1996:40). These individual differences are described as learning channels that are defined as the outward behaviours and the motivation behind the behaviours. Information is received and processed through these channels. Two mediation abilities are identified, namely perception and ordering. Perception is the way the learner grasps information. It is achieved either through abstract senses (ideas, emotion, intuition) or concrete senses (physical senses). Ordering is the way the learner arranges the information. It is achieved either through a linear, step-by-step manner (sequential) or a nonlinear, leaping manner that addresses numerous, diverse and independent elements (random) (Chase 1995:45). Gregorc (1984:52) suggests that individuals learn in dualities, through four channels, namely the concrete sequential channel, the abstract sequential channel, the abstract random channel, and the concrete random channel. They maintain that, although all learners have and use all four channels, one or two dominate over the others. These learning channels are called learning styles.

◆   **Concrete sequential learning style**

The concrete sequential learning style is characterised by thinking processes that are instinctive, methodological, practical, structured, and deliberate (Carroll 1992:116; Duncan 1996:40). It is the basis of the ability to do something in the concrete world, to work step-by-step, to follow specific directions and to move consistently towards the completion of carefully developed plans or frameworks (Gregorc & Butler 1984:28). These learners prefer a quiet, ordered, and stable

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environment. They are adverse to change and distractions have a negative effect on their learning. This learning style involves physical senses together with methodological thinking (Chase 1995:46). To learn information these learners memorise or drill (Duncan 1996:40).

✦ **Abstract sequential learning style**

The abstract sequential learning style is characterised by thinking processes that are intellectual, logical and rational (Carroll 1992:116; Gregorc & Butler 1984:28). These learners prefer abstract ideas and pictures (Duncan 1996:40). Learners prefer an environment that is quiet and well-controlled, and do not have a high tolerance for distraction. They view the overall picture, develop a blue print or framework from an idea and visualise the final product (Gregorc & Butler 1984:28). The development of long-term plans and the sequence of the activities are important. This learning style involves feelings and ideas together with methodological thinking (Chase 1995:46).

✦ **Abstract random learning style**

The abstract random learning style is characterised by thinking processes that are anchored in feelings and emotions (Carroll 1992:116; Gregorc & Butler 1984:28). These learners are sensitive and flexible (Duncan 1996:40). They prefer the total environment and one that is busy, and respond to situations out of their "gut feelings". They would look for excitement rather than focusing on a content outline (Carroll 1992:116). This learning style involves feelings and ideas together with diverse thinking (Chase 1995:46).

✦ **Concrete random learning style**

The concrete random learning style is characterised by thinking processes that are quick and impulsive and learners often make intuitive leaps (Carroll 1992:116; Gregorc & Butler 1984:28). These learners are creative, independent and curious (Duncan 1996:40). They prefer a stimulus-rich environment and thrive on change. They would function well in a new and chaotic environment. These learners prefer to investigate, experiment and invent new ways of doing tasks (Gregorc & Butler 1984:28). This learning style involves the use of physical senses together with diverse thinking (Chase 1995:46).

3.5.3 Cognitive personality style models

The cognitive personality style models are concerned with the underlying and relatively stable dimensions of an individual's personality, such as intuition, impulsiveness and perception. The models describe a broader aspect of human behaviour, have wide applicability in predicting behaviour, for example global versus detailed perception, and include learning behaviour within the scope of interest (Merritt 1989:3). This level represents the individual's approach to adapting information as it has been assimilated through information processing. This level represents relatively stable, underlying personality dimensions of individuals.

There are two personality types of thinking involved in the brain's processes, namely convergent thinking and divergent thinking. The personality type that mainly uses convergent thinking (left brain hemisphere dominant) is the type that tends to simplify approaching problems logically and seek conventional solutions. The divergent thinker (right brain hemisphere dominant) would be the type that seeks new, non-conformist answers, using given information as a basis on which to build a complex structure (Huston & Huston 1995:40). Although various cognitive personality style models exist, most educational systems have been mainly left-brain oriented, with emphasis on the skills of reading and writing (and arithmetic). Certain kinds of imaginative thinking, technical skills and humour are not held to be as valuable as the more "academic" or "intellectual" activities associated with words and numbers. There is, however, a need for learning style models fostering both hemispheres of the brain.

Cognitive personality style models are thus characterised by the following: they

- refer to individual differences in how one thinks, perceives, learns, solves problems, and relates to others
- are extensive, holistic dimensions of personality that can be assessed according to the perceptual techniques used by individuals
- are relatively stable
- are bipolar characteristics with each pole having positive, adaptive value under certain circumstances

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3.5.3.1 Field-dependence and field-independence learning style model

The extensive and in-depth research on cognitive styles conducted by Witkin is classified as a personality model that focuses on the field dependence-independence dimension of learning styles (Witkin et al 1977:1-5).

After observing airline pilots, Witkin (Sternberg 1997:135) identified the learning styles of field-dependence and field-independence. This research tested individuals' ability to distinguish between the significant and the contextual. He categorised them in terms of the degree to which they are dependent on the structure of the prevailing visual field. Some individuals are highly dependent on this field, whereas others are not. Certain individuals can, when in an airline, sense whether the airline is level with the ground or flying at an angle, without looking out the window. Others need to look out the window to figure out the orientation of the airline relative to the ground. Bipolar learning styles were identified. The one pole, field-dependent, is dominated by the organisation of the field or parts of the field as integrated or merged. The field-dependent individual has trouble separating the hidden form from its surrounding context. On the other pole, the field-independent pole, parts of the field are experienced as discrete from the organised background. The field-independent individual can look at a complex drawing and find embedded within it a figure or a shape. These styles refer to ways in which individuals perceive and order the world around them (Cleverly 1994:440; Garity 1985:12; Sternberg 1997:135). Carnwell (2000:1019) describes these learning styles as being relatively fixed.

In the interaction with fellow human-beings, field-dependent and field-independent individuals differ. Field-dependent individuals experience or perceive a pattern in the world around them as a whole. They find it difficult to focus on one particular aspect of a situation and there is relative inability to perceive parts of a field as discrete. They are better at learning material with social content because of their interpersonal orientation. They are attentive to social cues, feelings, close emotional and physical contact and social relationships. External referents/stimuli and reinforcement by externally defined goals, are more likely to motivate the field-dependent individual. The field-dependent individual is also more affected by criticism and takes on a more passive spectator role. The field-independent individual perceives a total pattern in separate parts and is able to analyse a pattern and identify its components. The field-independent individual is inclined to maintain a social distance, is more individualistic and is described as a cold person with an impersonal orientation. Their frames

of reference are more internalised and are therefore more self-directed. When solving problems, the field-independent individual is better at analysing complex, unstructured material and then organising it to solve the problem. Field-independent learners are more concerned with ideas than people. They also prefer active participant roles and readily test out their ideas or opinions in the group (Cleverly 1994:441; Garity 1985:13; Ostrow 1986:149; Partridge 1983:244; Quinn 1995:373-374; Woolfolk 1995:127).

Regarding the teaching approaches, the field-dependent and field-independent individuals also differ. The field-dependent individual needs structured material, clear instructions on how to solve problems and are dependent on cues for learning. They respond best to teaching methods where there is a shared responsibility between teacher and learner and are influenced by verbal as well as non-verbal feedback. The discussion method is usually the preferred method of teaching. On the other hand, the field-independent individual prefers to use hypothesis-testing approaches to problem-solving and therefore the lecture method. They prefer to define their own objectives and do not need structure or cues. The field-independent individuals can break down material and reorganise it. Where material contains social information, they may need assistance, whereas they are good at learning material with natural science content. The field-independent health care professional is often found in the surgical field whereas the field-dependent health care professional is likely to work in the psychiatric field (Cleverly 1994:441; Garity 1985:13; Ostrow 1986:149; Partridge 1983:244; Quinn 1995:374; Woolfolk 1995:127).

Field dependence-independence is a significant variable in a learner's selection of major learning areas, course and career. Field dependence learners opt for social sciences, humanities, counselling and teaching where extensive interpersonal relations are important. Field-independence learners opt for the analytical fields such as engineering, mathematics and science (Claxton & Murrell 1987:9).

This model is one of the most extensively researched learning style models and has had wide application to educational environments (Talarczyk 1989:265).

3.5.3.2 Reflectivity-impulsivity learning styles

The reflective-impulsive model of learning styles can be explained as a tendency to reflect over alternative solution possibility, and in contrast the tendency to make an impulsive selection of a

solution in problems with a high response uncertainty (Partridge 1983:245). Sternberg (1997:139) describes these learning styles as "relatively stable over time and task".

Individuals have different conceptual tempos when confronted with problems to solve. They will either complete less of a task, but do what they do flawlessly, or, complete as much as they can, recognising that they will make mistakes (Sternberg 1997:139). A learner will either have a tendency to quickly select the first answer which appears nearly correct or on the other hand give careful consideration to each alternative before selecting one.

Learners with impulsive styles come up with an answer to a problem quickly and report the first choice that occurs to them. The response is often inaccurate. They allow themselves to make mistakes and prefer to complete as much as possible of the task. These learners usually finish their multiple-choice questions in no time and often need to be given specific strategies for checking their work (Cleverly 1994:442; Quinn 1995:374; Sternberg 1997:139; Woolfolk 1995:127). It is also said that they are more likely to offer incorrect solutions on problems requiring inductive reasoning or visual discrimination (Sternberg 1997:139).

Learners with reflective styles are usually slow and careful responders but tend to answer correctly. They take time to review and analyse possible strategies before responding. They complete less of the task, but are more careful not to make mistakes. The reflective learner is less likely to fail, although intelligence cannot be related to these two different styles. The mere fact of being more careful when answering more slowly may be more effective (Cleverly 1994:442; Quinn 1988:106; Sternberg 1997:139; Woolfolk 1995:127). In contrast to the impulsive learner, the reflective learner makes fewer mistakes in word-recognition tests and inductive reasoning.

When under intense pressure, a learner's tendency to be impulsive or reflective becomes more exacerbated. The impulsive learner will find it difficult to take a more deliberate approach, whereas the reflective learner can become immobilised and unable to move ahead and complete a task (Partridge 1983:245). Sternberg (1997:140) also distinguishes between personality differences. Impulsive individuals tend to have minimal anxiety over making mistakes, and have an orientation towards quick success rather than towards avoiding failure. Impulsive individuals have relatively low standards for their performance, have low motivation to master tasks, and pay less attention to monitoring of stimuli, compared to reflective individuals.

3.5.3.3 Perceptive/receptive-systematic/intuitive learning styles

This model of learning styles examines information gathering (perceptive/receptive) and information evaluation (systematic/intuitive). Perceptive learners separate/filter incoming data, while receptive learners focus on detail and tend to disregard relationships and preconceived notions. Learners who systematically evaluate information pursue problems in an orderly sequential manner, as opposed to those who use an intuitive approach by quickly jumping from one possible answer to another in a trial-and-error method (Partridge 1983:245).

3.5.3.4 Riding and Douglas cognitive style model

Riding and Douglas (1993), cited in Presland (1994:179), define a cognitive style as a learner's habitual or typical mode of thinking, perceiving, remembering and problem solving which excludes preferences for specific learning strategies. Sadler-Smith (1996:32-33) explain the classification of learners as a grouping according to one or two principal cognitive styles. Learners differ in terms of two fundamental styles.

- The *wholist-analyst* is on a dimension of cognitive styles that processes information in a habitual way. At the one end of the dimension is the analytic learner who tends to process information into its component parts, whereas at the other end of this dimension the wholist tends to retain a global view of the topic (Sadler-Smith 1996:32-33). The analytical learner has a style that is deductive, rigorous, constrained, convergent, formal and critical (Presland 1994:180). Learners with an extreme analytical style have focussed attention, noticing and remembering details. They prefer procedures and proper ways of doing things step-by-step and in sequential organisational schemes. These learners are critical and logical thinkers. Wholist learners have a tendency towards scanning, leading to the formation of comprehensive impressions rather than more precisely articulated systems. The wholist learner is a more intuitive thinker than the analytical learner, and is likely to be more impulsive (Sadler-Smith 1996:32-33). They are described by words like synthetic, inductive, unconstrained, divergent, informal, diffuse and creative (Presland 1994:180).

- The *verbaliser-imager* is on a dimension of cognitive styles where information is represented in different modes. At the one end of the verbaliser dimension the learners tend to represents

information in memory in words and at the other end of the dimension they represent the information in memory in pictorial form (Sadler-Smith 1996:32-33). Imagers recall highly descriptive text better than acoustically complex and unfamiliar text, while the reverse is true for verbalisers (Presland 1994:181).

These two bipolar dimensions may be considered to orthogonal. Nine different types of cognitive (learning) styles were identified from this bipolar model. The learning styles are depicted in figure 3.5. It indicates the learner's position on the wholist-analyst and verbaliser-imager dimensions by means of ratios which indicate performance in the verbal mode relative to the imagery mode, and balance between seeing the whole and seeing the parts (Sadler-Smith 1997:55).

3.6   INDIVIDUAL DIFFERENCES IN THE LEARNING PROCESS

Because it is impossible to provide all learners with individualised educational and learning environments, other means of trying to accommodate diverse learners must be found. An outcome of developments in education and learning has been the elaboration of educational approaches that are sensitive to individual differences. Recognition of individual differences in the learning environment and educational setting is necessary to enhance the quality of education and learning. Apart from the impact this will have on general individual development and growth, it will also have bearing on knowledge of the individual as a learner and will contribute to analysis and presentation of the body of knowledge (subject matter).

Six important specifications that are necessary for educating within a climate that addresses the individual needs of a learner are:

- cognitive predispositions of a learner, which are knowledge, skills and abilities that will influence performance
- affective predispositions of a learner, which are interests, attitudes and self-concept that are brought to a learning situation
- the ways in which the body of knowledge is structured in order for efficient and effective learning to take place
- the sequencing and best method of presenting that body of knowledge
- the mechanisms necessary to continuous learning
- methods of assessment of performance and of the teaching approach used (Child 1997:142)

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Wholist Verbaliser	Wholist Bimodal	Wholist Imager
Intermediate Verbaliser	Intermediate Bimodal	Intermediate Imager
Analytic Verbaliser	Analytic Bimodal	Analytic Imager

Figure 3.5
Riding and Douglas cognitive style model
(Adapted from Sadler-Smith 1997:56)

Cognitive and affective predispositions refer to the characteristics with which the learner enters the learning environment. These characteristics are part of the history of the learner. The learning style of a learner will be determined by these predispositions. The learner, with this individual learning style, approaches a learning situation where a body of knowledge is being structured in a specific way, where the sequence and method of presentation have been determined, and where specific mechanisms for reinforcement exist. The learning outcomes which are the effect of the learning that has taken place are then assessed. These outcomes then become a part of the history of the learner with which he or she will enter the next learning situation. A cyclical process develops.

Figure 3.6 illustrates the importance of knowledge of the entry predispositions and thus learning styles to find ways of placing the learner in a learning environment where the learner can cope with the learning process. In the learning environment learning is managed through the structure of the body of knowledge, the sequence and method of presentation and the reinforcement methods. Learning outcomes need to be considered alongside entry predispositions because knowledge of the learning destination is as important as choosing the route to get there. Assessment is an essential part of the management of learning. Effective assessment strategies are necessary to enable the educator to tailor learning to individuals, to evaluate the appropriateness of the learning and to evaluate the educational process that took place. To make an accurate diagnosis and treat the individual competently, the assessment process is particularly challenging and must be an essential part of the learning process.

3.7 CONCLUSION

Although there is no unified conceptual description of learning styles, there is enough evidence to support a contention that such an educational entity exists at the paradigmatic level. Knowledge of learning styles provides a potentially powerful basis for educational guidance. A wealth of information is made available that can help the learner and the educator scientifically to individualise learning. This does not imply, however, that educators can no longer teach groups of learners but that individual differences can be addressed in the teaching-learning process. It has relevance for both the course of individual learning in various subject matter areas and for the nature of the learner-educator interactions and social behaviour in the learning environment. Certainly the direction of higher education should be towards obtaining more detailed knowledge of the individual learning styles of the learners involved.

Will contribute to development of further and more predispositions

Outcomes will be assessed

Form the learning styles

Cognitive predispositions

Affective predispositions

Learning environment

where

➣ **Body of knowledge is structured**
➣ **Secquence and methods are determined**
➣ **Mechanisms that promote continuous learning**

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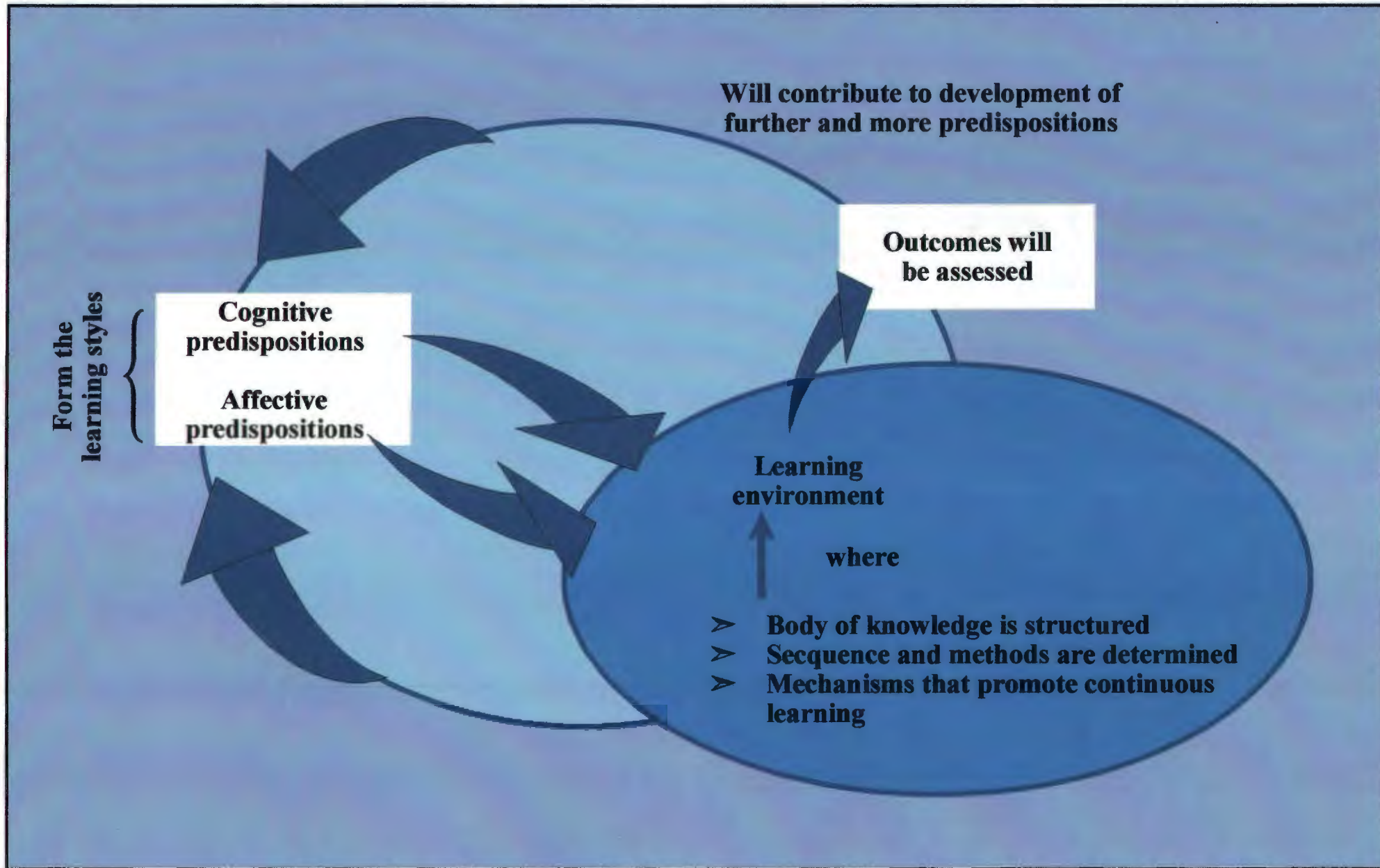
Figure 3.6
Individuality in learning
(Developed from Child 1997:142)

This chapter served as an analysis and exploration of the concept of interest. In the following chapter the process of learning is explored, learning theories are described and related to the concept of learning style, and related phenomena are discussed.

CHAPTER 4

LEARNING IN HIGHER EDUCATION

4.1 INTRODUCTION

Higher education is faced with the challenge of providing adequate preparation for learners who are to enter the professional world as adults. Learners are called on to master a large body of information, not only to remember detailed facts, but also to make practice applications based on their knowledge of complex subject matter. Higher education is engaged in a sustained and continuous process of maximising the quality of its output. Thus, it is vitally important for educational institutions to focus on improving the critical variables in higher education. One of these critical variables is learning styles.

In the previous chapter the concepts of learning styles and learning style models were analysed and specific distinctions were made as to the how, when and where of learning. The emphasis on individual differences within the process of learning is placed on the *how* of learning rather than on the abilities of the learner or the content of instruction. The assumption underlying the use of learning style information to plan the educational process is that individuals learn more and better if allowed and guided to learn the way they prefer to, and are more motivated to learn if assisted in this manner.

This chapter forms part of phase 1 of the research that addresses the aim of developing a conceptual model that recognises and promotes individual differences within the learning process in any learning environment for higher education. In so doing, the model aims to encourage the development of independent learning and learning for understanding through the acknowledgement of individual differences in the learning process. In order to understand individuality in the learning process, it is necessary to explore the concept of learning. Theories of learning are analysed to gain an understanding of how individuals learn. The analysis of the concept of learning serves as a guideline towards an awareness and the promotion of learning styles in higher education.

4.2 THE NATURE OF LEARNING

Learning is a very complex phenomenon. Different views on this phenomenon exist, and it is

described in many different ways. It is necessary to understand learning in order to structure the educational process and environment. By exploring the phenomenon, and discussing the different views of theorists and researchers, differences and similarities have been pointed out and commonalities identified.

Learning is the perceiving and storing of information or content that is reproduced at an appropriate time. It is a process of active and social construction of meaning through a process in which the learner uses competencies to construct the meanings (Kruger & Adams 1998:7). Learning is the mastering of competencies with the emphasis on how material is being taught and not on what is being taught. Cullingford (1990:205) describes learning as a "skill that enables an increasing accumulation of knowledge".

Learning is an interactive process between the learner and the environment (Arndt & Underwood 1990:28; Slavin 1991:125). Learning as a continuous process is based on the reality that the learner does not enter the learning process without any prior knowledge. It is a process of constructing meaning through discovery (Slabbert 1993:38). Some preconceived ideas may exist about a fact or phenomenon, which may be inaccurate and not well-formed. The goal then should be to assist the learner to refine existing knowledge or ideas, or to cast them off completely if necessary (Arndt & Underwood 1990:29). Learning takes place intentionally, when a learner acquires information presented to him or her, or unintentionally, when a learner reacts to an experience (Slavin 1991:98, 125).

Learning may occur through experience (by reflecting on what happens after an event) but experience alone is not sufficient. It must be an active experience in which observations and reflections are interpreted and integrated into cognitive processes to become new or expanded knowledge (Smith & Russell 1991:285). Learning then follows. The effort invested in the experience will determine the quality of the learning that took place. Individuals learn most if they are enabled to find ways of gaining new knowledge from experiences and of applying and evaluating established theories/knowledge. Capitalising on experience therefore becomes a key challenge for both educator and learner.

A behaviourist view of learning is that it is a change in an individual that results from experience. Experiences bring with them a change in cognitive, psychomotor, and/or affective behaviour (Dobbin

2001:10). This involves the acquisition of abilities that are not innate. The acquisition of new knowledge need not result in change, for learning to take place. He proposes that learning is the acquisition of knowledge, skill and attitude through study, experience and education.

Kolb (1984:38) defines learning from an experiential perspective as a process whereby knowledge is created through the transformation of experiences. The process involves four dimensions:

- concrete experience which involves feeling
- reflective observation which involves watching
- abstract conceptualisation which involves thinking
- active experimentation which involves doing (Kolb 1984:31)

Learning continues to have a distinct purpose for the individual and the individual's relationship with others, which creates a level of self-knowledge. Self-knowledge is not just the end of learning or a rectification of learning, but is also a means of learning in itself. Some kind of self-knowledge is always included when learning takes place. Self-knowledge is not just a form of self-consciousness or means for success. The kind of self-knowledge that evolves from learning is neither only about the individual nor about success measured by outcomes, but is a relationship between the two that stems from individuality and the quality of thought (Cullingford 1990:207). Self-knowledge is also a combination of academic learning skills and self-control that makes learning easier, and motivation that includes the skill and the will to learn (Woolfolk 1995:366). Self-knowledge of individuals is thus a combination of knowledge of the:

- *Self.* How they learn best, including their learning styles, what is easy and what is difficult for them, how to cope with the difficult parts, what their interests and talents are, and how to use their strengths.
- *Learning material.* The more they know the easier it is to learn more.
- *Learning activities and tasks.* Different learning tasks require different approaches on their part, and self-knowledge enables the learner to apply specific strategies to specific tasks as they are required.
- *Context.* They think about the context in which they are to apply their knowledge, and when and where they will use their learning which enable them to set motivated goals and make future plans.

Self-knowledge is comprehensive in that it involves the individual, the learning environment and the learning process, and is based on knowledge of the self. Acknowledging individual differences in learning will therefore contribute to self-knowledge.

Learning is thus an active process by which individuals construct their own knowledge based on their existing knowledge and on interaction with the world around them. This process entails not only absorption and discovery, but also construction of meaning. Learners' existing knowledge serves as an interpretive framework for newly constructed knowledge. Learning is a lifelong, cyclic experience that serves as a constant modifier of new knowledge through thinking, feeling, perceiving and behaving.

Learning encompasses individual preferences for a grasping dimension of concrete understanding versus abstract understanding, and a processing dimension of being actively involved versus reflecting on something. Learning also includes reflection that includes an act of thinking about what one has learned as well as how one learns. It involves a great deal of introspection as individuals continually look inward to examine their own styles, beliefs, biases, behaviours and skills in approaching the learning environment and learning content.

The different qualitative concepts of learning that are identified, are that learning is:

- a measurable increase in knowledge
- memorising new information
- acquisition of facts, methods, procedures and skills which can be retained and utilised when necessary
- the abstraction and construction of meaning
- an interpretative process aimed at the understanding of concepts, ideas or aspects of reality

4.3   THEORIES OF LEARNING

Adult learners are in an environment where there are overwhelming learning needs. A basic understanding of adult learning theories is useful in developing creative and effective learning opportunities and teaching strategies. Modern learning theories focus on the attributes of the learner,

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not the educator. Understanding what motivates and facilitates learning is thus important. This understanding allows educators to structure the education they offer to improve learning.

As individuality in the learning process is of specific relevance in this research, a holistic understanding of the learner is necessary. In order to understand the cognitive, psychomotor and affective processes of learners, relevant learning theories will be discussed below.

4.3.1 Andragogical learning theory

Andragogical learning theory is the cornerstone of adult education. Andragogy is a philosophical orientation for adult education. Adult education is built upon the concepts of andragogy (Nielsen 1992:148). Knowles (1980:13) bases his approach to adult learning on the differences between the learning and education of adults and children. Adults differ in some fundamental ways from children, and do therefore require a different educational system. An adult education system includes the ideas that:

- Adult education should be based on the learners' wealth of prior experience. Their experience should be the starting point for organising adult learning activities.
- Adults need to be able to apply what they learn. Their orientation to learning should be used to organise learning and life situations.
- Adult education should be an active rather than a passive process. Because of their need for self-directness, adult learners play a major role in the teaching-learning process. (Burnard 1989a:302; Nielsen 1992:148).

The above ideas may also be applicable to children, and can therefore not be confined to the education of adults. Andragogy can in fact be described as an attitude towards education rather than as a theory of adult education. For the purpose of this research, the learners are all drawn from the higher education system.

Andragogical learning theory has much in common with a learner-centred and individualistic learning approach, and with experiential learning, which emphasises the focus of personal experience and subjective interpretation. The successful implementation of adult learning theory requires collaboration between the educator and the learner.

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The four basic assumptions of andragogy are:

4.3.1.1 Adults have a desire and tendency to self-directness

Adult learners are mature, self-directed people who have extensive life experience. They are motivated and focused towards solving problems that exist in their immediate environment (Linares 1999:407; Marquis & Huston 2000:247). Adults desire and have a tendency to take responsibility for their own learning, by making an active input into the learning process. As they mature, their self-concept moves from one of a dependent personality towards one of a self-directed person (Knowles 1980:44). They are self-directed in determining their learning needs and monitoring progress with guidance. These learners are less tolerant of an educational system with rigid rules and procedures. The educator is responsible for creating a supportive environment where learners feel they can achieve (Dobbin 2001:3).

Brookfield (1988:321) quotes Paterson (1979) by explaining adult education as "... a purposive activity directed to the fuller development of adults as persons in their personhood by the taking of measures which are proper for this purpose". Personhood takes two forms, namely the enlargement of awareness, and the development of experience and knowledge characterised by breadth and balance. Developing the qualities of personhood requires adult education to be manifested by deliberateness, willingness, conscious control, interpersonal encounter, and active participation by the learner. It is also said that learning takes place when the subject matter is perceived by the learner as having relevance for his or her own purpose (Nielsen 1992:148).

Adults learn best when they play an active role in planning, implementing, and evaluating their own learning (Dobbin 2001:6). External threats should be kept to a minimum in situations where learning is perceived as threatening to the self. Self-evaluation and self-criticism are also more acceptable to adults than evaluation by others (Nielsen 1992:148).

Self-directed learning is described as intentional learning where the learner's major role is to gain and retain clearly defined knowledge or skills, or to produce a lasting change in behaviour, attitudes or knowledge of the self (Linares 1999:407).

Elements such as taking responsibility for one's own learning, being self-directed, having an enlarged awareness of one's personhood, taking conscious control, and perceiving subject matter or content as relevant, specifically relate to an educational approach where individual learning styles are acknowledged and fostered in the learning process. Self-directness and learning styles are thus presumed to be related learning characteristics that influence the way an individual approaches and interacts with the learning situation. This conclusion is supported by research that demonstrated a positive relationship between self-directness and learning styles when adaptive flexibility in the context of various learning situations was explored (Linares 1999:407).

What is to be learned and how this is to be done, is determined by the learner, who also takes primary responsibility for the learning process. Being aware of and acknowledging the reality of individual differences in the learning process makes the learner highly self-directed in the educational environment.

4.3.1.2 Adults have a rich resource of experiences for learning

When adults enter the learning environment they already have a great variety of experiences. These experiences are responsible for differences in the way adult learners solve problems and organise their thinking (Dobbin 2001:3). For an adult, personal experiences establish self-identity and are therefore highly valued (Knowles 1980:44). Because of this rich resource of experiences they learn more effectively through methods where their experience can be utilised, such as discussions and problem-solving (Mellish, Brink & Paton 1998:36).

Because adults derive their self-identity from experience, they may easily feel rejected when this experience is ignored. Experience can, however, also have a negative effect on learning because of the tendency to develop presuppositions and mental habits and biases. These tendencies may block the mind to new ideas and perceptions on different ways of thinking (Knowles 1986:57-58).

Experience can sometimes also be an obstacle to learning. Adults often have well-established attitudes, convictions and thinking patterns and may find it difficult to learn or apply new ways of thinking and doing if these contradict their beliefs and experience. Educational experiences are also brought to the educational setting. A discrepancy may arise where educational programmes are too confined or rigidly devised and require learners to follow the path laid out for them. This approach

disregards the input from learners. To promote independence, learners must be involved in the analysis, planning and evaluation of their educational programmes. They must be assisted to trust themselves as a resource for learning and to engage in negotiation about the educational process.

4.3.1.3 Adults have specific learning needs which govern the way they learn

Adults readiness to learn depends on what they feel they need to know and do. Learning takes place in relation to the specific learning needs created by the tasks and problems encountered in their everyday life. They become ready to learn when they experience the need to know and do. This readiness is stimulated by curiosity, challenge and a desire for better performance, and an urge to cope effectively (Knowles 1986:59).

Knowles (1986:60) maintains that adults are oriented towards completing a task, solving problems and improving their lives. They will therefore acquire new knowledge and skills more effectively when learning is presented in the context of application to real-life situations. Adult learners also value social interaction with educators and peers during the learning process as an important part of the learning process (Dobbin 2001:3).

Applying the learning context to real-life situations is not without limitations. In health sciences education, for example, educators may find it difficult to focus on learners' real-life concerns as advocated by Knowles (1986:60) within the confines of a structured curriculum as part of statutory education and training. Other work-related programmes, for example, where the training and education form part of the conditions for employment, learners might have little or no sense of need if the learning context is not related to real-life examples.

It can be concluded that adults readily engage in some form of learning, which can be linked to some confound circumstance, based on problems, challenges or needs arising from their real-life situation. They seek to enhance their identity through learning and want to be able to apply what they have learned. By acknowledging their individuality this need is enhanced.

4.3.1.4 Adults apply new knowledge and skills

Adults are considered to be motivated to grow and develop. Although both intrinsic and extrinsic

motivation is necessary, adults are more motivated by intrinsic motivators such as self-esteem, quality of life and job satisfaction. These motivators can, however, also become barriers to learning when they are negative, as, for example, where the adult experiences negative self-esteem or limited job opportunities. When the principles of adult education are violated and the learner is not able to maintain a positive level of motivation, adult learners will not apply new knowledge and skills and effective learning cannot take place (Knowles 1986:61).

Adult learners are most likely to be motivated to learn when actively solving real problems with new information. They want to be able to apply new knowledge and skills which they learn, immediately, which implicates a problem-solving and task-centred approach in education.

Based on the above assumptions, various theorists (Knowles 1976; Lindeman 1926; Rogers 1969) cited in Nielsen (1992:148-149) maintained that the educator of adults should not be seen as a teacher, but rather as a facilitator of learning. Furthermore, they maintained that teaching is a vastly overrated function and pointed out that the facilitation of learning should be the aim of education.

The following conclusions were made about adult education. Adult learners:

- want to be regarded as being unique
- tend to be motivated when they are solving immediate problems
- want to apply what they learn as soon as possible
- want to know detail and therefore participate actively
- have life experiences that they can draw upon
- prefer to function independently

Adults thus have a need to be regarded as individuals with their own characteristics, accumulated experiences, and specific life roles and tasks.

4.3.2   Behaviourist learning theory

The crux of behavioural approaches is to explain learning in terms of stimulus and response. Learning occurs when experience causes a relatively permanent change in an individual's knowledge or behaviour.

The behaviourist learning theory is based largely on the work of Pavlov and Skinner and can be summed up by "... behaviour is determined by its consequences" (Dobbin 2001:2). The theory emphasises observable behaviour. The term "behaviourist" derives from the fact that this school considers that only observable behaviour can be used to explain learning (Quinn 1995:89; Slavin 1991:99).

The proponents of the behaviourist learning theory believe that learning is achieved only when there are contingent rewards for learning. To internalise new knowledge or a new skill, the reward should closely follow the learner's application of the learned information (Dobbin 2001:2). The learning environment is a formal one where the educator controls the environment. Clear learning objectives are set, learning experiences are directed by the educator towards meeting the objectives, and learning is observed constantly. By observing learning, the educator can give positive reinforcement after each evaluation session. Evaluation is a means to determine progress, performance, effectiveness, efficiency, and achievement. Bevis and Watson (1989:263) describe evaluation as the driver in a behaviourist curriculum.

Dobbin (2001:2) describes the positive reinforcement in the learning environment that motivates learners as the most usable aspect of behavioural learning theory. Clearly stated learning objectives and outcomes must be discussed with the learners so that they know what behaviours are to be rewarded. Principles of the behavioural learning theory are useful in changing the behaviour of a learner.

A limitation of the behavioural learning theory is that the learner's process of thinking is not as important as achieving the objectives and outcomes, or giving correct answers. What it does not take into account is the learner's interaction with the process of learning new information or gaining new skills (Dobbin 2001:2). The theory focuses almost exclusively on observable behaviour (Slavin 1991:124). This may have an influence on situations where a learner must use other thinking processes to draw a conclusion or become competent in a certain skill. Less visible learning processes, such as concept formation, learning from text, problem-solving, and thinking, are difficult to observe directly and have therefore been neglected by behavioural learning theorists.

A behaviourist curriculum creates an environment which promotes conformity and compliance, and suppresses the development of creative, independent thinking in learners. Implicit in such a

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curriculum are shortcomings such as:

- aspects of knowing (creativity, critical thinking) basic to higher education that do not fit this learning theory
- educator-directed learning activities which reinforce passivity in the learner and forfeit accountability for learning
- emphasis on the presentation of content with minimal attention assigned to meanings
- minimal acknowledgment of differences in learning styles amongst learners
- emphasis on less relevant behaviours at the expense of more important outcomes

Because the behavioural learning theory proposes a dogmatic, controlled and inflexible teaching-learning environment, where emphasis is placed on extrinsic motivation, it does not play a significant role in higher education where learners are adults. In health sciences education, for example, it is sometimes used to reinforce certain skills, but does not play a significant role as it suppresses the creativity in the learning environment which is often necessary where a practitioner has to improvise and react fast. Although this approach has served the health sciences profession well in an era when it needed to be legitimised, it is now clear that it does not fully support an educative mode of teaching or learning required to prepare the future independent health care professionals. This theory is also not very useful to a learning environment where the learner is regarded as an individual with his or her own individual learning style and with a preference as to how learning should take place. It is, however, useful when used as a reinforcement to strengthen behaviour or repeat positive behaviour. In the educational environment behaviour is rewarded through feedback and by setting objectives and determining the outcomes thereof. The behaviourist theory is of interest to the educator where it has bearing on how new behaviour is formed.

4.3.3 Cognitive learning theories

Cognitive learning theories are specifically directed at how learning occurs and explore the development of thinking (Slavin 1991:191). These learning theories focus on the learner's mental processes in understanding the meaning of information and the learner's ability to relate the information to existing knowledge (Dobbin 2001:2). The structures of knowledge are important as well as abilities such as perception, attention, memory, problem-solving abilities, comprehension, and metacognition. Unobservable aspects, including knowledge, meaning, intention, expectations,

feelings, thoughts and creativity, are also important to the cognitive learning theorists (Woolfolk 1995:241).

The cognitive view of learning emphasises insight, thinking, meaningfulness and organisation of information as being essential for learning to take place (Mwamwenda 1995:213). Cognitive researchers describe learning as a holistic process in which perception, speech and action serve as mental internalisation. The learner then "acts upon the world" in which he or she exists (Presseisen 1992:1).

A highly valued aspect of learning using this theory is the ability to apply knowledge to real-life situations. Learning activities must be planned in such a way that they allow the learner to discover relationships between new information and previously learned material (Dobbin 2001:2). Critical thinking as goal or outcome is used by cognitive theorists. Discussing examples and making comparisons to what the learner already understands are highly suitable methods of instruction. The use of case studies is based on an appreciation of cognitive learning theory. Because a limited amount of new information is presented in each case study, a learner is allowed time to think about the concept and relate the new information to what is already known. Cognitive learning theory is less suitable for teaching large quantities of new information.

Learners are regarded as active processors of information who initiate experiences that facilitate learning (Woolfolk 1995:241). Cognitive learning theorists propose that learners can control learning activities and organise the field of operation, and have an inherent capacity to learn (Mwamwenda 1995:213).

The proponents of cognitive learning theories take the learner's thought processes into consideration when defining the learning process. The learner is described as an active and accountable participant in learning new knowledge and gaining new skills (Dobbin 2001:2).

Cognitive psychologists have shown great interest in how learning occurs and how educators can facilitate learning. Discovery learning, reception learning and conditions for learning are all important concepts in acknowledging individual differences in the learning process (Mwamwenda 1995:215-221).

4.3.3.1 Bruner's discovery learning

Discovery learning involves learners' discovery of what they are capable of doing or thinking for themselves. Discovery does not necessarily mean coming up with new knowledge that is unknown to anybody else, but coming up with knowledge by oneself. It involves rearranging or transforming evidence so as to obtain new information or insights. In discovery learning it is vital to provide learners with opportunities to engage in thinking, insights and problem-solving as an integral part of education, in order to encourage discovery (Mwamwenda 1995:214). Inductive processes leads the learner to the discovery of principles and concepts underlying the learning material that is studied or investigated. Learners are thus given the opportunity to discover for themselves. This process requires active participation by the learner (Woolfolk 1995:317).

Discovery learning entails intuitive thinking as a form of inductive reasoning, as part of discovery learning. This reasoning must, however, be subjected to scientific analysis before it is accepted as facts (Mwamwenda 1995:214; Woolfolk 1995:318). The role of the educator is primarily to provide learners with feedback on their performance. According to Bruner's theory, feedback is given through motivation, reinforcement, by giving the learning material in sequential order, and according to the learner's cognitive structure (Mwamwenda 1995:215; Slavin 1991:192).

When the nature of discovery learning is related to the experiential learning model, this theory of learning supports the processes of thinking and doing through problem-solving. It further supports the importance of self-knowledge. The educator presents examples (or problems) to learners, and the learners work with the examples (or problems) until they discover the interrelationships in the learning material. The way the learner prefers to approach the example or problem is part of the discovery process. Discovery learning provides the learner with an opportunity to use dominant learning abilities, identified through learning style assessment, to experience, explore and learn spontaneously as an independent learner. Because discovery learning stimulates and promotes thinking, showing and using insight, and problem-solving, it is applicable to adult learners who are expected to solve problems effectively. Discovery learning is thus appropriate in a higher education environment where individuality, expressed in learning styles, is promoted.

4.3.3.2 Ausubel's reception learning

Reception learning refers to a learning situation where learners are presented with all possible information on a given topic in its final form. Reception learning is meaningful because what is being learned is based on existing knowledge (Mwamwenda 1995:216). Although described as part of reception learning, meaningful learning, which is regarded as an important concept in the learning process, is discussed separately in section 4.5 of this chapter.

In reception learning, a learner is in a better position to learn, understand and recall a body of information if it is related to what is already known. Knowledge is acquired primarily through reception, rather than discovery (as in discovery learning). Concepts, principles and ideas are presented in an organised and focused manner. The learner then incorporates the new learning material into existing structures of knowledge (Mwamwenda 1995:216; Woolfolk 1995:319). The role of the educator is to structure the learning situation, to select the learning material that is appropriate to the learners, and then present them with well-organised material. Learning then progresses through deductive reasoning, in other words from the general to the specific, or from a principle to an example. The educator arranges the setting of facts and ideas, and the learner then derives more specific examples (Woolfolk 1995:320). This way of educating is often called expository teaching, which implies an educator-planned method of instruction (Slavin 1991:194). The role of the educator in this approach differs from the role of the educator in discovery learning. However, there are some commonalities in their roles, namely the fact that both require learners to be actively involved in the learning process, and that they emphasise the importance of prior knowledge to gain new knowledge. The limitation of reception learning lies in the core of the approach, which is educator-planned. It does not support the contention that learners in higher education must function as independent learners.

Reception learning is based on the contention that it occurs as a result of a relationship between what a learner already knows and new knowledge. When the nature of reception learning is related to the experiential learning model, this theory of learning supports the process of reflective observation. If the learner is given as much information on a topic as possible, the learner has the opportunity to reflect on the given information. The learner then has the opportunity to select information on the basis of what is more applicable or suitable for him or her to process according to dominant learning abilities or preferred ways of approaching learning material. Through deductive reasoning the learner

then arrives at more specific examples or answers.

4.3.3.3 Gagné's conditions for learning

Gagné's theory of learning (1974) proposes that certain conditions must be satisfied if learning is to take place. These conditions are related to certain events of instruction, and steps in the transmission of information. His theory sets out the relationship between the events of learning and the events of instruction. The events of learning encompass eight phases, namely the motivation phase, the apprehension phase, the acquisition phase, the retention phase, the recall phase, the generalisation phase, the performance phase, and the feedback phase. The events of instruction are: activating motivation and informing the learner of the objective; directing attention; stimulating recall; providing learning guidance; enhancing retention; promoting transfer of learning; and eliciting the performance by providing feedback (Mwamwenda 1995:221-224; Slavin 1991:195-199). The relationship between the two sets of events essentially lies in the fact that the events of instruction must be designed to lead learners through the steps they must accomplish to learn.

This theory addresses insights as to how learning takes place, including the type of learning that occur and the process of learning. The type of learning refers to signal learning, stimulus-response learning, simple chaining, verbal association, learning discrimination, concept learning, rule learning, and problem-solving. It is important that educators bear in mind that learners cannot engage in problem-solving before they are capable of discriminating between rules or principles. The process of learning implies that a learner is able to recall information and engage in discussions, revision and assignments based on and related to a topic that has been learned (Mwamwenda 1995:224).

The importance and relevance of this theory lie in the fact that instruction or the educational process must support the learner through the necessary cognitive steps so that learning can take place. This does not mean that learners cannot or should not go through the learning process on their own, but that the learning environment should be structured in such a way that learning is promoted. Educators can facilitate learning by motivating learners and equipping them with the necessary information before presenting new information. This implies that learners must be granted the opportunity to go through this process in a way that best suits their needs.

4.3.4 Humanistic learning theories

The humanistic learning theories all share a view of man as a holistic being, with thoughts, feelings and experiences. These theories acknowledge people's natural need to fulfil their own potential. The basic principles of humanism include a belief that an individual constructs his or her own reality by perceiving something as real and important.

Humanistic approaches to education emphasise the importance of feeling, open communication, and the value of every learner. An attitude of caring and respect for learners is part of this approach. The emphasis is placed on the dignity and worth of an individual and maintains that a learner has within himself or herself the ability to correct the imbalance between the individual and the learning environment (Mothata 2000:80). In line with this, humanistic education emphasises the relationship between the educator and the learner, and the development of the learner's full potential. This relationship includes opportunities for collaboration and dialogue between educator and learner. The learner becomes an active rather than passive participant who is accountable for his or her own learning, and whose past experiences have value and worth in the new learning situation (Watson 1997:20; Woolfolk 1995:493).

Humanistic education is focused on the affective outcomes of education, on learning how to learn, and enhancing creativity and human potential (Slavin 1991:264). One of the most important ideas behind humanistic education is that learners are granted the opportunity to direct their own learning in choosing what they want to learn, how they want to go about learning the content and to some degree, when they want to learn it. This supports the idea of learners being self-directed and self-motivated.

These theories are in direct contrast with those of behavioural theorists, who disregard inner feelings and experiences. Humanistic theorists differ from cognitive theorists as well, in that the latter are concerned with the thinking aspects of a person's behaviour.

The humanistic theory explains curriculum as the transactions and interactions that occur between and among learners and educators with the intention of allowing learning to take place (Rush, Ouellet & Wasson 1991:122). This view therefore describes the essence of a curriculum as interactional processes around content. Adopting such an approach requires a positive attitude towards the

complementary role of an educator in the learning process.

The humanistic approach has implications for both educators and learners. These implications are that:

- a flow of information is the interdependent exchange of information which takes the form of a dialogue
- both interactions and content form the basis for learning, where the content is the medium for the interactions rather than the substance of the learning itself
- educators and learners are active co-participants in the learning process, where both educators and learners decide what needs to be learned and how it is to be learned
- expertise and ability in interpersonal and learning processes are prerequisites for educators and should be a goal for learners

Humanistic theorists stress the importance of intrinsic motivation, with the need for self-actualisation as an essential component of motivation. Learners are continuously striving towards realising their unique potentialities and are self-directed and self-motivated. The individuality or uniqueness of each learner is recognised and valued. Each learner is believed to have potential and possess the power to achieve, to solve problems and to develop into a successful person (Watson 1997:23).

When the nature of humanistic theories is related to the experiential learning model, these theories of learning support the process of learning through experience, with each individual bringing along his or her own experiences as a holistic being, with thoughts, feelings and previous experiences.

The learner-centred learning environment that is advocated by the humanistic theorists is congruent with the concepts of individuality and independence in higher education. Active participation in the learning process involving feelings, intrinsic motivation, independence and self-reliance is an important concept in facilitating meaningful learning. The application of humanistic educational concepts can contribute towards the development of a learning environment where individuality in the learning process is fostered and promoted.

Learners in higher education are specifically guided towards developing responsibility, accountability, and the professional and personal independence necessary to function in a profession. This level can

only be reached if they are self-directed, and have achieved self-actualisation. A holistic approach respects an individual as a unique being. A self-actualised learner becomes a responsible professional who respects other individuals, and functions as a responsible, accountable, and independent professional.

4.3.5 Social learning theory

Social learning theory is a direct outgrowth of behavioural learning theory. It bridges a gap between behavioural theory and cognitive theory. Social learning theorists acknowledge that learning is guided by what is observed (behaviour), through direct experience and observation. They also acknowledge the importance of cognitive processes such as observational learning as an ongoing process. Social learning theory is therefore primarily based on what an individual learns as he or she interacts or observes in the learning environment (Mwamwenda 1995:203).

Social learning theory involves four separate processes, namely that people learn as a result of the direct experience of the effects of their actions, that knowledge is frequently obtained through experiences gained from others (such as observing someone else), that people learn by judgments voiced by others, and that people evaluate the soundness of the new information by reasoning through inductive and deductive strategies (Marquis & Huston 2000:249). Factors that promote the occurrence of social learning are attention (deliberate and calculated attention leads to maximum learning), memory (short-term and long-term memory that can be retrieved), motor skills (applying and practising skills after observing behaviour), reinforcement (reward for particular behaviour enhances learning), identification (with specific role models' behaviour, attitudes and values), the status of a role model (status influences rewarding and punishments), and a caring role model (more likely to be modeled than an uncaring role model) (Mwamwenda 1995:204-206).

According to social theorists, most learning occurs through observational learning, with minimal instruction accompanied by reinforcement of a tangible nature. Sometimes disapproval or punishment are also used. In some instances social learning does not occur because the learner does not see the importance of the behaviour observed, or the learner does not remember the behaviour, or the learner does not want to engage in that behaviour owing to lack of motivation, or the learner lacks the skills necessary to implement the observed behaviour (Mwamwenda 1995:206).

To improve learning, social theorists suggest a resocialisation of educators and learners into liberated educative processes. This resocialisation, based on social theory, is a deliberate, active, conscious process which empowers both the educator and the learner. Critical ways of knowing and thinking which form the underpinnings of social theory make clear oppressive forces that hinder the realisation of individual or group potential, and promote liberation from constraining circumstances. They also suggest that liberation is accomplished by raising the consciousness of individuals who are disrupted by oppressive constraints and bringing about conditions that will illuminate oppressive elements so that change can occur (Rush et al 1991:123).

The soundness of social learning theory is demonstrated by the effectiveness of the educators, facilitators or mentors, in other words role models. Because this theory involves cognitive processes, learning is more effective if the learner is informed in advance of the benefits of adopting certain behaviour of the role models. If the role models stimulate positive experiences by being good role models, more vicarious learning takes place. If an educator is objective in accepting that all individuals are different (in their assessment of human behaviour), learners are assisted to become independent individuals with self-respect, which again enhances self-actualisation. A caring educator is likely to be modeled. Although it is not likely that a learner, especially in higher education, should work for the purpose of pleasing the educator, it may serve as extrinsic motivation. A learner who needs guidance academically, socially or vocationally may benefit from social learning, and more specifically observational learning.

From the above discussions on learning theories it can be concluded that, by definition, an educator must direct his or her development towards becoming an expert in learning in order to assist learners with learning how to learn and become successful. This can be achieved by adopting and using educational approaches that promote learning in higher education. Learners must be freed from prescriptive confines of training and opened to learning that includes questioning, intuiting, seeing patterns and finding meanings, investigating, strategising and creating. Within such as framework, educators and learners are resocialised into educative processes that are liberating for both the educator and the learner. The shift from a very comfortable educational approach to a more eclectic, liberated way of thinking and interacting with learners in the learning environment is a challenging perspective.

4.4 LEARNING PROCESS

The learning process is described as an individual process that may take place either with or without interaction between learners (Closhen 1994:51). Race (1995:80) advocates a down-to-earth model of learning processes based on the answers given to him by many people on how they experience their learning. The four important factors that contribute towards a successful process of learning are:

- *Wanting to learn.* Learners must be motivated to learn, have a sense of purpose with clear intentions to learn from doing, mistakes and triumphs.
- *Learning by doing.* Learning takes place from experience.
- *Feedback.* Which should be continuous.
- *Digesting.* Making sense of the learning experience and feedback.

Race (1995:82) furthermore states that any dedicated educator will want to know more about how individuals learn, and how teaching approaches can help learners to learn even more effectively and successfully. Rew (1996:311) maintains that to develop an awareness of how differences among learners affect the learning process, the focus must be on the interaction between the educator and the learner, that is on the process rather than the product as the outcome of the learning process.

The behaviouristic approach to the learning process is based on observable behaviour when learning, and on the belief that learning is a result of an association between a stimulus and a response in the learning process (Quinn 1995:89). The learner is manipulated and governed by the external environment. This approach is described as the scientific method of approaching natural laws and physical sciences (Reilly & Oermann 1992:25). The learning that occurs, is the product of experience, is relatively permanent and changes an individual's behaviour or knowledge.

Cognitive researchers define the learning process as a holistic approach in which perception, speech and action serve as instruments of mental internalisation (Presseisen 1992:1). Educators with a cognitive-mediation view of learning and a learner-centred approach to education see the learner as the central element in the teaching-learning process. They focus on what happens to the learner and *how* the learner engages in the learning process, instead of focusing on the process itself and the product of their education. Learners are seen as active constructors of their own learning while the educators are the facilitators of the learning process (Kruger 1998:112).

The phenomenologic view of the learning process recognises the uniqueness of the individual and the mental capacities that enable a learner to grasp meaning from experiences in a creative way; make choices and decisions based upon thoughtful deliberations; and be the source of his or her own responses to events in both the internal and the external environment. This view accepts the notion that learning behaviour is often an internal process deriving from behaviour change (Reilly & Oermann 1992:26).

The outcome of the learning process in an organisational context may be considered at four levels:

- the learner's reaction to the learning event
- the acquisition of new knowledge, skills or attitudes
- the ability to apply new learning in a work situation
- the measurable effects of learning on organisational performance (Sadler-Smith 1996:29)

The following variables are regarded as major considerations during the learning process. They include:

- the role of motivation in learning
- the role of language which has an influence on information transfer
- visualisation of concepts and linking them to existing frames of reference
- the exploitation of auditory functions in the learning process
- the selection and application of specific learning strategies
- the importance of factual learning, summarising important concepts and principles, and self-assessment
- memorising as a cognitive skill
- the integration and application of content

In this research it was concluded that the learning process encompasses components of the behaviouristic, cognitive, and phenomenological views on the process, and this research therefore supports an eclectic approach. Although the theories are not applicable in their entirety, certain aspects of the theories are relevant to the learning process. The learning process is behaviouristic in that skills are acquired through repetition, cognitive in that it emphasises how an individual learns, social in that the learner learns vicariously by being exposed to a caring role model, and

phenomenological in that it is a continuous process.

4.5 MEANINGFUL LEARNING

Meaningful learning is a cognitive process of acquiring and storing a vast quantity of ideas and information represented by any field of knowledge (Bigge & Hunt 1980:81). Meaningful learning occurs when the learning material is understood, questions are asked, learners reach a level of logical conclusion and when the meaning of learning material is grasped (Fransman 1991:74). When all three levels (cognitive, psychomotor and affective) are affected by learning, a learner has the opportunity to reach a meaningful level of learning. Meaningful learning refers to the mental processing of new information which leads to its linkage with previously learned knowledge (Slavin 1991:162). It is furthermore explained as a process of recognising a similarity or other relationship between new information and existing knowledge (Gouws 1998:66).

Learning that is meaningful is not only a function of how people learn. It is also a reflection of how they feel about the learning, and the cognitive rules or reasoning they use to design and implement their actions. It can be described as a kind of "master programme" stored in the brain, governing all learning behaviour. Learners need to be taught to continuously improve these "master programmes", and reason about their learning behaviour in new and more effective ways (Argyris 1991:100).

To make learning meaningful, learners, especially beginners, must take a lot of responsibility for their own learning (Van Aardt, Van Wyk & Steyn 1993:226). Relevant content is, however, also necessary for such learning to take place (Slabbert 1993:38). Meaningful learning presupposes a meaningful learning set and a potentially meaningful learning task. It thus refers to the differentiated cognitive content that may be evoked in a learner by a particular representation.

In a research study on learner preferences for learning it was concluded that learners had an overwhelming preference for meaningful learning and higher-order problem-solving. A correlation was also drawn between assignments and meaningful learning and the correlation showed that learners want to adapt a meaningful style of learning which could be evoked through assigning problem-solving activities where learners have to make use of references, and interpret information within certain limits and arrive at an answer (Fransman 1991:75).

The psychologist Ausubel (Quinn 1995:67) identified three important criteria for meaningful learning to take place:

- The learner must approach a learning task in an appropriate way in which the learner feels comfortable.
- The learning task must have logical meaning, in that it can be related to the learner's own cognitive structure in a sensible way. This cognitive structure provides the basis for assimilation.
- The cognitive structures of the learner must contain specifically relevant ideas with which the new material can interact in a specific way.

The advantages of meaningful learning are that it is an efficient way of learning and that it is superior to rote learning; it facilitates further learning, and is ideal to use in the professional world since it has a high transfer element. It furthermore meets a major objective of higher education in that it provides learners with information and skills that are transferable to the practical aspect of a profession and life (Herb 2000:293; Mwamwenda 1995:219).

There are a number of factors that contribute to how an individual benefits from a particular learning experience. These include teaching styles, teaching methods, motivation, attention, previous learning experiences, sociological factors, and learning styles. For meaningful learning to take place, all these factors must be acknowledged. Education based on meaningful learning necessitates the assessment of readiness in the learner by identifying individual characteristics such as learning styles, levels of capabilities, cognitive structures and motivation. Principles and concepts are stressed to make learners aware of what has to be learnt within a flexible learning environment. This implies moving away from traditional education to a more progressive philosophy.

For meaningful learning to take place, the thinking processes of learners with regard to active involvement in integrating and connecting learning material to prior knowledge or experiences is more than just rehearsing, copying and underlining notes, or playing a passive role in the educational process. Meaningful learning demands motivation and the assumption of responsibility for one's own learning.

4.6   EXPERIENTIAL LEARNING

Experiential learning is the process of using experience as a foundation for learning, and using that learning to develop one's practice (Dewar & Walker 1999:1462). The essence of experiential learning is concerned with how experience is transformed into ideas which can be used in turn to select and integrate new experiences. The primary focus is therefore on the learning process. Experience is central to the learning process (Kolb 1984:20). Miles (1987:85) maintains that "... experiential learning occurs when a person engages in some activity, looks back at the activity critically, abstracts some useful insight from the analysis and puts the result to work". The sequence of these experiences and learning actions forms a learning cycle. Knowledge is constantly created and recreated. Kolb (1984:36) also explains that the construction of knowledge is a process of transaction between social knowledge and personal subjective knowledge. Experiential learning has a holistic approach. Although cognitive learning is emphasised, psychomotor and affective dimensions of learning are also addressed (Kolb 1984:21).

Burnard (1989a:301) explains experiential learning through a theory of knowledge. Three types of knowledge have been proposed: propositional, practical and experiential knowledge. Propositional knowledge is theoretical knowledge of facts, theories and models. Practical knowledge is knowledge displayed through practice by successfully demonstrating a skill. Experiential knowledge is personal knowledge, gained through direct encounter with a person, place or thing. This knowledge cannot easily be transmitted to other people. Experiential learning, then, is any learning which increases the facilitation of experiential knowledge, including the development of propositional and/or practical knowledge.

4.6.1   Experiential learning and andragogy

Experiential learning and andragogy can usefully be combined because of its learner-centred and individualistic approach to education. Basic principles such as negotiation, the importance of personal experience, and the use of self and peer assessment must be taken into account when using this approach (Burnard 1989a:302). Figure 4.1 contains a schematic representation of the cycle of learning that takes place where the principles of both andragogy and experiential learning are combined.

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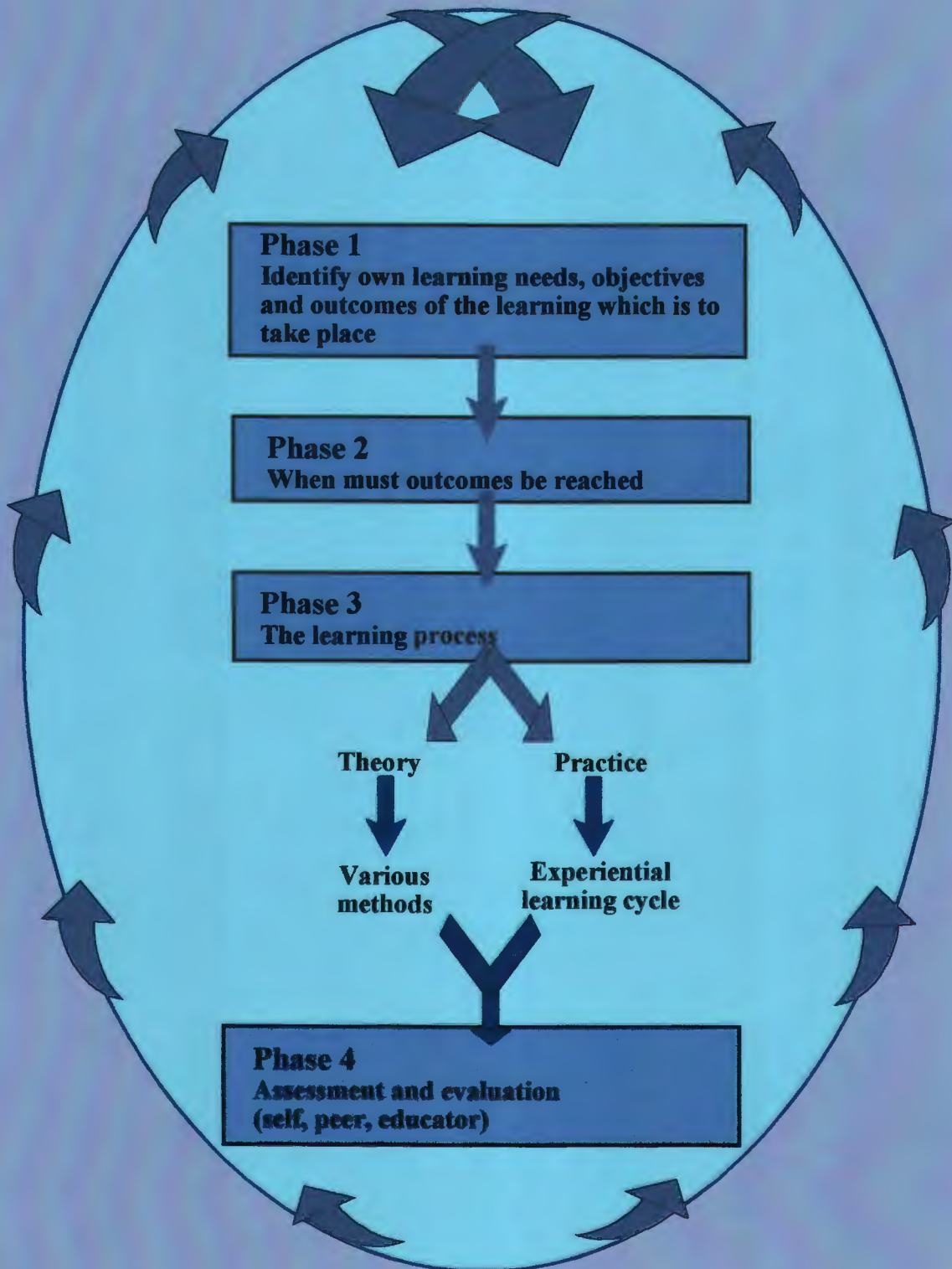
Figure 4.1
Andragogy and experiential learning
(Adapted from Burnard 1989a:303; Kolb 1984:42)

In *phase 1*, two processes take place. Learners identify their own learning needs according to the objectives and outcomes that are to be met. Educators also identify certain learning needs from the prescribed course of study. In this phase the learners "draw" information from experience, and can learn through brainstorming (Burnard 1989a:303). In *phase 2* both the learner and the educator must decide on the time when the outcomes must be reached. Their negotiated time frames may differ. Different times may also be determined for the meeting of theoretical objectives and outcomes, and practical objectives and outcomes. During *phase 3* the actual learning process takes place. The theoretical and practical objectives and outcomes may be reached at the same time as the integration of the learning needs of both components. The theory component may be addressed using a whole range of educational approaches. For the practical component it is recommended that the experiential learning cycle be used. Following the learning of theory and practice, evaluation has to take place. This is done by the learner himself or herself, peers and the educator. The aim of this phase is to encourage learner independence and develop abilities of assessment. At this stage it is suggested that the more objective processes of evaluation are used such as tests, questionnaires, check lists and examination (Burnard 1989a:304). A new assessment phase can emerge from *phase 4* and the cycle continues.

The cycle in figure 4.1 illustrates the learner-centred approach of andragogy with an emphasis on personal experience, and self and peer evaluation of experiential learning. It also acknowledges that learners have to work towards outcomes and that educators can contribute much by effectively planning around the outcomes. A negotiating approach is adopted where the learning programme emerges from the experiences and knowledge of both learners and educators. As educators learn how to incorporate alternatives into the curriculum and the teaching-learning environment, they will be more comfortable with the challenge of acknowledging learners' life experiences and ways of thinking and learning, and will be able to better assist learners in identifying learning needs.

The attitude towards higher education should be learner-centred. The issue is not whether or not the learner or the educator should serve as the focal point of the educational process, but the means by which the learners' educational needs are identified and fulfilled. By acknowledging learners' previous experiences the educator can:

- provide an opportunity for learner self-reflection on learning needs
- facilitate communication or dialogue with learners to foster learner-educator relationships

- make learners responsible for active engagement in self-directed learning, thereby empowering the learner

- increase self-confidence by enabling learners to identify their own loci of motivation

4.6.2   Relevance of experiential learning to health sciences education

Experiences can be defined as any activities which generate information; they do not necessarily take place in a classroom. This is particularly important in the case of learners in the health care professions, where learners hold posts in the clinical field where opportunities to gain information abound. The learner experiences various situations which form part of the learning cycle (Kolb 1984:38).

Experiential learning in health sciences education is interpreted in different ways. Some health sciences educators see it only as a means of teaching certain topics, such as interpersonal skills. Others see it as applicable to all health sciences topics including ethics and anatomy. It is also seen as being concerned with learning from practical experience by clinical placements, or as being concerned with personal learning and self-awareness rather than theory. In some instances educators view experiential learning as being concerned mainly with role play and contrast it to the more traditional teaching methods such as the formal lecture (Burnard 1989b:41). Some health sciences educators are enthusiastic enough to adopt a fairly complete experiential learning approach to their curriculum, where others use it as one of a range of teaching methods.

4.7   METACOGNITION

Metacognition means knowledge about one's own learning or how to learn (Slavin 1991:173). Metacognition is an activity of the learner who is aware of his or her learning process and who can intentionally plan, execute, monitor and evaluate his or her learning. It involves reflecting on one's own internal cognitive processes. The learner moves to a higher level of awareness or consciousness where he or she has complete and active control over learning (Beekman 2000:38; Quinn 1995:390). Metacognition is also described as the "learning to learn process in a manner that actively involves the learner", and the development of an awareness of his or her mental abilities (Fraser, Loubser & Van Rooy 1996:50).

Metacognition is an important process in academic achievement including higher order intellectual behaviour such as decision making, problem-solving and critical thinking. The processes involve reflection on activities that are often performed automatically (Cust 1995:282).

A learner needs to develop metacognitive skills by actively reflecting on *how* he or she learns, the strategies and skills that are used and whether they are effective or how they can be corrected. The quality of the product of the learning process is assessed (Beekman 2000:38; Slabbert 1993:39). Metacognition includes two components: (1) knowledge of learning and (2) regulation of learning. To reach the aim of quality learning, both these components are important. Metacognition can also be described as an important factor in academic achievement (Cust 1995:282). Successful learners take charge of their learning by reflecting on and controlling what they do. They also adopt a metacognitive awareness and self-regulation of progress spontaneously, whereas the less able learner fails to monitor progress.

Metacognition must be a continuous process, although it is not always a deliberate one. No learner's metacognitive process is always effective and successful. To improve this, the process should be made wittingly so that the learner is constantly aware of the individual differences in the learning process, and can become aware of the different ways of interpreting and processing information (Stavast 1991:190).

To make learners aware of metacognitive processes, a range of activities such as discussing work with a fellow learner, group discussions in which ideas are explained and views debated, reflective partnerships during clinical practice sessions, the keeping of journals, and other written assignments can be implemented to expose and examine what learners know and feel about ideas and learning experiences (Cust 1995:282). By doing these activities, learners work through ideas and views until gaps and discrepancies in knowledge become more clear and their knowledge develops and changes.

Learners have to plan their learning. This is done by using metacognition whereby the learner reflects on how he or she is learning, the learning strategy and the skills needed to execute the learning task, how effective they are and how one can correct mistakes. Executing a learning task is not a strategy but is of vital importance in determining whether the learning task has been executed successfully.

Monitoring one's own learning process is the most important metacognition strategy. It entails continuous control over each step of the learning process. Activities such as self-management, self-questioning, expectation, elaboration and confirmation are used to reflect on how one learns. The learning process is therefore the focus during the monitoring process (Slabbert 1993:39). The learning process can also be monitored by using metacognitive sub-processes, including what one knows, predicting outcomes of learning, planning ahead, checking outcomes, efficiently scheduling time and cognitive resources, monitoring and revising one's learning, and reality testing (Brown 1978:77; Cust 1995:282).

In adult learning the expectation is that learners will develop self-regulation. By structuring the learning environment in such a way that it promotes higher order thinking and learning, metacognition is promoted. Learners then engage in a purposeful and high level of cognitive learning (Dart & Clarke 1991:319).

In higher education there is an increase in the level of knowledge, intellectual disposition, and cognitive abilities of learners. They become more aware of themselves as learners (including their individual learning styles), the context of learning, and the short and long term outcomes of learning. Eventually they develop abilities for metacognition that enables them to analyse their own learning processes to determine the learning approaches for each task. If quality learning is achieved through metacognition, then educating for metacognition with an awareness of individuality in learning styles is a necessity.

4.8   COOPERATIVE LEARNING

Cooperative learning can be explained as procedures that are designed to engage learners actively in the learning process through enquiry and discussion with their peers in small groups (Davidson & Worsham 1992:xi). Cooperative learning is the instructional use of carefully organised and structured small groups where learners work together to maximise their own and each other's learning. It is more than putting them together in a group and giving them a task. It also involves careful attention and thought to various aspects of the group process. The group has shared goals and each member is responsible for learning the assigned material and making sure that the other members of the group do likewise. In cooperative learning a learner seeks an outcome that is beneficial to herself or himself as well as beneficial to the other members of the group. In the group they help one another to

enhance the quality of their learning through reflection on the learning process (Johnson & Johnson 1992:121; Slabbert 1993:39).

Placing learners in groups and telling them to work together does not in itself promote higher achievement and higher level reasoning. A group effort may go wrong. Cooperative learning may be contrasted with individualistic learning. In cooperative learning situations, groups must be structured to include the essential elements of positive interdependence, face-to-face promotive interaction, individual accountability, interpersonal and small group skills and group processing. These elements provide a social support mechanism for learning. In individualistic learning situations learners work by themselves to accomplish learning goals unrelated to those of other learners (Johnson & Johnson 1992:121-122; Slabbert 1993:39).

Cooperative learning places the responsibility for learning on the learner. This establishes a relationship between metacognition and cooperative learning where cooperative learning is used as a primary teaching method to promote metacognition (Slabbert 1993:40). Metacognition is not reached through cooperative learning alone, it only provides an instrument through which reflection on one's own learning is obtained. Individual accountability then serves as a link between dependence in cooperative learning and independence in metacognition. By using cooperative learning to establish metacognition, one develops a learner who is knowledgeable and capable in many contexts and functions at a high intellectual level.

Educators utilising cooperative learning need to be aware of learners' different learning styles. By acknowledging the validity of different learning styles and by accommodating these differences when possible, the learning environment can be made more favourable for each learner. However, not every learning style can be accommodated in all learning environments.

It is important to note that learning style awareness and the accommodation of individual differences should not be confused with individualised learning where the interpersonal exchange between learners does not take place. Interpersonal exchange is very necessary to cognition and metacognition. Apart from mastering and retaining study material, a learner must also develop quality reasoning abilities, abilities to generate new ideas and solutions as well as to transfer what is learned from one situation to another (Johnson & Johnson 1992:122).

Cooperative learning has been proved to be successful in enhancing metacognition in higher education (Caine & Caine 1990:67; Slabbert 1993:40). It promotes metacognition for the following reasons:

- The way learners conceptualise material and organise it cognitively is different in cooperative learning when they are learning material to teach others than when they are learning material for their own benefit. Higher level strategies are used more frequently.

- Learners have more frequent discussions that promote oral summarising, explaining and elaborating on what they know. These tasks are necessary for the storage of information into the memory and the long-term retention of the information. The process of conveying meaning helps learners to store it as knowledge and use it to gain perspective. While summarising, explaining and elaborating, learners organise and systematise cognitively the concepts and information they are discussing.

- In cooperative learning the group members are heterogeneous. As learners accommodate themselves to each other's different perspectives, strategies and approaches to completing assignments, divergent and creative thinking are stimulated. Learning experiences are enriched by the exchange of knowledge and perspectives of learners from different achievement levels, cultural and social backgrounds, and different sexes.

- Not all learners in a group have complete knowledge when they interact with others in the group. In order to understand all the information and the different perspectives and create an integration based on the best reasoning and information by everyone involved, learners have to attempt to understand the content of the information being presented as well as the cognitive and affective perspective of the learner presenting the information. Learners must also be able to hold both their own and other learners' perspectives in mind at the same time.

- In cooperative learning ideas, perspectives and reasoning are externalised for critical examination, which results in peer monitoring, and regulation of learners' thinking and reasoning. Learners can monitor the reasoning of other learners in the group which will help enhance their understanding. This serves as a training ground for metacognitive skills that are transferable to individual learning.

- Within cooperative learning groups, learners may give each other feedback concerning the quality and relevance of contributions and how to improve one's reasoning or performance.

- Because of the involved participation in cooperative learning groups, the aspect of controversy is very powerful. Learners experience conflicts concerning ideas, opinions, conclusions, theories, and information (Johnson & Johnson 1992:123-125).

By sensitising individuals to differences in learning styles, cooperative learning is enhanced (Pankratius 1997:73). By working in a group, differences in thought patterns are accommodated, compromises are reached, and eventually sensible solutions can be posed.

Beck (1995:226) explains cooperative learning as independent learning that requires an open-minded educator, who provides a learning environment that enhances thinking amongst learners. Cooperative learning thus changes the educational environment to an environment where both educators and learners think about learning, what learning is and how learning takes place. Furthermore, the structure of cooperative learning provides for individuals to act in such a way as to promote each other's success and achievements, resulting in higher academic self-esteem.

4.9 COLLABORATIVE LEARNING

Collaborative learning takes place where there is social interaction between a facilitator and a learner, in other words in a relationship in which knowledge is constructed (Flanagan & Sayed 1992:111). Collaborative learning is a specific form of learning in which facilitation is conceived as being the driver of cognitive growth. The learning environment is shared by the facilitator and the learner, and thus the collaborative relationships in the learning environment emphasise the fact that responsibility for learning is also shared by learner and facilitator or educator (Morton-Cooper & Palmer 1993:100).

Collaborative learning grants learners the opportunity to communicate with peers about the learning process (Golian 2000:140). Learners are regarded as responsible individuals who want to use specific learning preferences in undertaking and completing learning activities and tasks.

Collaborative learning is a theory of learning and not a theory of social interaction between facilitator and learner. Although this theory of learning is useful, especially where transcultural issues are taught, other approaches to learning cannot be ignored. It cannot and should not be used as the only approach to learning.

According to Matthews, Cooper, Davidson and Hawkes (1995:37), collaborative learning shares a number of assumptions and areas of agreement with cooperative learning, namely:

- Learning in an active mode is more effective than passively received information.
- The educator is a facilitator of learning.
- Education and learning are shared experiences between the educator and learner.
- Higher-order thinking skills are developed during group activities.
- Accepting responsibility for learning as an individual and as a member of a group enhances intellectual development.
- Sharing one's own ideas in a group enhances one's ability to reflect on the learning process.
- Diversity among learners and educators is appreciated.

The particular significance of collaborative learning suggests that a facilitator or an educator changes from the role of conveying knowledge to a role where higher order thinking and metacognition are stimulated, and helps educators to take account of how individuals prefer o learn. Learners must be stimulated to reflect on the processes of learning and human activity, such as a preference for a specific learning style.

4.10   INDIVIDUALISED LEARNING

Individualised learning can be described as self-paced learning where the educator is concerned about tailoring instruction to individual needs and placing more emphasis on learning than the process of education (DeYoung 1990:120-121). The significance lies in the active involvement of the learner in the learning process and the principles of behavioural psychology, with its emphasis on positive reinforcement for learning.

DeYoung (1990:121) explains a personalised system of instruction that is widely used. The plan outlines five components that distinguish a more personalised approach to learning from conventional teaching methods:

- *Self-pacing,* where the learner progresses through the course at a comfortable pace that fits his or her learning style and life style.
- *Content mastery,* where the learner can move on to new content only after mastering previous content.
- *Lectures and demonstrations as motivation,* where the learner is only allowed to attend these optional events after certain material has been mastered, and they are not tested on the

material.

- *Stress on the written word*, where the learner is given most of the content of the course in written form and thus retains more control over the learning process.

- *Use of proctors*, where teaching aids are available to give immediate support.

In this approach to learning the significant role change for the educator is moving from disseminator of information to facilitator of learning. The educator guides and supports the learner in his or her individual quest for learning. Learners benefit from individualised learning by learning to be independent and gaining confidence in their own ability to learn.

The disadvantage of individualised learning lies in the fact that learners may not take responsibility for their own learning or may lack motivation to function independently. Support can then be given to such learners by developing learning activities and tasks that motivate learners to become more involved and thus more independent.

Individualised learning contributes to self-directness by stimulating learners to make conscious decisions about what, where, when and how to learn (Rees & Reilly 1990:76; Van Schoor 1992:60). The learner takes more initiative and responsibility for the learning process. Subsequently, the learner is actively involved in assessing learning needs, formulating outcomes, and determining the pace and sequence of learning activities and tasks. Bell and Bell (1983:30) maintain that individualised learning results in richer learning opportunities for learners, as well as flexibility in accommodating individual learning styles. Astin (1985:36) expresses this in stronger terms by stating that the key to effective learning is learner involvement through individualised learning, where the learning styles of individuals are one of the "highly expected criteria" for enhancing involvement. Individualised learning is thus another way of encouraging and enabling learners to move towards self-direction and become efficient and active learners who can select both *what* to learn and *how* to learn it effectively.

4.11 MOTIVATION

Motivation is reflected in the action people take because of a force within them that influences strength or direction of behaviour. It is the willingness to put effort into achieving a goal or reward to decrease the tension caused by the need (Marquis & Huston 2000:281). Mwamwenda (1995:259) describes motivation as a concept used to explain the way in which a person behaves and refers to

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something that is essential within an individual. Quinn (1995:18) defines motivation as a cognitive construct that is used to explain the causes of behaviour and the reasons why people behave in a certain way rather than another.

Motivation is described as being either intrinsic or extrinsic. Intrinsic motivation refers to an individual's level of aspiration. Extrinsic motivation is enhanced by the environment or external rewards. Individuals are always motivated to some extent, but because they are unique, they are motivated differently (Marquis & Huston 2000:282).

Motivation is vital for adult success (Moletsane 1992:106). Classical constructivist theorists maintain that motivation is intrinsic to human learning, requiring no special formulations to account for it. Other cognitive theorists propose special constructs such as self-efficacy (perceptions of competence) and perception of control that influence one another, to account for motivation. Self-efficacy belief or judgments about one's competence in specific tasks or activities influence the choice of academic tasks, the kind and amount of learning one engages in and the proficiencies a learner acquires. By exercising personal control in learning, the belief in one's capabilities is strengthened. It has also been claimed that the attributions (such as luck, ability, effort, and task difficulty) or explanations learners give for their successes and failures are what motivated them. Although it is difficult to generate an appropriate definition for academic motivation, it appears to be influenced by relevant subject matter which is appropriately challenging, enthusiastic and supportive teaching, frequent informative, positive and encouraging feedback, grading that is non-competitive and criterion-referenced, opportunities for self-management, and a degree of ownership of work (Cust 1995:282). Furthermore, Jacobs, Gawe and Vakalisa (2000:30) suggest that if an enthusiastic educator continuously reminds learners of the intended outcomes and allows them to experience a growing confidence and status as their own competence increases, they can be transformed into eager, motivated learners.

Social learning theorists explain motivation as being partially reinforcement. They also suggest that people learn most behaviour by direct experience and observation, and that behaviour is either retained or not depending on positive and negative rewards (Marquis & Huston 2000:249). Motivation to achieve will cause the learner to study more actively and set higher levels of aspiration, which will be conducive to effective learning.

The ideal learning situation originates where both intrinsic and extrinsic motivation are present. Intrinsic motivation is present when factors such as interest, needs, curiosity and enjoyments bring a sense of accomplishment. Incentives or punishments are not necessary to initiate an activity, because the activity itself brings the sense of accomplishment. When motivation is directed to the act of learning, it is called intrinsic motivation. Intrinsic motivation is a higher level characteristic in the promotion of self-directed learning. Extrinsic motivation is influenced by incentives or the possibility of punishment, or the fact that the learner wants to please the educator. The learner is concerned about the gain and not the activity itself. When motivation is directed to aims that are not directly related to learning, and when it is merely a means to an end, it is called extrinsic motivation (Van Rensburg 1995:63; Woolfolk 1995:332). However, both forms of motivation are necessary and important, the ultimate objective being to have stronger intrinsic motivation to learn (Mwamwenda 1995:260).

In order to explain the importance of motivation in the learning process, an explanation of the motivation cycle in the learning situation is given. Figure 4.2 illustrates a motivation cycle in the learning process (Van Rensburg 1995:66). This cyclic presentation of motivation includes different processes and refers to the learner in a higher education learning situation.

The processes of the motivation cycle in the learning process are:

- (1-4) A learner who decides to study has certain existing knowledge. This means that he or she already has a particular self-concept of his or her abilities or knowledge of the field of study. The learner experiences a need for learning or gaining more information, realising the knowledge gap which exists and sets a goal regarding what should be known or what level of knowledge should be reached. Through intrinsic and extrinsic factors the learner is motivated to study to bridge the knowledge gap that exists.

- (5-9) By means of this motivation, the learner becomes involved in the learning process. This intentional involvement in the learning environment is a prerequisite for successful learning. When the subject matter is mastered, learning takes place. The cognitive process of reception of the subject matter forms part of the process through which learning takes place. The learner gains insight into the abstract. The significant attribution of the cognitive process by putting meaning to the subject matter brings about an experiential learning situation.

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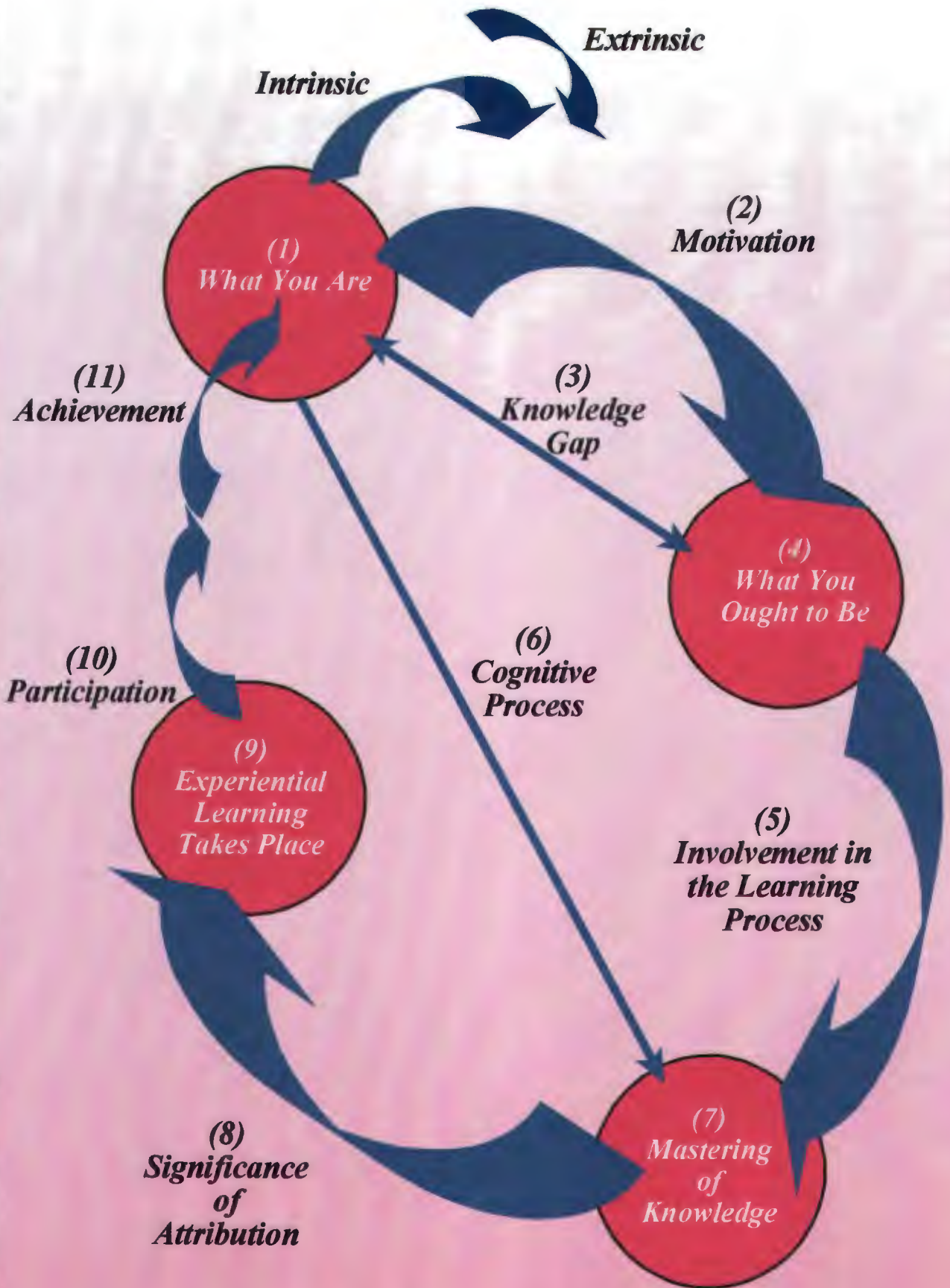
Figure 4.2
Motivation cycle in the learning process
(Van Rensburg 1995:66)

- (10-11) If the attribution of meaning of the subject matter is positive, the learner will want to be involved in this situation again, and will therefore want to learn and know more about the subject. The positive level of achievement will contribute to the level of self-concept in such a way that the learner will be motivated to become more involved in the learning environment. This positive attribution towards oneself will motivate the learner to move into such a situation again.

Guidance to achieve a positive motivation cycle must be given in order to support a learner in the learning process and to promote self-actualisation, especially where the cycle has taken a negative turn. Knowledge of one's learning style can contribute to empowerment by promoting self-actualisation. When a learner is in a positive motivational cycle, learning becomes effective and meaningful.

4.12   EFFECTIVE LEARNING

The problem faced by educators is not to get individuals to learn but to help them learn effectively. Learners are already engaged in learning when they enter higher education. The right stimulus is necessary to focus the attention and the mental effort of the learner to learn effectively.

4.12.1 Dimensions of effective learning

Marzano (1992:7) describe the types of thinking that occur during effective learning as dimensions of learning. Although there is no agreement as to the exact process or sequence of events relative to the learning process, there is agreement as to some basic types of thinking that occur during effective learning. A framework that was created by Marzano (1992:7) identifies five dimensions of learning:

- *Dimension 1.* Thinking needed to develop attitudes and perceptions that create a positive mental climate.
- *Dimension 2.* Thinking needed to acquire and integrate knowledge.
- *Dimension 3.* Thinking needed to extend and refine knowledge.
- *Dimension 4.* Thinking needed to make meaningful use of knowledge.
- *Dimension 5.* Thinking needed to develop favourable habits of mind.

Although the dimensions are presented in a linear fashion, this in no way implies a linear process, but rather the interrelationship between the five dimensions as depicted in figure 4.3.

As figure 4.3 illustrates, attitudes and perceptions of learners and their habits of mind form the backdrop of any learning experience. A learner comes to a learning situation with attitudes and perceptions (*dimension 1*) about factors like acceptance, safety and comfort. Negative attitudes and perceptions relative to any of these factors will negatively affect the learning process. Certain attitudes and perceptions will therefore constitute the context within which learning occurs. Correspondingly, a learner must utilise certain positive mental habits, such as sensitivity to feedback and accuracy during an effective learning experience. These mental habits *(dimension 5)*, like attitudes and perceptions, form part of the context of learning. The use or lack of use of these habits drastically affects the learning process (Marzano 1992:8).

Learning is a matter of acquiring and integrating new knowledge (*dimension 2*), given the existence of the types of thinking in *dimensions 1* and *5*. New information is incorporated into the existing knowledge base. *Assimilation* takes place. This knowledge changes over time, however, and new knowledge structures are formed that are not only additions to existing knowledge, but new entities with unique distinctions. *Accommodation* occurs. Extending and refining knowledge (*dimension 3*) and using knowledge meaningfully (*dimension 4*) now play a major role. The shift from assimilation to accommodation is an integrated one involving the types of thinking in *dimensions 2* to *4*, as illustrated by the interlocking circles in figure 4.3.

This shift can be thought of as occurring on something of a continuum, where all the types of thinking in these three dimensions are used. When learners acquire and integrate knowledge, they also start to extend and refine that knowledge. Extending and refining knowledge is also an aspect of using knowledge meaningfully (Marzano 1992:9).
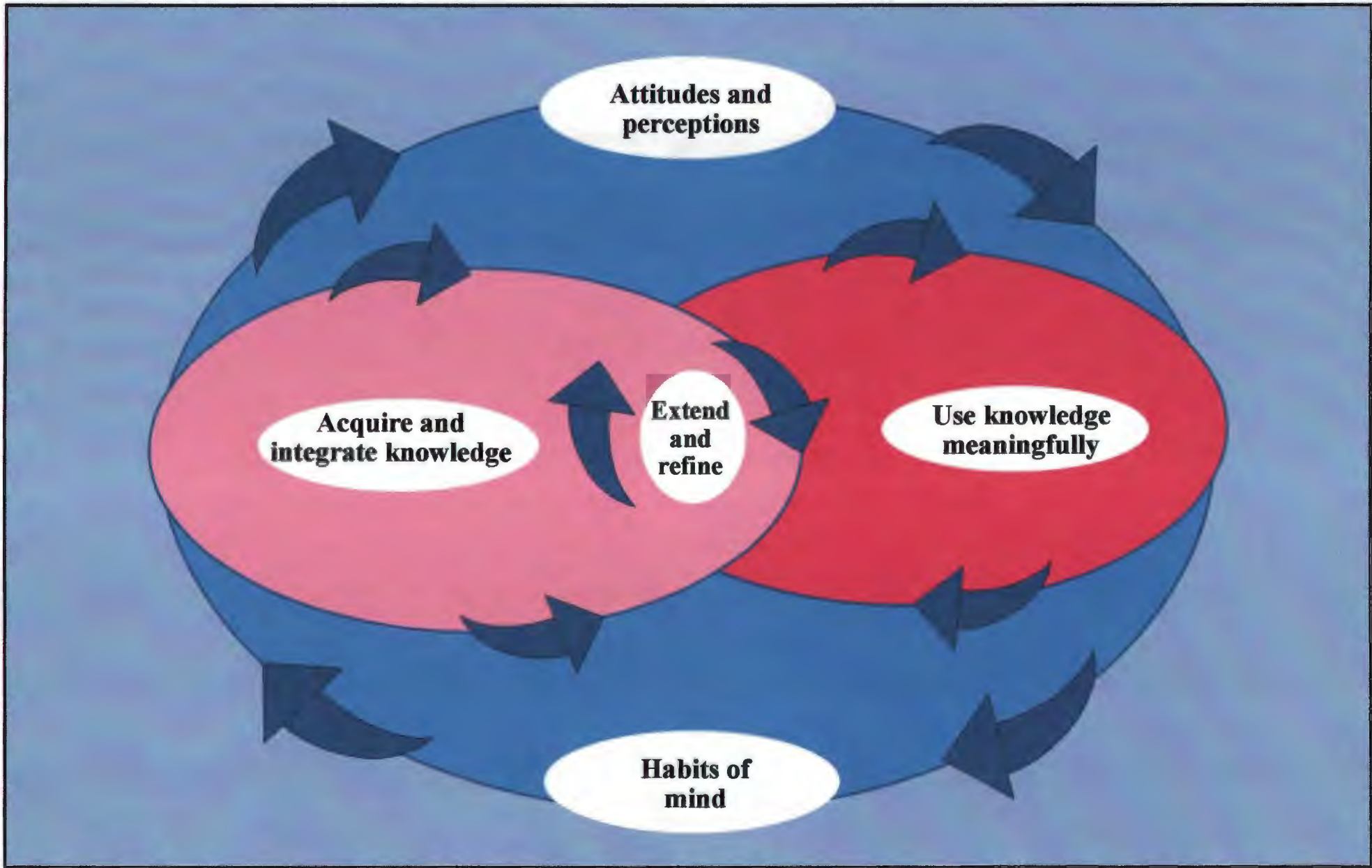
Figure 4.3
The five dimensions of learning
(Adopted from Marzano 1992:8)

4.12.1.1 Dimension 1: Developing attitudes and perceptions conducive to a positive mental climate

The attitudes and perceptions that constitute a positive mental climate should be seen from the perspective of the learner rather than as the presence or absence of factors external to the learner. These attitudes and perceptions include a sense of physical comfort, a positive affective tone, a sense of order and a sense of safety and acceptance (Marzano 1992:10). If a sense of physical comfort (eg temperature, space, arrangement of furniture) in the actual physical environment where learning is taking place is not experienced, it is scientifically and intuitively valid to say that optimal learning cannot take place. The affective tone in the learning environment does not necessarily have to be positive, but cannot be negative. A negative affective tone will inhibit learning and a positive affective tone will enhance it. A neutral affective tone will neither enhance nor inhibit learning. A sense of order, where learners know the parameters of behaviour within a learning situation, creates a climate conducive to learning and is affected by explicit and consistent rules and procedures. A sense of safety and acceptance is also necessary for a positive mental climate. Apart from the obvious aspect of safety with regard to the physical learning environment, the learner should also perceive the learning environment as a place where risks can be taken as part of the learning process. Ideas should be honoured and valued and failures should not be met with ridicule. Acceptance by educators and peers is also important. If one or more of these attitudes and perceptions are not present, learning is inhibited (Marzano 1992:10).

✦ **Using knowledge of learning styles to establish a positive mental climate**

An educator will always have a role to play in establishing a positive mental climate. By identifying a learner's learning style and by informing the learner about learning styles, the educator can empower the learner not only to create and maintain this positive climate but also to enhance learning.

Desired features of the physical environment in which learning takes place can be identified by the learner himself or herself. Learning style theories indicate that learners define physical comfort in different ways. The learner should be given the opportunity to make a decision as to the physical characteristics of the learning environment. When a learner's learning style is known, activities can be identified and planned in such a way that they will enhance the perception of a positive affective tone. Activities that can change a negative affective tone could be used. It is also necessary to plan

for activities that will include enjoyment and relaxation (Woolfolk 1995:416).

A learner should be responsible for generating and implementing rules and procedures in the learning environment. These rules and procedures can include specific routines, study time and group work. To establish and implement a physically and psychologically safe environment, a personal code of conduct can be identified. Aspects such as how to show respect for educators and other learners and their opinions, how to listen attentively, how to be sensitive to the feelings and knowledge base of others and how to conduct an academic debate could be covered.

4.12.1.2 Dimension 2: Acquisition and integration of knowledge

According to Marzano (1992:13), knowledge involves at least two types of content: declarative and procedural knowledge. Declarative knowledge is concerned with the who, what, where and when of information. Procedural knowledge is concerned with the how, for example, how to draw up a health care plan. In some instances the components of procedural knowledge are represented as steps that must be applied in a certain sequence.

When a learner is presented with new declarative or procedural knowledge, prior knowledge should be used to comprehend the information and then assimilate it into the existing knowledge base. The acquisition and integration of knowledge requires the construction of internal representations of the information. This internal representation is a combination of a previous knowledge base and new information. In this way a macro-structure of knowledge is created. Two important aspects of a macro-structure which make it relative to learning are the extent to which the macro-structure contains top level information from the learning situation and the extent to which the macro-structure does not contain misconceptions. Top level information is that information which contains the most important information presented. When creating a macro-structure, a learner might use inaccurate information and cause a misconception in the initial acquisition and integration of knowledge, because a macro-structure is always an amalgam of new information from a learning experience and old information from the learner's long-term memory (Marzano 1992:13-14).

It is the role of the educator to ensure that top-level information is recognised by the learner. Strategies such as advance organisers and modeling can be used to facilitate learner recognition of top level information. Advance organisers can be presented in the form of questions prior to the

learning situation (for example, questions presented to the learners before they read a chapter) and outlines of the important information prior to or during a learning experience (Slavin 1991:166). This strategy is used for declarative knowledge. Modeling can be used to help the learner to recognise the top level information in procedural knowledge. The educator presents the most important steps for the skill or process in a most useful order.

Because the educator cannot monitor every learner's understanding of knowledge in detail, the learner has a major responsibility to guard against misconceptions within a macro-structure.

✦ Using knowledge of learning styles to acquire and integrate knowledge

The initial acquisition and integration of knowledge can be greatly enhanced by acknowledging the individual differences regarding learning styles. When a learner identifies the top-level information within a learning experience where the learning environment and the teaching strategy suit her or his needs with regard to learning styles, there should be less chance of settling on a subordinate macro-structure of information. The learner can establish which organisational structure is best suited to forming the final macro-structure, by trying a variety of these structures. By way of illustration, consider explanatory information presented in a textbook. A top level structure in this text might have few visual or linguistic markers such as subheadings or formatting cues, owing to the nature and content of the information in the text. For such a situation learners have the tendency to settle on structures with which they are familiar, rather than those that best capture the essence of the information presented in the text. One learner might find generalisation with supporting examples to be the best way to organise information. Another might use a causal network as most appropriate organisational scheme. When the most suitable organisation scheme is used, the probability of capturing the essence of the information is maximised (Marzano 1992:16). The role of the educator in helping the learner to avoid the infusion of erroneous information into a macro-structure remains important.

Generating alternatives in the knowledge acquisition and integration dimension of learning is a key aspect of creativity. Additionally, without the ability to generate a variety of alternatives, a learner cannot adapt well to a changing learning environment (Marzano 1992:16). It is the task of the educator to stimulate the learner to use a less preferred way of organising information to enable her or him to become a more flexible learner. The educator as a facilitator should support the learner in

such a way that learning activities are congruent with learning styles to enhance learning.

4.12.1.3 Dimension 3: Extending and refining knowledge

Knowledge can easily remain static. To prevent this, an active process of acquiring knowledge is necessary. New cognitive structures are created when acquired knowledge is developed by engaging in specific types of tasks. These tasks mainly extend and refine knowledge or use knowledge in meaningful ways. Extending and refining knowledge, then, is another dimension (*dimension 3*) of learning, as is the meaningful use of knowledge (*dimension 4*) (Marzano 1992:17).

Learning activities and tasks that stimulate the types of thinking necessary to make new connections among the learner's body of information and refine existing knowledge have two defining characteristics, namely that they are partially specified and multidimensional. Partially specified tasks encourage the learner to explain the outcome of a certain problem, situation or question. For example, where learners have to order a series of actions it would require them to explain or justify why they selected a specific order as well as explain the criteria used to order the actions. With fully specified tasks learners do not have the opportunity of explaining the reasoning behind their conclusions and therefore knowledge extension and refinement will not take place. Examples of fully specified tasks are answering true/false questions or matching items. The format in which the answer is communicated as well as the outcomes of the tasks are already fully determined.

Extension and refinement of knowledge take place in various multidimensional steps that interact in a complex way. Multidimensional tasks are thus required to enable a learner to extend and refine existing knowledge. Marzano (1992:18) proposes a set of eight tasks which are particularly applicable to knowledge extension and refinement. They consist of the following cognitive activities:

- *Comparing* similarities and differences between sections of information relative to specific attributes through identification and articulation.
- *Classifying* items into definable groups on the basis of their attributes.
- *Inducing* by deriving unknown generalisations or principles from observation or analysis.
- *Deducing* by deriving unknown outcomes and necessary conditions from given principles and generalisations.
- *Analysing errors* in one's own thinking or in that of others.

- *Constructing support* or proof for a statement.

- *Abstracting* through the identification and articulation of the underlying theme or general pattern of information.

- *Analysing value* through the identification and articulation of personal value and general value of information.

Within the learning situation a learner, either alone or in a group, can embark on these cognitive activities to extend and refine existing knowledge as well as to acquire new knowledge. To extend and refine existing knowledge the cognitive activities are used consciously, accurately and with great involvement. When acquiring new knowledge the cognitive activities are more automatic and relatively unconscious (Marzano 1992:19).

✦ **Using knowledge of learning styles to extend and refine knowledge**

Acknowledging learning styles when knowledge extension and refinement tasks are assigned can be very powerful. The diversity in learning styles will also bring about diversity in responses to tasks. Learners will produce diverse answers and solutions to a problem because of individual differences which also influence input and opinion. When learners are in a group, the diversity will establish a need for explanation and reasoning. By discussing how they came to a certain conclusion, will also quite naturally extend and refine their knowledge.

The educator initiates knowledge extension and refinement tasks by using different questioning techniques. It is difficult, however, to structure questions that involve comparison, classification, induction and deduction, among others. Enhancing knowledge extension and refinement is a complex task, the effectiveness of which can be increased if the motivation of the learner to perform certain tasks is increased.

4.12.1.4 Dimension 4: Making meaningful use of knowledge

To use knowledge meaningfully, tasks that are partially specified and multidimensional (as discussed in *dimension 3*), as well as tasks that are learner-directed and long-term, are appropriate. It is said that true knowledge development tasks are those that spread over a period of time. Decision-making tasks, problem-solving tasks, scientific inquiry and investigations are examples of tasks that need

extended periods of time. These tasks are enhanced by doing other activities such as exercises, test-yourself questions and workbook completion (Marzano 1992:20-21). Tasks that are learner-directed are those where the learners have a great deal of control over the knowledge development activities in which they engage. The individual differences of the learners will influence their decisions as to how they will use their knowledge to solve a problem, report on findings or complete an exercise.

✦ **Using knowledge of learning styles to make knowledge meaningful**

A high degree of individual accountability is created when learners have to decide how to use their knowledge to solve a problem, make a decision or embark on scientific inquiry. Tasks are probably done more efficiently when an individual has to decide how the task will be executed. Existing knowledge, ability, energy and available resources will be used in a preferred way to enable the learner to develop knowledge in a meaningful way. The reward for an individual should be a function of the extent to which that individual has learned and performed within a task.

4.12.1.5 Dimension 5: Developing favourable (well-disposed) habits of mind

Marzano (1992:23-24) refers to various research findings (Costa 1984; Ennis 1987; Paul 1984 & Resnick 1987) that indicated that a high level of learning has occurred when a learner has developed favourable habits of mind which are governed by mental dispositions such as being sensitive to feedback, seeking accuracy, evaluating the effectiveness of one's actions, being precise, engaging in tasks intensely to find answers or solutions, pushing the limits of your knowledge and performance, generating and following your own standards and generating new ways of viewing situations. When a learner engages in tasks with habits such as the above, learning is enhanced. Being precise, aiming at accuracy or evaluating the effectiveness of tasks and actions will, for example, always enhance performance. These habits make execution of tasks more effective and enhances the knowledge base of an individual who engages in them. The educator can reinforce these dispositions by either commenting positively on the actions and use of mental habits or remarking on the absence thereof.

✦ **Using knowledge of learning styles to develop favourable habits of mind**

The dispositions of higher level learning can be fostered by acknowledging the individual learning styles of learners. Because the dispositions are by their nature difficult to self-observe, support from

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the educator is necessary to make learners aware of the extent to which their actions are precise, their actions are correct or their standards are of a high level. Acknowledging individual learning styles can provide an opportunity for learners to feel positive about the use of the mental habits of higher learning and the effects of these dispositions on their performance.

Learning style awareness and accommodation of individual differences play a role in the interlocking dimensions within the learning process, as described above. One cannot always accommodate every different learning style, and there is merit to having learners develop competence in different situations. However, by acknowledging the validity of different learning styles and by accommodating those differences when possible, the learning environment can be made more favourable for the learner.

4.13   LEARNING ENVIRONMENT

The learning environment is an environment where learning activities take place (Woolfolk 1995:415). Reilly and Oermann (1992:109) describe it as an environment where education and learning take place, with the educator playing a supportive role in carrying out educational responsibilities. The learning environment is an environment that is characterised by valuing learning, exhibiting a caring relationship for all concerned, providing freedom for individual differences, and fostering the development of individuals to independent learners, and one that provides for the development of new patterns of thinking, feeling and doing.

4.13.1 Conducive learning environment

An environment is explained as external conditions or surroundings which influence development and behaviour (McLeod 1986b:283). Conducive means to lead or contribute to a result (McLeod 1986b:178). A conducive learning environment can thus be explained as conditions and surroundings that contribute to the learning process. Experiential learning theory provides a system for managing the learning process in the learning environment. Any educational programme, or part of it, can be viewed as having degrees of orientation towards the four learning modes of the experiential learning cycle, labeled as affective, perceptual, symbolic, and behavioural. These orientations imply the overall climate they create and the particular learning skill or mode they require. Figure 4.4 illustrates the learning environment in experiential learning.
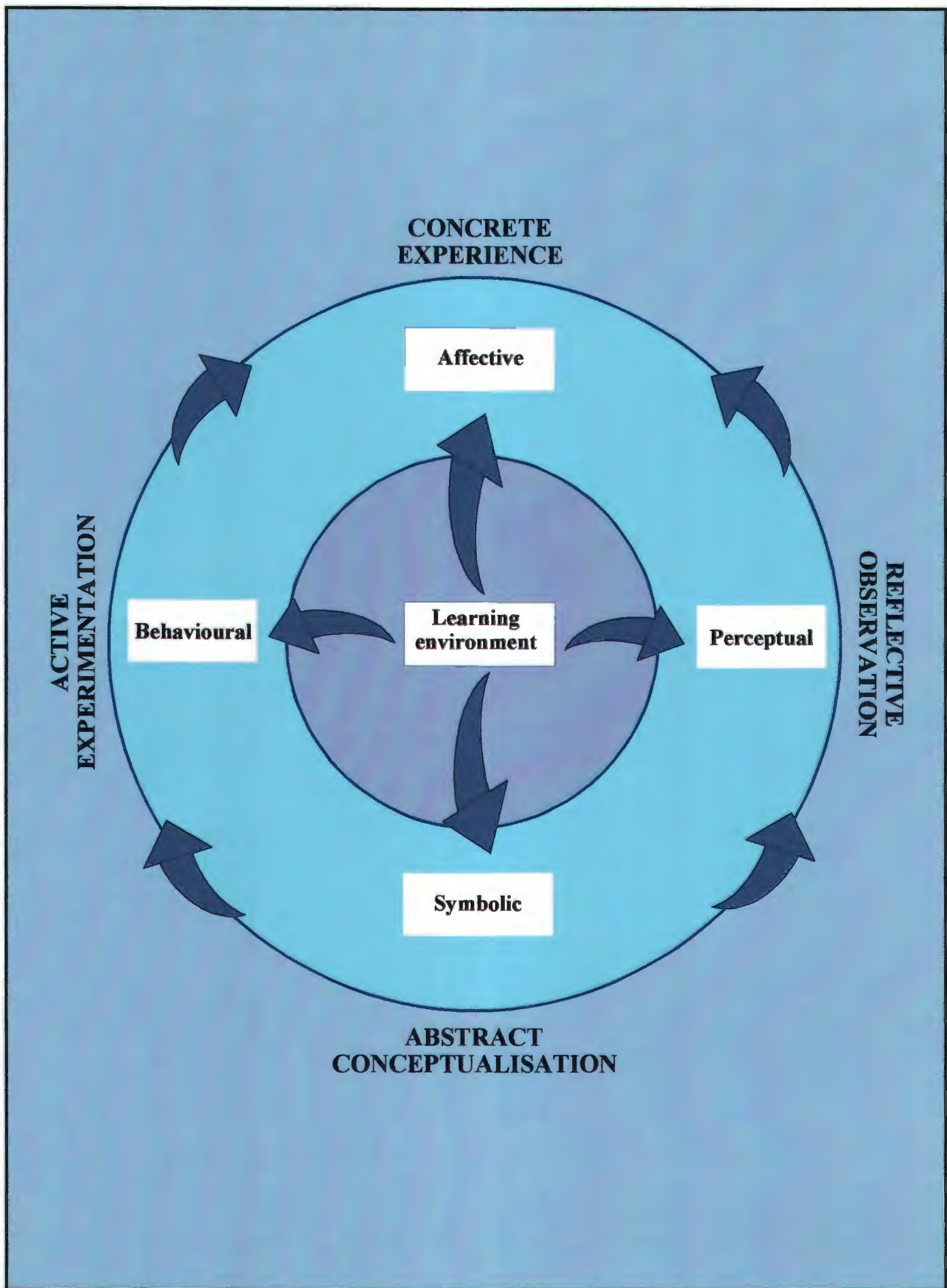
Figure 4.4
Learning environment in experiential learning
(Developed from Kolb 1984:198; McLeod 1986b:283; Reilly & Oermann 1992:109)

An *affective* environment emphasises the experiencing of concrete events. In this learning environment learners experience what it is actually like to be a professional in the field of study. Learners are engaged in activities that simulate what will be expected of them after completion of study. They are also encouraged to reflect upon an experience to generate these insights and feelings about themselves.

Regular discussions between learners and with educators generate knowledge which often comes from expressions of feelings, values and opinions. Such expressions of feelings are encouraged and seen as productive inputs to the learning process. Activities may vary from a planned schedule as a result of the learners' needs. The educator serves as a role model for the profession, relating to learners on a personal basis and more often as a colleague than an authority. Feedback is aimed at the individual's needs and the individual is not compared to other learners (Kolb 1984:198).

A *symbolic* environment emphasises abstract conceptualisation. In this learning environment the primary goal is to understand something, identify relationships between concepts, define problems for investigation, collect relevant information, and to be able to analyse a question. Learners are encouraged to view the content from different perspectives (own experience, expert opinion, literature) and in different ways (observe, listen, write, discuss, think, smell). The process of how a task is being done or a problem solved is more important than the solution. Performance is not measured against rigid criteria. Learners are left to set criteria of success for themselves. Individual differences in this process are allowed and used as a basis for further understanding. Learners may explore other's opinions, ideas and reactions in order to determine their own perspectives. The educator serves as a process facilitator, with a non-evaluative role, who answers questions with questions, suggests instead of critiquing, and relates current issues to the bigger picture. Feedback is aimed at a reward system that emphasises the methodology of inquiry versus getting a particular answer. Time is spent on reflection in order to guide the learner in future activities (Kolb 1984:198).

A *perceptual* environment emphasises observation and appreciation. In this learning environment the primary goal is to involve the learner in trying to solve problems for which there is usually a right answer or a best solution. The source of the information, question or problem being dealt with is abstract, in that it is removed from the present and presented in the form of data, pictures, reading and lectures. In handling this information the learner is both guided and constrained by external rules of inference (protocols, jargon, technology), which the learner often has to recall through memory.

The educator is the accepted representative of the body of knowledge, who evaluates learner output, interprets information that cannot be dealt with, and enforces methodology of the field of study. The educator sets goals, manages time, and enforces schedules of events in order for the learner to become immersed in the analytical exercise necessary to reach a solution. The educator decides on the flow and nature of the activities. Success is measured against rigid criteria imposed by the educator or accepted in the field, or against the best solution or expert opinion (Kolb 1984:198-199).

A *behavioural* environment emphasises action taking in situations with real consequences. In this learning environment the primary goal is to actively apply knowledge or skills to a practical problem. The problem has to be one the learner can relate to, value, and feel some intrinsic satisfaction from having solved, but need not have a right or best answer. Real-life problems, case studies or simulation that could be expected in professional life are usually used. The focus on doing and completing the task, is essential. The learner must manage the time in which the problem is solved, although there may be externally set deadlines for reports and other information. The learner's behaviour on the one task will thus have an effect on the next task. In this way the learner is always left to make choices and decisions about how to proceed. The educator acts as a trainer or advisor, but primarily on the learner's request or initiative. Success is measured against criteria associated with the task (feasibility, quality, acceptability, costs, and results) (Kolb 1984:199).

Learning environments vary in the degrees to which they are oriented to any of the four types described above. Any particular learning experience can have some or all of these orientations, to different degrees, at the same time. In a lecture where learners are required to listen and to interpret the presentation (reflective observation skills), and to reason and induce conceptual relationships from what is heard (abstract conceptualisation skills), both perceptual and symbolic orientations are present. There may also be an affective orientation, as some learners may be experiencing the educator presenting the lecture as a role model. Or, by directing questions or posing problems to the learners, the educator can increase the behavioural orientation by encouraging discussion.

4.13.2 Acknowledgment of learning styles in a learning environment

Quality education goes beyond traditional teaching and educators are challenged to become more knowledgeable about and involved with their learners. The challenge lies in conveying and transferring information to learners in a dynamic learning environment, with its constantly changing

bodies of knowledge, in a format providing for individual differences. Another goal of quality education is to help learners develop to an advanced stage by giving them mixed experiences to attain that goal (Shaubach 2000:293).

Environmental control as a phenomenon in the learning environment refers to a person's perception of control over his or her environment (internal locus of control). This internal locus of control may affect how a person approaches and carries out a delegated learning activity or task. When a person experiences an internal locus of control, he or she is more likely to be creative and autonomous in making decisions in the learning process (Marquis & Huston 2000:340). In a project on multi-cultural immersion, learners were allowed to learn about cultures in a way that takes into account their different learning styles. These learners experienced a positive locus of control. As a result affective as well as cognitive learning took place (Evans 1997:195).

By the time learners enter the learning situation in higher education, they each have different interests, skills, abilities, knowledge, experiences, attitudes, and motivation. Each one of them will learn different things, at different paces, in different settings, and with a different sense of involvement. These factors will affect learning styles. It is therefore important for educators to be aware of and respond to the individual needs of the learners, including their learning styles, when entering the learning environment.

4.14   MANAGING THE LEARNING PROCESS

Education is concerned with teaching the *how* rather than the *that*. Slabbert (1993:39) describes the educator as the specialist in the art of getting learners to learn effectively. After determining the competencies that need to be obtained and selecting the content that will best facilitate the competencies, the most appealing and suitable learning experiences should be designed.

Learning must be a positive experience in its own terms. It must be fun and mindful. If it were only fun with no effort, learners would not have to be persuaded to study. To understand this relationship between variability and effort, one must distinguish between carefulness and mindfulness. Mindfulness results when a learner learns from drawing distinctions, examining information from new perspectives, and being sensitive to context. The learner has an open, creative, probabilistic state of mind in which differences between aspects thought to be similar and aspects thought to be different

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are found. On the other hand, carefulness is when one has a particular stimulus in mind with an expectation of what the stimulus is rather than what it could be (Langer 1993:44). Research by Langer (1993:449) has indicated that there must be a relationship between learning and fun. The old cliché of "no pain, no gain" is inaccurate and can be detrimental to the educational process. Learners must be educated in such a way that they explore and think for themselves. By promoting this, learning becomes fun. In contrast, when learning is not fun, mindlessness may be found.

For an educational institution to manage the educational process in a way that is sensitive to the individual learning styles and that promotes learner development, the learning process must be managed. It can, however, only be managed if the educational process is built on a sound model of the learning process that provides for the differences in learning styles.

4.15   CONCLUSION

The educator in higher education is challenged with engaging in educational practice where individuals are recognised as having their own learning styles. In order to focus on a learning process that enables the learner to arrive at an understanding of how to learn, the learning process itself needs to be explored. Educators need to be open to learning and the factors that play a role in the learning process. Learning in higher education indicates an importance in designing, initiating, implementing, monitoring and evaluating learning of individuals with recognised learning styles.

In the following chapter the educational importance of learning style theories and the application thereof in higher education will be explored. Learner, educator and teaching descriptors will be explained in order to analyse the need for accommodation of individual differences in the learning process. This theoretical analysis of the literature will be done in order to come to a proper understanding of the phenomena of interest and to contribute to the construction of the conceptual model.

CHAPTER 5

EDUCATIONAL IMPORTANCE OF LEARNING STYLES

5.1 INTRODUCTION

Phase 1 of this research addresses the analysis and exploration of the concept of learning style, learning in higher education, and the educational importance of learning styles. The previous two chapters dealt with an analysis and exploration of the concept, and learning in higher education. To understand the fundamental aim of any education, which is to facilitate learning effectively, the educational environment has to be explored, and the educational importance of learning styles has to be put into context.

The educational importance of learning styles in higher education was explored in this chapter. Aspects such as placing learning styles within the context of higher education, learning styles and the professional environment, and the implications of learning styles for higher education, were discussed.

5.2 UNDERSTANDING THE EDUCATIONAL IMPORTANCE OF LEARNING STYLES

Individual learning profiles have been the focal point of a great deal of research. The differences in the way individuals learn have been apparent for many years, but only in the last few decades have the learning characteristics and preferences of individuals been identified and compared. If one accepts the fact that educators facilitate learning rather than teach a specific discipline, then preferred methods of learning have implications for instruction. If learners are assessed for their preferred learning styles, it soon becomes clear how educators can assist learners in the learning process.

A fundamental aim of higher education is to facilitate learning effectively (Kruger 1998:107). The practical application of learning style theory is that once educators know their learners' learning styles, they can use that information in facilitating, supporting, counselling and teaching. Individual learners can be helped to learn. Evidence in the case for individuality in learning is growing rapidly and more and more educators are taking cognisance of this important educational approach.

When an educator facilitates learning, there is more interaction than meets the eye. A complex set of mental alignments that are required for learning to occur is used. These alignments can make the difference between mastery or missing the point entirely. The mental alignments with regard to teaching styles and learning styles are sometimes the reason why learners are either successful or unsuccessful in the learning process (Gregorc & Butler 1984:27).

Considering the mental alignments lead to a comprehensive approach to learning. Securing a better comprehension of the learning processes through learning experiences within an environment where differences in learning styles are acknowledged brings about a substantial list of benefits. These benefits include:

- an increase in the capacity of individuals to learn
- a reduction in the frustration caused by being exposed to inefficient learning processes
- an increase in motivation to learn
- a recognition that unwillingness to learn from one particular learning activity cannot be generalised to an unwillingness to learn from another learning activity
- development of learning opportunities beyond formally created learning situations
- a multiplier effect for educators in their facilitator relationship with learners
- the reduction of dependence on an educator
- the provision of processes which continue beyond formal programmes into the professional environment
- better identification of the role of learning in effective professional behaviour
- the development of more effective behaviour in relation to a profession

The competence of the educator is a critical part of the educational and learning process (Stoy 2000:19). Educators must have an action plan to assist them in improving their competencies in education. The steps educators take to improve is thus an integral dimension of higher education. Educators and learners need to understand this extremely important relationship between educating and learning. To meet the commitment to higher education, to learners, and to the community at large, educators need to commit themselves to competencies in promoting learning style awareness. Eventually, higher education demands independent thinking and independent learning.

5.3 PLACING LEARNING STYLES WITHIN THE CONTEXT OF THE EDUCATIONAL ENVIRONMENT

The term "educational environment" is a comprehensive term that includes the learner and educator as role players, the learning process, the learning environment, the teaching style, educational instruction, learning activities and tasks, and learning material.

Educational and learning practices in higher education have become important research issues. There is a clear need for bringing these issues to the surface to help educational institutions as well as administrators to think more deeply about their roles and the institutional culture in which education and learning is taking place (Bhowan & Tewari 1997:122; Cavanagh & Coffin 1994:106; Carpio, Illesca & Ellis 1999:32; Claxton & Murrell 1987:iii). Learning style is a concept that is very important in this movement, not only in informing educational practices but also in empowering learners with self-knowledge and increasing learners' self-responsibility.

Research on learning styles contributes to quality improvement in higher education. Along with that, it also improves the chances of success when educating a diverse learner population. Current economic, demographic and disease profile changes in society are having a tremendous impact on higher education. In a shrinking economy where there is a higher demand on services nationwide, the future will belong to those who can successfully anticipate problems, build information networks, and create bridges of shared resources with other disciplines. Acknowledging and integrating individual differences in learning styles, with emphasis on their strengths and limitations, provides valuable information to educators. Educators can assist greatly in addressing the important task of reordering priorities in higher education and thus also in the professional world.

The following discussion explains the role and importance of learning styles within the context of the educational environment with regard to the learning process and learning environment.

5.3.1 Learning styles and the learning process

Learning style is an important concept in the learning process. Assessing the learning styles of learners means deriving the greatest benefit from education (Dobbin 2001:4; Sadler-Smith 1996:29). Recognition of learning styles does not mean that the educator has to change the content or the

method of evaluation, but it can lead to important adaptations in the delivery of learning material so that it is received correctly by learners who have diverse learning styles. Doors are opened to the placement of individualised instruction on a more rational basis. This gives educators a powerful leverage to analyse, motivate and assist learners in the learning process. As such, it is the foundation of a modern approach to the learning process and thus to education.

Factors relevant to a complete understanding of individual differences in the learning process include whether a learner is an independent or dependent learner, an active doer or a passive listener, learning in a group or alone, and what his or her preferences are for certain teaching-learning media. These factors influence the learning potential of learners. Part of the responsibilities of an educator as a role player in the educational environment is to ensure that the learning potential of the learner is maximised. Dewar and Walker (1999:1461) emphasise the importance of support of learners in enabling them to identify their own learning potential and articulate it for the purposes of individual learning styles. Acknowledging individual learning styles thus forms part of maximising learning potential.

5.3.2 Learning styles and the learning environment

When entering the learning environment, learners bring with them a particular learning style, derived from a variety of previous learning experiences. This does not mean, however, that learning styles cannot be modified with suitable intervention and guidance by educators (Davis 1990:407). Educators have a responsibility to create a learning environment that maximises learning. Such an environment results only from proper planning and requires an understanding of theories of human behaviour and how individuals learn (Vakalisa 1998:179). Furthermore, the learning environment has an impact on the learner and the learner affects the learning environment (Daly 1996:110). In this learner-to-environment relationship, individual differences are important as these differences will influence the learning situation. The role of the educator, then, is to manage the learning environment created by a specific learning situation.

Matching learning styles to the learning environment is particularly appropriate when learners are new to a specific learning situation. Variables such as self-esteem and the motivation of learners and educators are influenced. Mismatching of learning styles and the learning environment is also important and stimulates ways of thinking and the need to improve on oneself. Mismatching can

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increase the mobility and range of the learning styles used. This can be of value where the learning content requires one particular style rather than another. An example is where learners are taught to solve problems. Not all learning styles lend themselves to problem-solving. Learners are then supported in such a learning environment to use their less dominant learning characteristics and preferences. By forcing someone to use a non-preferred learning style, that person can be led to more active restructuring of the learning material that is to be learned, which can in itself lead to better learning (Presland 1994:182). The need to improve serves as motivation. Success gained too easily can decrease motivation. On the other hand, some learners have a stronger need to avoid failure. This situation refers to resultant motivation. These learners are usually discouraged by failure and encouraged by success (Woolfolk 1995:129). Resultant motivation should, however, not be used as the main approach because of the negative effect it could have on motivation to learn. Mismatches must be well-planned, and deliberate and oriented towards clear goals.

Cavanagh et al (1994:40) suggest that the possibility exists that an individual's approach to learning is influenced by the environment in which learning occurs. In other words, a learning environment for health care professionals may influence the approach to learning because it is a human sciences environment. This implies that the learning competencies of professions can act to shape the learning styles of members of that profession. This cannot, however, serve as a definite guideline as to whether an individual is suitable for a certain profession or not. Learning styles can never be used to select individuals with a particular learning style for a particular profession. In addition, individuals cannot be placed in a learning style because of the learning environment or profession they come from (see section 5.13.1).

By structuring the learning environment to accommodate all individual learners, educators have attempted to promote a purposeful and high level of cognitive engagement in learning. Learners become more involved in the learning activities and their approach to learning becomes deeper. The learning environment thus becomes more conducive to learning, promoting the learning potential of each individual.

Inevitably, the educational environment plays an important part in how learners learn and ultimately achieve. In higher education, academic achievement is more than performing well in the educational environment. As Mothata (2000:126) describes it, the achievement of a learner is measured holistically or through integrated demonstrations of cognitive, affective and psychomotor activities.

5.4   LEARNING STYLES AND ACADEMIC ACHIEVEMENT

Achievement is described as the ability to complete something successfully (McLeod 1986a:7). Academic achievement refers to achievement in an academic or educational environment. It is a holistic or integrated demonstration of cognitive, psychomotor and affective activities. Academic achievement furthermore involves a demonstration of the ability to complete specific learning activities or tasks that are measurable and observable as well as an explanation of the rationale for doing these learning activities or tasks in particular ways (Mothata 2000:125). Academic achievement is part of the learning process and provides an explanation of how individuals gain and retain knowledge (Fraser & Nieman 1996:186).

Various studies (Fraser & Nieman 1996:186; Joyce-Nagata 1996:72; Linares 1999:413; Ronan 1996a:111; Van Rensburg 1995:147) have concluded that a preference for one learning style or another is not a major factor in academic achievement. The acknowledgment of the existence and the accommodation of different learning styles are, however, part of the comprehensive process to ensure the creation of well-constructed knowledge. Learning style information can aid in understanding and enhancing learners' academic achievement in higher education (Forney 1994:338). Achievement is enhanced when teaching styles and instructional modes (teaching methods and teaching strategies) are compatible with learning styles (Blagg 1985:94; Fraser & Nieman 1996:186; Garity 1985:15; Grimes 1995:422; Joyce-Nagata 1996:73; Talarczyk 1989:265). This compatibility includes the matching and mismatching of teaching styles and methods, with the aim of promoting learning. When educators consider and address the issue of both matching and mismatching learning styles and teaching styles and methods, they stimulate the development of a learner's learning skills and interests (Joyce-Nagata 1996:73). The role of the educator, furthermore, is to consider whether the existing and planned methods of assessment and evaluation do justice to the academic performance and achievement of the learners.

Dunn and Dunn (1979:238-239), two well-known learning style researchers, argue that certain learners achieve only through selected instructional modes, and these are often modes that frequently fail to produce academic achievement for others. By experimenting with innovative teaching strategies, they also found that most teaching strategies appeared to work with some learners but not with others. Eventually it was recognised that, in many cases, those learners who were successful

with a particular teaching strategy or set of learning materials had essentially similar learning style characteristics. Research results repeatedly revealed that, when learners were exposed to teaching strategies that complemented their learning styles, they became increasingly motivated and achieved better academically. However, in a research project on whether learning styles predict differential success in educational programmes, Talarczyk (1989:268) came to the conclusion that there is no significant correlation between the two learning styles, field-dependent and field-independent, and the overall academic achievement of a specific group of learners.

Academic achievement is often associated with cognitive ability, and so are learning styles. However, learning styles and cognitive ability are unrelated. A style is a way of doing something. It is not an ability, but rather a preferred way of using the abilities one has. The distinction between a learning style and cognitive ability is an essential one. As Sternberg (1997:8) explains it, cognitive ability refers to how well an individual "can do something", and a learning style refers to how individuals "prefer to do it".

A specific learning style does not determine academic achievement or success. The researcher supports the notion that it is more important for learners to use more than one learning style when appropriate than to rely solely on one preferred learning style. The reason being that no learning situation can be structured or planned to suit the specific learning characteristics and preferences of each learner. Learners will, no doubt, be exposed to learning activities and tasks that demand the use of their less dominant learning characteristics and preferences. Such activities must be seen as a challenge and used as a form of motivation to enhance learning. Furthermore, the learner must gain enough confidence to approach a learning situation that poses a challenge to him or her, regarding how learning is to take place in that situation. Thus, it is important for learners to develop their least preferred learning styles since this will contribute to maximising their academic achievement and learning potential. The learning environment should be such that a variety of instructional modes are used, thereby planning and structuring the learning environment for the various learning styles. An important purpose of learning style research is to identify factors which could be used by educators to strengthen future academic achievement among learners.

Learning to learn should be placed in the forefront of the educational environment as an explicit activity and not just confined to an information session at the beginning of a programme. Learning to learn is described as "timeless wisdom" (Sadler-Smith 1996:32). Identifying preferred learning

styles and integrating them into educational programmes promotes positive learning experiences (Joyce-Nagata 1996:69). By contrast, although it is suggested that a learning event can usefully start with an identification and discussion on learning styles, this should not be emphasised at the expense of ignoring the educational programme or environment (Anderson 1993:98). In an educational programme or environment where learning styles are acknowledged and promoted, the learner is more involved as part of the complete programme (Guskey 1988:89). Learning how to learn and promoting learning styles in higher education can be described as the basis for an educational programme. The basis serves as a starting point or guideline for approaching the learner and the educational environment, without being prescriptive. Acceptance of learning styles as fundamental strengths in each individual contributes to the development of the self esteem of a learner, and ultimately to academic achievement.

5.5   LEARNING APPROACHES

The concept of learning approaches emphasises the relationship between learning intention, the learning process, and learning outcomes in a specific context (Gravett 2001:33). An individual will approach learning in a particular way as a result of the demands or requirements of the learning situation. This is not a permanent characteristic of an individual, but describes a relationship between a learner and a specific learning endeavour. It explains how and with what intention the learner deals with the learning activity or task (Entwistle & Tait 1995:93-94).

Differences in the learning process lead to qualitative differences in the level of learning. Learning styles are also described as clearly identifiable, qualitative distinctions in learning approaches or levels of learning which are classified as deep learning, surface learning and strategic learning (Entwistle & Tait 1995:95; Mockford & Denton 1998:12; Ramsden 1992:45). Sadler-Smith (1997:54) includes two more learning approaches to higher education, namely, lack of direction and academic self-confidence. The last two approaches, lack of direction and academic self-confidence, do not have definite distinguishing characteristics and serve rather as an orientation towards the learning situation and higher education. *Lack of direction* reflects a learner's lack of clear academic and career directions and goals. *Academic self-confidence* is an orientation where learners typically perceive themselves as able, intelligent and able to cope with the intellectual and academic demands of their studies (Sadler-Smith 1997:54). The main three defining approaches to learning are illustrated in figure 5.1.
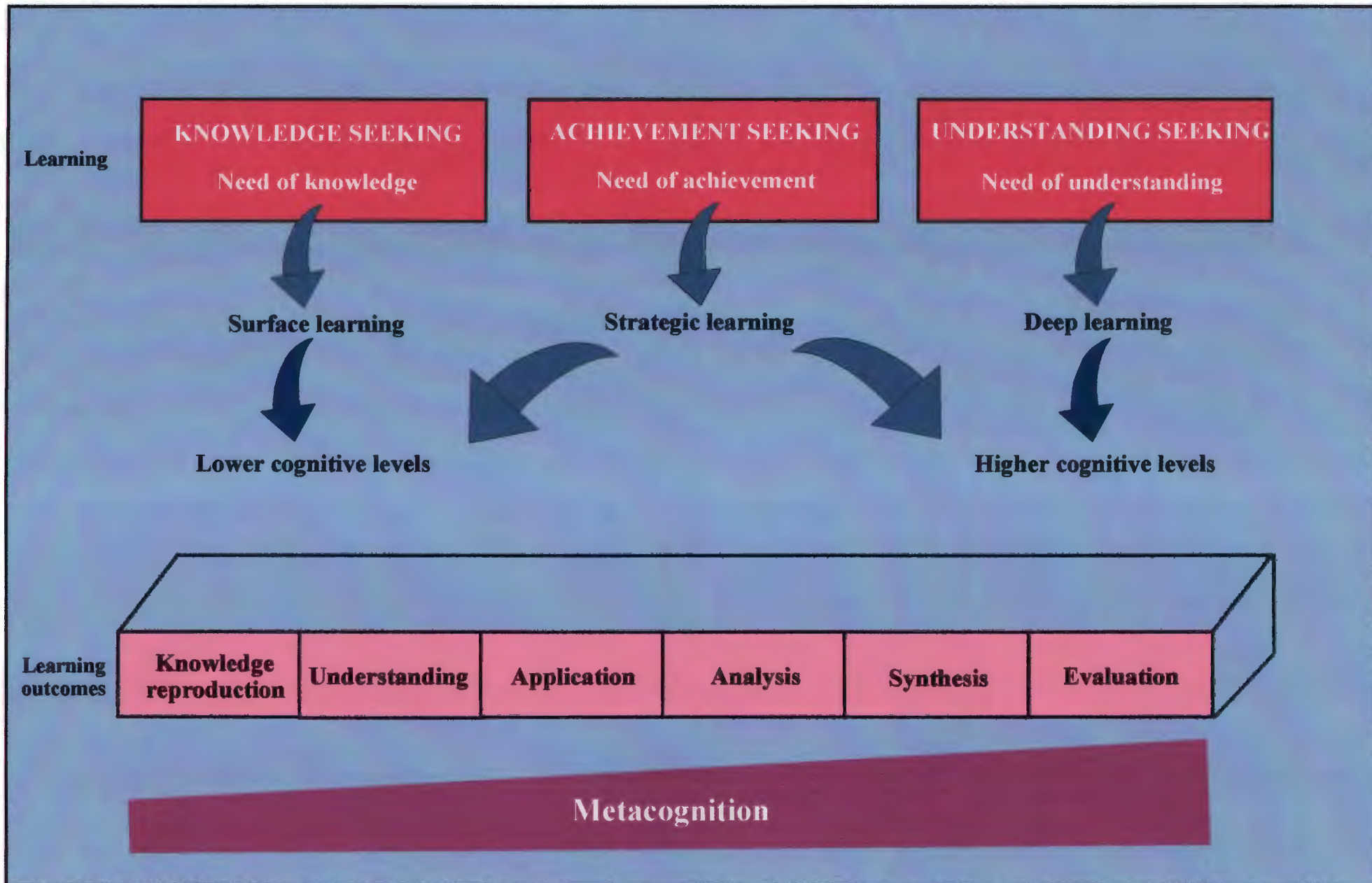
Figure 5.1
Approaches to learning
(Adapted from Pretorius 1996:46)

Deep learning is based on high levels of intrinsic motivation, with the learner striving for new ideas and materials through a variety of strategies in the search for understanding. Deep learning approaches include critical thinking and reflection. It is characterised by an active search for meaning (Gravett 1995:34). A deep learning approach starts with the intention of understanding the meaning of a concept, questioning and reasoning the issues, and then relating them to both previous knowledge and personal experience (Sadler-Smith 1997:54). It is based on a true interest in the subject matter related to a learning activity or task (Pretorius 1996:45). This is the ideal model for learning (Gow & Kember 1990:337). Assessment and evaluation is of less importance, is relatively infrequent, or is of a different type than normally used (Sharp 1990:335). Although learner performance may not necessarily be recognised in the award of high marks during assessment, it will develop the learner holistically. Learning will involve the intention to understand with a focus on significance. The learner relates previous knowledge to new knowledge, using knowledge of different programmes or learning areas, and relates theoretical ideas to everyday experience. A relationship and distinction can be drawn between evidence and argument. Learners will organise and structure content into a coherent whole to make aspects more visible and intelligible, and try to work out the meaning of information for themselves. They do not accept ideas without critical examination, and look for reasoning, justification and logic behind ideas (Ramsden 1992:46; Sadler-Smith 1997:54). These learners therefore function at high levels, which entail activities such as analysis, synthesis and evaluation.

Surface learning takes place when the learner only puts in the minimal effort to avoid failure. The focus is on the assessment requirements and very limited decision making takes place. Surface learners focus on certain words or terms, or unrelated parts of a task. They try to find a formula that will lead them to problem-solving, accepting ideas without necessarily understanding them, instead of analysing and arguing the issues (Magnussen 2001:44). These learners rely on memorising information or associating facts and concepts without contemplation and are unable to identify principles. The acquisition of factual information in isolation from a wider picture is emphasised. Learning activities and tasks are applied by memorising and using examples from everyday reality. Learners who follow a surface approach to learning tend to function more on the lower cognitive levels of thinking such as knowledge reproduction, understanding and application (Pretorius 1996:45). Surface learners express anxiety about their studies in terms of organisation and volume of learning material (Ramsden 1992:46; Sadler-Smith 1997:54). Learning then becomes an exercise which is meaningless (Biggs 1993:76; Fransman 1991:73). Surface learning is an approach which

should be discouraged, because of its negative effects on academic achievement.

Strategic learning emphasises the product of learning rather than the process of learning. The focus is on achievement of more success with a strong element of competition involved. Time and effort are used to reach specific predetermined outcomes through organisational skills and behaviour. This means that product requirements are met without information necessarily having been acquired and reflected on. Learners who use this approach have clear goals related to their studies and are identified as being hard workers. They also make sure that they have the appropriate resources and conditions for successful study (Sadler-Smith 1997:54). Because both surface and strategic learning focus on the assessment structures, learning experiences in these approaches to learning can be impaired (Mockford & Denton 1998:13).

The approaches to learning identify learners' ability to approach academic texts and learning material. Learners' intention to understand the meaning of a concept and their ability to reason are identified. Their approaches in terms of predominant motivations and intentions are revealed. This will enable the educator to determine the learning experiences and learning process that takes place within the context of styles of learning.

Educators must be aware of the approaches to learning that their teaching, instruction and/or facilitation engender. It is vital that education is approached reflectively and that educators deliberately assess their teaching styles and instruction modes. The educator as a reflective practitioner should therefore plan thoughtfully, act deliberately, observe the consequences of action, and reflect critically on the educational constraints and practical potential of the educational actions taken.

Higher education should be promoting and encouraging deep learning by using appropriate instructional modes such as problem-solving and project work, and evaluation methods. This in turn will encourage independent learning. However, as learners proceed through higher education, the use of a deep learning approach tends to diminish. The frequency and nature of assessment becomes a most important (in many cases *the* most important) influence on the approach to learning adopted by learners. Possible explanations relate to extrinsic motivation, social pressures, work pressures, assessment pressures, didactic versus interactive educational approaches, demands of educators, and rote memorisation. Learning programmes focus narrowly on producing professionals and staff for

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specific posts instead of encouraging intrinsic interests. Reasons should be identified so that this can be rectified.

In higher education the learner seeks some form of qualification and career. In other cases individuals return to higher education partly because they want to learn more and partly because they want another qualification. For the latter group success might not be all-important, they already have a qualification to which they can return should they be unsuccessful. The first group have quite contrary goals and perceive their examinations to be of much greater importance because they have a need for a qualification. Failure to pass is thus often seen to be the end of all hopes and the examination therefore assumes a very high priority. Although this should not be the approach to higher education, it seems, from the learners' point of view, very logical. Developing a deep learning approach is less important to them. Educators in higher education cannot ignore this viewpoint, but should accordingly organise educational and evaluative practices to counteract it. Assessment and evaluation which require learners merely to regurgitate content obtained through lectures and required reading virtually force them to use a surface approach to learning that content. On the other hand, assessment and evaluation which require learners to apply the knowledge gained in the course to the solution of problems cannot be used without the learner having a deeper understanding of content, thus a deep learning approach. Richardson (1994:449) maintains that learners in higher education adopt a deep learning approach in so far as they acknowledge the more abstract forms of learning that are demanded by higher education and are motivated by relevance of the learning programme to their own personal needs and interests, but they adopt a surface approach in so far as they encounter an overloaded curriculum and methods of assessment that emphasise superficial properties of the material that is to be learned.

Learners will continue to memorise facts even after experiencing innovative instructional modes. Learners need to use memorisation because they are required to reproduce detailed learning material in either a test, an examination, or in a practical or clinical setting. However, the learning material must be understood and connections formed in order for the information to be retained and used as the basis for a career or profession. Therefore, the combination of memorisation, conceptualisation, and reflection is likely to lead to both an understanding of learning material and the retention of relevant facts.

The application of learning theory to facilitate education offers the educator a method of approaching learners holistically by recognising that not everyone processes information the same way, or approaches learning the same. Quality education takes place when strategies are used to meet the various approaches to and styles of learning. Magnussen (2001:45) supports this notion by explaining that, in a faculty where the development of independent learning and learning for understanding is encouraged, learners will decrease the amount of memorisation while studying and increase the amount of conceptualisation.

Although deep, surface and strategic learning approaches are all necessary, learners must be encouraged to strive for a deep understanding of learning material. A deep learning approach can be linked with positive project engagement, with limited reference to assessment criteria, and the desire to produce workable proposals. A strategic learning approach will be characterised by the matching of output to individual assessment criteria, where a workable proposal is less likely to be generated.

Understanding approaches to learning contributes to establishing general principles to guide effective education and learning (Entwistle & Tait 1995:100). Together with the acknowledgment of learning styles and the assessment thereof, an analysis of the educational environment serves as a starting point to discover whether the desired approaches to learning are being supported. The general principles derived from this discovery will then allow educators to decide for themselves how they should modify, if necessary, their arrangements in the educational environment to provide a learning environment which supports high-quality learning. Above all, learners must be encouraged to reflect on their own styles of learning, and n which skills and strategies they need to improve their learning and approaches to the learning process.

5.6 IMPLICATIONS OF LEARNING STYLES FOR EDUCATORS

The educator contributes to the quality of learning. The role of the educator is not merely one of conducting education but also one of facilitating learning by assisting the learner to control his or her own learning to reach a level of metacognition (White 1992:160). Accepting the relevance of learning styles for quality learning to take place imposes a great responsibility on the educator, in that the educator must contribute to the securing of quality learning.

The learning style of an individual is only one aspect of the comprehensive approach to the process of higher education. Important aspects include, apart from learning styles and their implications for the educational environment, the teaching style of the educator and the impact it has on learning and the learning process. Before the teaching style of the educator can be addressed or considered, the role of the educator in an educational environment where individuality, expressed in learning styles, is accepted, must be explained. The educator therefore needs to reflect on the implications of the acknowledgment and assessment of learning styles for the educational environment.

First, the learning styles of educators and their learners should be considered. In considering teaching styles, the contribution of the educator's own learning style is important. Child (1997:329) maintains that, in a situation where educators and learners have similar or complementary learning styles, the most successful combination is formed in terms of academic achievement. Whether or not it improves academic achievement, it is important for the educator to know his or her own learning style in order to plan and approach the educational process. There are some advantages and some disadvantages to matching the learning styles of learners and educators (Chase 1995:46). Bhowan and Tewari (1997:129) conclude that most learners have a learning style profile that is operative up to a moderate level if measured on a learning style instrument, which means that learners can cope with a variety of instructional modes, which are again influenced by the learning style of the educator.

Second, if educators want to formulate and design individual learning, the learning styles of learners must be assessed. By getting to know the learner, the educator is better able to maximise learning experiences. The following questions arise now: How often should learners be assessed? Should their learning styles be assessed in each course or by the institution on admission? How should the learning styles of individual learners be communicated to educators? These questions cannot be answered by hard and fast rules. Furthermore, the assessment of the learning styles of educators and the possible implications for educator-learner interaction during professional preparation are important. An educator can sometimes feel a lack of connection to the learner/s, given their learning styles versus his or hers. Educators therefore need to acknowledge the existence and implications of learning style assessment for the educational environment and process.

The perspective that takes learning characteristics and preferences into consideration when selecting instructional modes suggests a particular philosophy of education in which instruction is viewed as an active two-way communication process involving the direct and indirect exchange of knowledge,

skill and effect. Individual learning characteristics and preferences relate to several factors such as personality, learning needs, context and learning experiences (Sadler-Smith 1997:60). The learner is involved intellectually, physically, emotionally, and socially in order for learning to take place (Ostmoe, Van Hoozer, Scheffel & Crowell 1984:27). The involvement may be mediated through experience, context and motivation. The appropriate response to recognised individuality in the learning process should lie in the provision of variety and options, rather than compromise (Joughin 1992:6). For educators to meet individual learner needs when there is a group of learners, and when there is so much information to be conveyed, is an impossible task unless the educator departs from a well-planned and organised pattern and follows a programme that is more flexible and adaptable. It must also be recognised, however, that not all educators are skillful or comfortable in the use of all instructional modes.

Joughin (1992:3) explored the need for a supportive interpersonal learning environment. He acknowledges that learners respond in significantly different ways to some of the key elements of a learning situation. Subsequently, educators need to be constantly aware of these elements and the different implications they will have for the learners with different learning styles (Joughin 1992:13). The key elements of the learning environment include structure, analytical ability, responsiveness to affective considerations and responsibility. The need for external structure, responses to provided structure and the ability to create structure where none is provided, can be expected to vary in learners. A critical aspect of higher education is the description of known learning characteristics and preferences of the learners and the attempt to discover particularly significant characteristics and preferences which can serve as central organising principles for the educator (Joughin 1992:3).

The question arises whether learners should work within an educational environment where specific teaching styles are used rather than allowing them to develop as professionals within an educational environment that accommodates individual differences. Taking the latter into consideration, the approaches to learning will have an influence on the design and presentation of methods such as project work (Mockford & Denton 1998:12-13). Thus, the educator must consider the comprehensive approach to higher education, and cannot only address either teaching styles or learning styles. Together with this, the educator has to acknowledge his or her own individuality, expressed in a learning style. In addition, the educator must acknowledge the implications that the assessment of learning styles has on the educational environment and the process of higher education.

Most important, learning styles are neither good nor bad. It is a question of fit. One can say that it is better or worse, but, it should be made clear that it is only better or worse within a given context. A learning style that may fit in well in one context may fit poorly or not at all in another (Sternberg 1997:97, 136). Learning styles form the foundation of how individuals perceive, process and integrate new information. Very different responses to identical learning situations exist. There are, however, great dangers in the misuse of learning style concepts. Learners may be turned into stereotypes. Therefore, learners should not be denied the opportunity to develop themselves fully by only exposing them to an educational environment that matches their strengths or dominant learning characteristics and preferences.

According to Witkin et al (1977:53), there is an uncertainty among educators with regard to the development of greater diversity in learning and educational approaches where learners are directed by their learning styles. This does not mean, however, that every learner will take equally well to the diversity. For the educator, the development of greater diversity in educational approaches as well as the development of individual diversity in behaviours seems as important as the recognition and utilisation of existing diversity among individuals (Partridge 1983:248).

The challenge for educators lies in their willingness to change their thinking and their teaching styles and do the extra work that it takes to design individual learning, or plan and organise education for diversity to accommodate a diverse group of learners.

5.7   LEARNING STYLES AND TEACHING STYLES

Although the focus of the research is on learning styles, teaching styles become important in the light of the fact that different learners will respond differently to different teaching styles. A discussion on the role, importance and types of teaching styles is necessary in order to explain the educational process comprehensively.

5.7.1   Role and importance of teaching styles

An educator has a certain style of conveying information to a learner. The act of educating includes the term teaching. Teaching can be defined as the performance of acts aimed at imparting knowledge and/or skills in a learning area to a willing learner (Bhowan & Tewari 1997:123). Teaching takes

place when an educator conveys constructed meaning to a learner which he or she accepts and constructs into his or her own meaning. It is not merely the transfer of knowledge as the learner receives the content in a de-constructed format, after which a constructive process takes place (Slabbert 1993:38). A teaching style therefore refers to the way in which educators differ in facilitating learning and presenting learning material to learners.

Rentel (1994:179) describes teaching styles as individualistic patterns of action that play out in interactions with learners and circumstances. Like individual differences in learning styles, there are also individual differences in teaching styles. Educators are not all able to teach in the same way. There is a commonly ascribed-to belief that educators teach the way they were taught. A more accurate statement would, however, be that educators teach the way they learn. Research findings state that educators' teaching styles are similar to their learning styles (Matthews & Jones 1994:234). Dunn and Dunn (1979:241) found that educators believe that the way they learn is the "easy" or "right" way, and that they therefore direct their learners towards mastering knowledge in much the same manner.

Educators tend to value learners like themselves by seeing those who approach the learning environment and material as they do. As a result learners are not appreciated for their individuality, but rather for how they fit into the stylistic pattern of the educator in a given learning environment (Sternberg 1997:98). Learners with learning styles corresponding to those of the educators appear to the educators to be brighter (Sternberg 1990:368). Learning styles should, however, not be confused with quality of mind. Quality of mind or learning abilities are not the factors influencing the educational environment, but the learner individuality.

Teaching styles and learning styles are interrelated. This does not imply that all education should be based on learning styles. Learning styles cannot be the exclusive basis for designing educational instruction. Learning styles and teaching style characteristics do not cluster into accurate entities or packages. Learners can furthermore adapt to a variety of instructional modes.

Teaching styles make different demands on the learner. Although it is accepted that matching a learning style with a teaching style and instructional mode can positively affect academic achievement, there is no guarantee. The misconceptions are that learning styles and teaching style characteristics do not always cluster into such neat packages, and that learning styles and teaching styles can be

matched and still not provide the learner with an effective educator. Matching and mismatching learning styles and teaching styles must be done in a planned and well-prepared manner. Both matching and mismatching are appropriate or applicable in certain learning situations. Performance, attitude and behaviour of learners can be enhanced when teaching accommodates learning styles (Lemmer & Squelch 1993:62). According to Gregorc and Butler (1984:27), a learner can experience feelings of great insecurity, frustration, anxiety, anger, alienation, overcompensation, and futility when the teaching style does not fit his or her learning style. In order to identify those characteristics that produce effective instruction and facilitation of learning, certain weaknesses in the teaching-learning process must be identified. One major problem is a lack of understanding that educators may be knowledgeable, charismatic, caring, hardworking, and dedicated, but still not be effective with learners whose learning styles are not complemented by their own teaching styles (Dunn & Dunn 1979:241).

Cranston and McCort (1985:136) maintain that it is imperative to provide the best possible match of instructional mode for learning characteristics and preferences. Grasha and Riechmann (1982:81) state that although learners have specific learning styles, these styles can and often do change depending on how the educator structures the educational environment.

Sternberg (1990:368) maintains that when a mismatch exists between the preferred learning styles of educators and that of a particular learner, the learner may frequently seem bored, since educators tend to teach, develop evaluation methods, and create assignments that reflect their own learning style. Although both educators and learners have preferred learning styles, educators need to be flexible in their teaching in order to reach the greatest possible number of learners.

Teaching styles determine the way in which information is conveyed to the learner. When the teaching style does not meet the needs of a particular learning style, and therefore does not succeed in conveying information, not much learning takes place. Although teaching styles may be ingrained and difficult to modify, they can be expanded to respond to varied learning styles, provided the educator understands why one teaching style cannot be effective with all learners, and strives to acquire additional teaching skills within a style or expand to another.

In changing to a new educational approach that uses interactions and transactions between and among learners and educators as a basis for learning, educators must reflect on the practice of

education or facilitating learning. As the approach to learning changes, so too does the approach to education or facilitating learning. By experimenting with new educational approaches the educator gradually brings about a change in how learning occurs and in his or her role in effecting this change which is consistent with this new approach. By this reflection-in-practice the educator becomes open to experiencing the unexpected in learning situations, to feeling the discomfort associated with role function changes, and to being challenged by the confusing changes during the educational process. Reflection-in-practice is a strategy that is purposeful. Educators become pro-active in the learning environment by becoming able to read the external signs and internal cues that characterise the learning process and experience. The educator who reflects-in-practice is continually placed in touch with the climate of learning and can match the educational process to a changing learning environment. For an educator to be able to reflect-in-practice, a sound knowledge and understanding of different teaching styles is necessary.

Two questions around teaching styles often arise. Does one teach the way one learns? If so, is it possible to teach in a different style from the one in which one learns? The implications of these questions are wide. If the answers to the questions are "yes", and if it was clear that matching teaching styles to student learning styles will promote more effective learning, such matching should not only be considered, but implemented, and could lead to quality learning. The fact is, the educator, as an independent practitioner, with individual differences, needs to consider the teaching styles that will ultimately promote quality learning in higher education.

5.7.2 Types of teaching styles

Different ways of categorising teaching styles exist. Not one of the categories can be described as being the best or the ideal type of teaching style. An educator may fit into one of these styles or may use a combination of several teaching styles.

5.7.2.1 Observational Research and Classroom Learning Evaluation (ORACLE) teaching styles

Child (1997:329) describes the Observational Research and Classroom Learning Evaluation (ORACLE) project which defines four teaching styles, namely:

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- *Individual monitors* where the interaction is characterised by a low level of questioning and a high level of non-verbal interaction. The learner is mainly monitored through assessing the work. Of the four styles identified by this project, the educator using this style engages in the highest number of interactions concerned with instructing the learner what to do and to a lesser extent with assessing the work.

- *Class enquirers* where the interaction is characterised by great emphasis on questioning. The educator manages learning by starting a new topic and then progresses using the question and answer technique.

- *Group instructors* where the interaction is characterised by a high level of information transference. The educator gives a large number of factual statements compared with a number of ideas. First carefully structured groupwork is done, which is then followed by a discussion. This group is regarded as the most interesting group of educators.

- *Style changers* form the biggest group and are classified into three different types; *infrequent changers, rotating changers* and *habitual changers*. The *infrequent changer* is prepared, only from time to time, to change teaching tactics to suit a change of circumstances. The *rotating changer* has groups of learners work on tasks with one particular topic being studied at any one table. The groups rotate from one topic to the other with the whole class moving at the same time. The *habitual changer* makes frequent changes between individual and group instruction with no particular plan.

No overall best teaching style emerged from this project although the rotating changers had the least success. However, the structure in the educational environment, formal or informal, was found to be significant. Structure with regard to well-founded knowledge must be transmitted in the teaching-learning-thinking processes for new experiences to be set against the background of existing knowledge. Child (1997:329) indicates that it is inevitable that the educator's teaching style should include structure, to be established in the learning and teaching strategies used.

5.7.2.2 *Dunn and Dunn elements of teaching style*

Dunn and Dunn (1979:241) list nine elements of teaching style. They maintain that educators have a unique combination of these elements which make up their teaching style.

- *Educational philosophy* and *learner preferences* are two elements that are not observable and that cannot be objectively assessed. These elements refer to the attitudes of educators towards various instructional programmes, methods and resources as well as the type of learners they prefer working with.

- *Instructional planning* includes the assessment, planning and evaluation completed for learners and can be evaluated objectively through classroom observations or examination of records, assignments, projects, or other work.

- *Learner groupings* is an observable element and encompasses the way in which an educator permits learning to occur sociologically.

- *Room design* reflects the ways in which the educator uses instructional areas to match the learning needs of learners. That, too, is observable and can be measured against clearly stated criteria.

- *Teaching environment* is an element that indicates how instruction is scheduled, and what options are available.

- *Teaching characteristics* are those values and standards an educator displays. These characteristics can be observed through the operational approaches used to convey them, and include the amount of direction and supervision provided to learners, and the educator's degree of flexibility.

- *Teaching methods* and *evaluation techniques* are observable elements which constitute the final elements.

5.7.2.3 Henson and Borthwick teaching styles

Sternberg (1997:146) suggests six different teaching styles compiled by Henson and Borthwick (1984). The teaching styles are not mutually exclusive, and could be used in combination with each other, with much success.

- *Task-oriented teaching style.* The task-oriented approach uses planned tasks associated with appropriate materials.

- *Co-operative-planner teaching style.* In a co-operative-planner approach, an instructional venture is planned by educators and learners collaboratively, although the educators are basically in charge.

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- *Child-centred teaching style.* In a child-centred approach, the educator provides the task structure, and the learners select an option according to interest.

- *Learning area-centred teaching style.* When using the learning area-centred approach, the content is planned and structured to the extent that learners are nearly excluded from the learning-teaching process.

- *Learning-centred teaching style.* The learning-centred approach shows equal concern by the educator for the learner and the learning area content.

- *Emotionally exciting teaching style.* In an emotionally exciting approach, the educator tries to make the teaching as emotionally stimulating as possible.

5.7.2.4 Pearson and Pohlkamp teaching styles

Pearson and Pohlkamp (1991:18) identify four basic teaching styles.

- *Directors* are well-organised educators who prefer the lecture method where they can tell learners what to do and then control participation within a group. Their primary characteristics include creating a perceptual learning environment; preparing notes; being well-organised, adhering to an announced programme or agenda; and developing contingency plans.

- *Coaches* encourage active participation by drawing out learners' experiences to assign discussion topics, projects and activities. Their primary characteristics include creating a behavioural learning environment; encouraging experimentation with practical application; acting as facilitators to make the experience more meaningful; and drawing on the strengths of the group.

- *Listeners* encourage learners to express their feelings and make sure every learner is heard. They are flexible and let the group direct itself. Their primary characteristics include creating an affective learning environment; encouraging learners to express personal needs freely; reading nonverbal behaviour; and going with the flow.

- *Interpreters* encourage the learning of rules and theories. They present case studies and share ideas with the learners. Discussions on feelings though are limited. Their primary characteristics include creating a symbolic learning environment; integrating theory and events; presenting well-constructed interpretations; and encouraging learners to think independently.

A good educator must have a balanced mix of all of these teaching styles to be able to address all individual differences, assess the level of development of the learners and design educational instruction for a diverse group of learners. Educators must realise their strengths, use them maximally, but also consciously develop and use the other styles of teaching.

Educators and researchers categorise teaching styles differently. Ideally, the way educators teach should match the way learners learn. The concern of educators should be the learning styles of the learners. Educators can then adapt their teaching styles to suit the learning styles of their learners. Poon Teng Fatt (2000:38) maintains that learners should not have to adapt themselves to the different teaching styles of their educators. It is, however, unwise and impractical for educators to adapt to the varied learning styles of a group of learners. Teaching styles should be varied according to the dominant learning characteristics and preferences in the group as well as between learning activities and tasks to be completed. An example of a versatile instructional mode is combining a strong structure and developing argument with illustrations, anecdotes or humour. Each educator will have his or her own balance of combinations according to the needs of the group of learners. The effectiveness of the educator lies in the manifestation of the knowledge of the learners' learning styles in the facilitation of learning or during a learning activity or task.

5.7.3 Programme philosophy and conceptual framework

Teaching styles are influenced by the educational programmes and the philosophy and conceptual frameworks of a particular programme. Higher education normally leads to the development of an individual for a specific profession. An essential characteristic of any professional or occupational group is the philosophical paradigm which provides the base for the context within which that particular group functions. The conceptual framework provides the ground rules for making curriculum decisions about objectives, content, teaching strategies, and evaluation. It comprises concepts, facts, hypotheses, theories and models of the teaching/learning process (Watson 1997:20-21). An educational programme philosophy thus includes the teaching/learning process. The essence of the teaching/learning process is the relationship between the educator and the learner. Learners bring a variety of experiences to the learning environment, which must be taken into consideration. The learner is placed at the centre of the learning experiences, and is held accountable for academic achievement. The educator is responsible for facilitating these learning experiences which will promote learning potential and self-development. In order for a programme in higher education to

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serve a philosophy, the learner with his or her individual learning characteristics and preferences becomes the core of the teaching/learning process.

Hopefully, a more progressive philosophy of education will displace the traditional teaching styles where the imparting of knowledge didactically is seen as teaching, whether or not the learners can apply the learning material in the written, clinical or professional situation. In this way educators learn to meet the new demands made on them through adapting traditional formal teaching strategies to more progressive ones that accommodate and give attention to individual learning styles, so that more effective learning can take place. The need for mobility within the learning environment can be accommodated by the educator, regardless of a teaching style, as long as the phenomena (learning styles and teaching styles) are understood, and the educator is willing to permit some flexibility within the teaching-learning environment. Educators should assess themselves to identify their learning styles as well as their teaching styles.

5.8   LEARNING STYLES AND EDUCATIONAL INSTRUCTION

Learning style awareness in higher education can be used to create more multidimensional educational instruction. Linares (1999:413) states that a faculty can only develop curricula appropriate to the needs of each kind of learner if their learning styles are determined beforehand. Information about learning styles helps an educational institution to become more sensitive to the differences learners bring to the learning situation. The information serves as a guide in designing learning experiences that match or mismatch learning styles, depending on the purpose. Learners who are aware of their learning styles and who have knowledge of the strengths and weaknesses are empowered to select the right style of learning for the particular learning activity or task that faces them (Presland 1994:182).

Research has shown that identifying an individual's learning style and then providing educational instruction consistent with the learning style will contribute to more effective learning (Claxton & Murrell 1987:iii; Partridge 1983:247; Presland 1994:181). In a study done by Bhowan and Tewari (1997:130) it was concluded that the learning styles of all groups of learners should be measured so that the educational instruction for a programme can be adapted to accommodate the learning style profiles of the learners. Where learning style profiles reflect weaknesses, guidelines should be given to develop the weaker learning styles.

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5.8.1 Experiential learning for educational instruction

When exploring experiential learning as an instructional mode, one has to describe the processes of learning both through and from experience. In learning through experience, an activity is set up through which learning may take place. In learning from experience, learners are encouraged to reflect upon past experiences as a means of discovering solutions to present problems from past situations. Burnard (1988:130) describes this reflective quality as part of a practical exercise of the two concepts of action and reflection. If learners reflect on what they are doing, their action can be modified if necessary. Action without reflection does not lead to informed, intentional behaviour, whereas action followed by reflection can ensure that anything learned from the action can be transferred to the next learning situation. The process of action and reflection is thus concerned with the domain of experiential knowledge (see section 3.5.2.1).

Each learner's perception of the learning experience may be different, and so will be their reflections upon that experience. Educators must therefore adhere to two important principles, which are the uniqueness of the learner's personal experience, and the need to draw together some sort of consensus reality for the application of new ideas in other or new situations.

Learning activities and tasks need to be consolidated to offer a learner the opportunity to see the learning material in a new context and to understand it better. This is done by affording a learner the opportunity to obtain clear feedback on progress through self-evaluation activities (Pretorius 1996:47). Self-evaluation activities should, however, be planned in such a way that they offer the learner an opportunity for reflective observation. It is this that makes the self-evaluation meaningful.

The Kolb model of experiential learning was used to explain the planning of teaching-learning activities. Such a plan enables learners to utilise their own experiences to the best advantage. Figure 5.2 illustrates the plan of how learners utilise their own experiences when moving through the learning process.
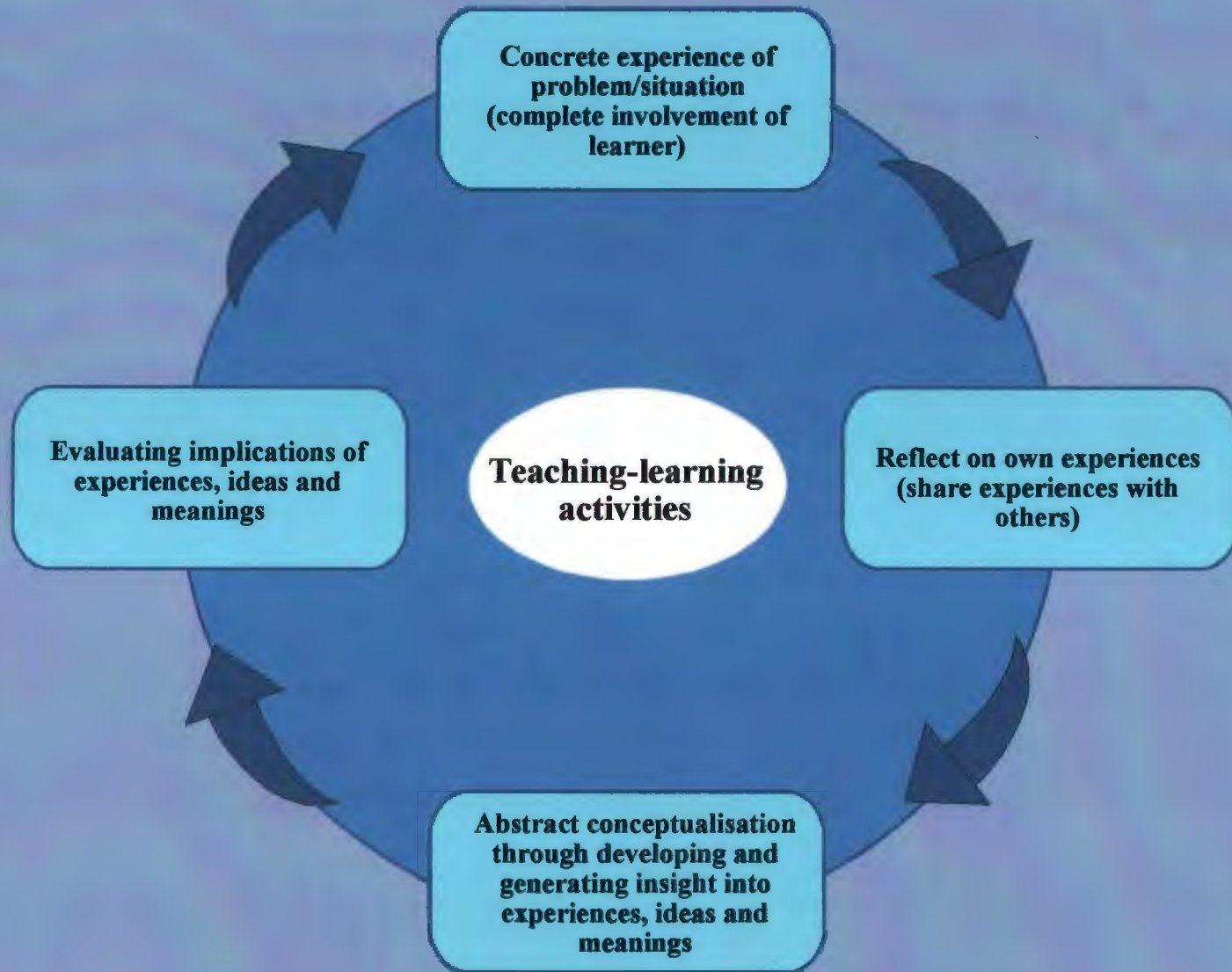
Figure 5.2
Planning of teaching-learning activities using the Kolb model of experiential learning
(Developed from Burnard 1988:130-131; Kolb 1984:41-43; Pretorius 1996:47)

- *Concrete experience*. The beginning of the learning process entails the concrete experience of a problem or situation, where there is complete involvement of the learner. The involvement is open and without bias. The learner is offered experience, be it an exercise, game, simulation or practical experience. The learning content should not be entirely new and should be related to the learner's existing field of experience. This experience must be of such a nature that the learner is not able to answer all questions from previous experiences. This creates motivation for further learning.

- *Reflective observation*. Because of limited experience, the learner now has to rely on other resources such as educators, peers and textbooks. At this stage learners are encouraged to reflect upon previous experience. Learners can share their ideas with others, which will help them to express themselves more clearly and with more ease in that specific learning area. This process is indeed a means of reflecting on one's own experiences and meanings, as well as on how others go about reflecting on experiences. Learners are therefore exposed in their sharing of experiences, ideas and meanings. Through this, experiences, ideas and meanings are broadened and answers are found.

- *Abstract conceptualisation*. The learner's understanding is not complete. The learning content must still be structured in order to overcome the existing limitations. Answers need to be assessed, corrected or confirmed. Learners must be able to explain how they found solutions, and construct whatever they have been able to establish into a fixed form. In this phase the educator ensures that the learner is able to translate experience, ideas and meanings into scientific language, in order to make them logical and useful.

- *Active experimentation*. At this stage the learners must demonstrate what they have learnt and where they can still improve. The educator must allow the learners to experiment with the new knowledge. Learners are assigned tasks which they must complete. This phase also serves as an evaluation phase. Feedback on the progress of the learner and possible deficiencies will then serve as the stimulus for a new learning cycle.

The experiential learning cycle can further be applied to demonstrate how practical experience in the workplace can be used as a basis for planning theoretical study. When learners enter the educational institution with experience from the practical field, they reflect on that experience. Figure 5.3

illustrates how the learner, after having gone through the cycle, is assessed and preparations made to apply the new learning in new situations. The learners then return to their workplace to use the new learning, and the cycle begins again.

When learners go through this cycle of experiential learning in the practical field of a profession, they acquire new skills and develop their judgment. A framework (Dobbin 2001:4), based on the Dreyfus model for understanding how a novice reaches the expert stage through experiential learning, was developed. The framework on thinking-in-action and reasoning-in-transition serves as a guide for enhancing critical thinking and practical judgment. In order to develop practical judgment, the level of skill at which a learner is operating is important. The five levels of development of skills and judgment are explained in table 5.1.

Table 5.1   Levels of development of skills and judgment

LEVEL	CHARACTERISTICS	INSTRUCTIONAL STRATEGIES
Novice	Learning is based on theoretical information; guidelines govern behaviour; prior experience not applied.	Instruction is based on facts, concepts and procedures; test on recall of facts and concepts committed to memory.
Advanced beginner	Recognition of situations based on previous experience; cannot prioritise without assistance.	Instruction is based on guidelines and cues to prompt action and intervention; priorities must be set; guided experiences in practical field.
Competent	Understands practical field; actions and interventions are planned in an organised manner with outcomes in mind.	Instruction is based on improving decision-making skills and ways to improve coordination of multiple issues.
Proficient	Perceives the whole situation; knows what to expect in a given situation or changed situation; can modify a plan based on accurate assessment and previous experience.	Instruction in the form of assistance; learner presents real life situations/cases; assist learner to evaluate the presented situations/cases.
Expert	Intuitive grasping of situations; can identify solutions correctly; manages situations extraordinary; recognised as expert by others.	Instruction on documenting and articulating situations/cases/incidents from practical field; shared practical expertise.

(Adapted from Dobbin 2001:4)
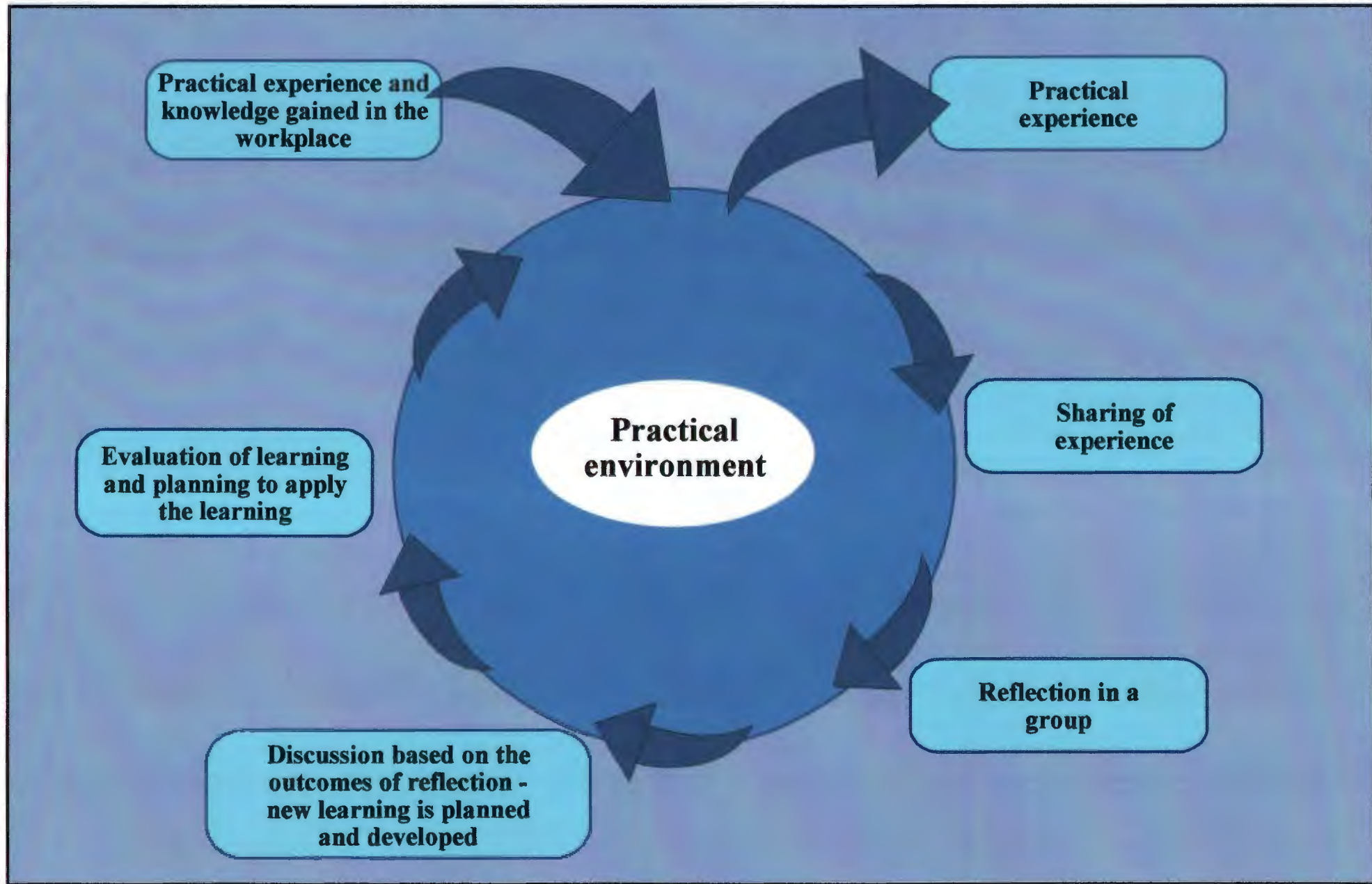
Figure 5.3
Practical knowledge as basis for theoretical study
(Developed from Dobbin 2001:4; Kolb 1984:198-199)

5.8.2   Diversity model for educational instruction

McLoughlin and Oliver (2000:64) adopted a diversity model for educational instruction. The model includes an awareness of the multiple ways in which individuals interpret educational instruction. A pragmatic approach to the design of this diversity appropriate model was used. Factors that influence learning, communication and cultural differences, while promoting learning, were included in the model. The model contains seven aspects which address the:

- learning environment that is most familiar to learners
- learning styles of individuals
- influence of cultural background of learners on the conceptions of learning
- relationship between educator and learner
- methods of assessment that are preferred
- forms of feedback required to enhance motivation
- learners' own level of motivation

Although the current research does not address the cultural variables that impact on learning, the above aspects are all congruent with the notion of learning style promotion in higher education. When designing instruction for higher education programmes, these aspects all influence the process.

The following principles can guide the design of educational instruction. Features for planning educational instruction are also discussed.

- Adopt an awareness of learner needs and individual differences. Instruction and learning activities must support differences in learning styles.
- Adopt interactive approaches to learning activities. Instruction must incorporate cognitive approaches, skills, values, and channels for interaction between educator and learner.
- Create authentic learning activities. Learning activities build on experiences and reinforce learning.
- Emphasise learner input. Learners must be able to create and select relevant sources of information.
- Ensure different forms of support. Support structures will depend on the level of development of the learner.

- Establish learner roles and responsibilities. Learners must be aware of their own individual differences, must know their own level of development, and be able to choose learning activities.
- Ensure flexibility in goals, modes of assessment and learning outcomes. Flexibility and inclusivity are necessary to allow the learner to choose.
- Provide channels for communication between educator and learner. Learners need to share ideas, discuss topics, raise concerns, and receive feedback and support.
- Create a collaborative and constructive environment. Learners must be motivated to share ideas, discuss topics, raise concerns, and share projects with other learners.
- Create a sense of progress. Learning activities must create a path that will lead learners to the successful completion of a task.
- Ensure flexibility in the role of the educator. Roles of educators need to be interchangeable and modifiable to be responsive to learner needs.
- Design for choice. Clear communication of aims, objectives and learning outcomes provides maximum clarity for making choices.
- Promote self-direction. Learners must be motivated to lifelong learning.

Considering adult learning, there are certain principles that have practical implications for educational instruction. Four main principles are identified.

- As a learner matures, his or her self-concept moves from one of dependent learner towards one of a self-directed learner. This principle implies that learners should be actively involved in the learning process and the identification of their own learning needs.
- The reservoir of experiences that are a rich source for learning establishes self-identity and must be valued highly. This principle implies that learners must be granted the opportunity to apply their experiences to the learning process and situation.
- Readiness to learn becomes oriented increasingly to the developmental tasks of their social roles. This principle implies that learners must be exposed to learning experiences that will articulate these developmental tasks.
- Adult learners require an immediate application of knowledge and performance. This principle implies that learning must be oriented to "problem areas" or areas appropriate for learning (Nielsen 1992:150).

Educational instruction in higher education must therefore follow an approach that is the embodiment and expression of a philosophy of education for adults. This approach is aimed at enabling individual learners to become aware that they should be originators of their own learning.

Educational instruction is guided by principles and cannot be rigidly planned. A multidimensional approach to educational instruction is sensitive to the differences learners bring to the learning situation. The information of individual differences serves as a guide in planning and designing the instructional modes (teaching method and teaching strategies), learning activities and tasks, and learning material.

5.9   LEARNER AND EDUCATOR DESCRIPTORS

Learners and educators are the important role players in the educational environment. The learning style of an individual, whether learner or educator, has an influence on how an individual enters the learning situation. Furthermore, learning styles and teaching styles are interrelated. This again influences how the educator approaches the educational environment. Table 5.2 reflects a set of descriptors for learners and educators concerning learning styles and teaching styles. These descriptors reflect the role of the educator and corresponding teaching styles.

When a learner enters the learning situation with little or no information about his or her own learning characteristics and preferences (strengths and weaknesses with regard to how he or she learns or prefers to learn), the learner is highly dependent on the educator. While the learner is still a novice in the learning area, the learner is also more dependent, with a need for structure, direction, external reinforcement and support, provided by the educator. The educator as an authority and expert has a more prominent role in teaching, encouraging, designing and evaluating teaching material. By making the learner aware of his or her individual differences with regard to learning styles, and as the learner develops and moves through the learning situation, and gains more knowledge on the learning area, a more interactive situation develops. The educator creates an environment that is conducive to interaction, and also participates in the learning situation by serving as a model, providing resources, asking questions and giving feedback, evaluating and grading learners, and observing and managing the learning process.

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Table 5.2   Learner and educator descriptors

LEARNER		EDUCATOR	
Learning style	**Learning needs**	**Teaching role**	**Teaching style**
Dependent: when learner has no or little information upon entering learning environment	• structure • direction • external reinforcement • encouragement • esteem from authority	Expert Authority	• lecturing • demonstrating • assigning • checking • encouraging • testing • reinforcing • transmitting content • designing materials • grading
Collaborative: when learner has some information and wants to share it or try it out	• interaction • practice • probe self and others • observation • peer challenge • peer esteem • experimentation	Co-learner Environment setter Participation	• interacting • questioning • providing resources • modeling • providing feedback • coordinating • evaluating • managing • observing processes • grading
Independent: when learner has skill and wants to continue to search on own	• internal awareness • experimentation • time • nonjudgmental support	Facilitator	• allowing • providing requested feedback • providing resources • consulting • listening • negotiating • evaluating

(Chase 1995:46-47; Joyce et al 1992:394; Thompson & Crutchlow 1993:34)

When a learner enters the learning situation with internal awareness and experience, and wants to continue to search for more information on his or her own, the role of the educator becomes that of a facilitator. The learner acts independently and seeks nonjudgmental support. The educator provides resources and feedback on request, facilitates the learning process by listening, negotiating and evaluating, and serves as a consultant.

When learners enter the learning situation with knowledge of their learning styles and learning characteristics and preferences, the speed at which a learner moves from a dependent learner to an independent learner is increased. Eventually, all learners in higher education must reach a level of

independence, which will grant them the opportunity to continue as self-actualised learners. The more independent and self-actualised the learner becomes, the less important the role of the educator and his or her teaching style, as well as preferences for specific teaching strategies, become.

5.9.1 Matching learner and educator

Entwistle (1988:207) discusses some evidence that learners may benefit from having an educator of an opposing learning style although they may prefer to have educators from the same learning style. Some educators believe that growth cannot occur without the learner experiencing some discomfort to serve as a catalyst to broaden the learner's strategies and promote flexibility in learning (Chase 1995:46-47; Joyce et al 1992:394; Thompson & Crutchlow 1993:34). If the learning environment becomes too comfortable, learners may be satisfied at the stage of concrete thinking and thus limit the ability to integrate new information and form new conceptual systems (Joyce et al 1992:394). Linares (1999:409), on the other hand, suggests that when educator and learner are matched on learning styles, the learner failure-withdrawal rate is decreased, and learning and academic achievement are enhanced.

The learner should not be confronted with a completely unfamiliar learning situation but with one that causes a certain amount of discomfort. A deliberate mismatch of learner and learning environment forces the learner to move on towards greater complexity. The danger of helping learners to become too rigid, unable to learn comfortably with a new structure, should be kept in mind. Because of the complexity of certain professional practices and equipment, it is beneficial to have flexibility in the learning environment.

Claxton and Murrell (1987:10), discuss a study done by Witkin (1976) where the learning styles of learners and educators were matched and mismatched. The results revealed that when learners and educators were matched and mismatched in terms of field-dependence and field-independence, the matched learners and educators described each other positively and valued their abilities, and the mismatched group described each other negatively and did not appreciate each others' attributes in terms of cognitive skills. After extensive research, however, Witkin concluded that the achievement of learners did not vary according to match-mismatch of learning and teaching styles. He also indicated that matching the teaching styles and the degree of guidance with the learning styles did not lead to improved learning.

Chase (1995:47) conducted a study that used an approach of both matching and mismatching of learner and educator. Learners were assigned to work with preceptors possessing similar learning styles to theirs, using teaching strategies that were compatible with their learning styles. They were subsequently assigned to educators with dissimilar learning styles. Teaching strategies that were not considered compatible with their learning styles were used. The results indicated that learners had a high level of satisfaction in both situations. The matching of educator and teaching strategies was beneficial during the initial period of education because it decreased the anxiety level and increased the confidence level. As the learners became more confident, the incompatible teaching strategies became a challenge. Thus, when confidence increases new teaching strategies can be introduced.

5.9.2 Learning styles of educators

Because of the interrelationships between the learning styles of learners and educators, and between learning styles and teaching styles, it became evident that the learning styles of educators should be acknowledged. The educator's own preference for processing information affects the development of instructional mode and delivery of learning material Not much attention in research has been given to date to the investigation of the dominant learning styles of educators in a faculty.

What is important, however, is acknowledging the interrelationship of the learning styles of learners and educators, and seeing the acknowledgment of the learning styles of both groups as equally important. All individuals have their own learning styles.

5.10 LEARNING STYLES AND INSTRUCTIONAL MODES

Instructional modes include teaching methods and teaching strategies, and form an important part of the educational environment. Teaching methods and strategies structure and organise the learning environment and learning activities and tasks.

When a learner's preferred learning style is matched with a congruent instructional mode the learner is more comfortable with the educational interaction and learns more efficiently and effectively. However, when a learner habitually utilises only one learning style, he or she may be at a serious disadvantage when confronted with the need to utilise different instructional modes (Partridge 1983:247). Given the differences among adults and the way they learn, the identification of different

instructional modes acknowledges this individuality and will go some way to meeting individual needs.

Different learning styles will call for different instructional modes and will have important implications for teaching, instructing, facilitating learning, and educational development. The decision whether to match or mismatch a learner with an instructional mode is made after the purpose of the learning experience has been identified. If the purpose is instrumental, to learn the subject matter or task, then a match between learning styles and instructional mode is relevant. If the purpose is developmental, to broaden the learner's learning potential, then a learner must be confronted with instructional modes that are more challenging, such as problem-solving. What is important though is that consistent support is established after a decision has been made and that a good mentoring relationship between educator and learner is ensured.

The following factors must be considered before deciding on a strategy of matching or mismatching learning styles and instructional mode:

- The developmental level of the learner must be determined. Younger learners may be more responsive to mixtures and mismatching because they are probably more malleable than older learners.
- The learning material to be learned must be identified. Learners have more freedom to select the match when the learning material is highly structured or where specific style and skill is demanded.
- The learning environment or surrounding context is important. This includes the receptivity of the learner to the various matches and the reality of the availability or unavailability of various teaching aids.
- The goals of the education must be clear. The desired educational outcomes must be identified from a personal, institutional and societal perspective.

Potential strategies that can be used to match learners' preferred learning styles with congruent instructional modes are set out in table 5.3.

Table 5.3   Potential matching strategies

TYPE OF MATCHING STRATEGY	DESCRIPTION
Corrective match	Deficiencies that are a risk to further progress in learning are rectified. The learner is exposed to more of the same instruction that was initially ineffective. There may be a slower pace, more repetitions and specificity.
Compensatory match	Designed to circumvent the debilitative effects of learner deficiencies or disturbances without trying to remove or improve them.
Capitalisation match	The learner's preferred mode of functioning is used to exploit what the learner is already capable of doing well and ignores learner deficiencies, attempting neither to correct them nor to compensate for them.
Combination match	A combination of the first three matches since they are complementary and not conflicting.
Challenge match	A mismatch is used which attempts to create conflict to challenge the learner to change to expand his or her repertoire of learning styles.

(Adapted from Partridge 1983:248)

Kolb (1984:200-201) suggests that a strategy is worked out for learners in which the educator incorporates a mix of content deliveries in appealing to the four different learning styles identified by his model of experiential learning. Learners then move along a continuum from concrete experience to abstract conceptualisation. Abstract conceptualisation is characterised by thinking and reflecting about the learning material. Learners can also have a preference for reflective observation or active experimentation. Novices are generally most comfortable with the more interactive types of learning preferences which are concrete experience and active experimentation. To comprehend new concepts and analyse information in order to make decisions, abstract conceptualisation and reflective observation are important. Thus, when instructional mode, and thus content delivery is planned, the educator needs to assess the level of knowledge and skills of the learners with regard to the specific topic or content that is to be conveyed. This can be done in a pretest. This test can also assess the learner's exposure (reflective observation) and previous actual hands-on experience. As learners progress they would benefit from more challenging instructional modes such as discussions and case studies. The educator's approach and method of instruction and delivery of content thus depends on the needs of the learner.

In a study on whether educators take into account the individual learning styles of their learners when formulating instructional modes, teaching methods or teaching strategies, Dux (1989:187) investigated a possible relationship between learning styles of learners and the teaching methods used in a college. The study was designed to determine whether educators used teaching methods which typically benefitted those learners with certain learning styles only, and whether these teaching methods reflect the educator's own learning style and/or those of the learners. The results indicated that younger learners exhibited a preference for a combination of learning styles and would subsequently be more responsive to different teaching methods or teaching-learning experiences than the more senior learners, who have very definite preference for one learning style (Dux 1989:188). It was also found that in practice educators tend to use the more traditional and less progressive teaching methods. There was also no indication that the needs of the learners were considered with regard to their preferred learning styles, when planning teaching strategies (Dux 1989:189). The apparent preference by the educator for using a specific teaching strategy appeared to relate well to their own learning styles.

The results of the abovementioned study could be used to help plan teaching and learning strategies for junior and senior learners. Educators must be committed to moving away from the few traditional instructional modes to a wide range of innovative and progressive approaches. A further implication is that there is a need to support educators to meet the individual needs of each learner, as well as the objectives of the educational programme. Educators and learners might find the learning process more challenging and rewarding if a more individualised approach were adopted, and education were to take place using an appropriate instructional mode, and not one that was used just because it had always been used for that purpose.

Sadler-Smith (1996:32) maintains that most learners have a need to develop one or more learning styles to an acceptably high level. On the contrary, "all-round" learners or "integrated" learners are better equipped to manage all the stages of the learning cycle. Matching learning styles to teaching method will inevitably lead to individuals' specialising in certain parts of the learning cycle. But, it must be recognised that not all learning styles are suitable for all individuals. Knowledge of learning styles can be seen as a starting point for self-development of a broader range of learning skills. To do this it may be necessary to expose learners to activities and experiences that are congruent with their learning styles, but which, under appropriate guidance, will lead to their developing into a more integrated learner. This notion is supported by a study done by Sheperd (1995:69), where it was

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concluded that individuals prefer a mixture of instructional modes, making learning more "interesting and stimulating".

Research done by Chase (1995:46) indicates that the idea of matching facilitators and learners based on their learning styles would enhance orientation and training programmes. Chase (1995:47) maintains that the successful orientation and training programmes are those that focus on utilisation of instructional modes that promote learning in all three domains: affective, cognitive and psychomotor. Matching learning styles to instructional modes does not guarantee success, but it did prove to be beneficial in that particular study.

Partridge (1983:247) describes the matching of an individual's preferred learning style with a congruent instructional mode as wise and obvious. The learner will probably learn more efficiently and effectively and should be more comfortable with the educational interaction. As many other educators she also suggests, however, that a learner should be confronted with different instructional modes that do not necessarily match the learning style. If not, that learner could be at a serious disadvantage when confronted with the necessity to utilise a different instructional mode.

Mockford and Denton (1998:13) undertook a study to investigate the learning styles of learners as applied to technology project work. In this study it became evident that there is a significant correlation between learning styles and instructional mode. The learners had a perception that certain design or teaching strategies were more successful for their specific needs than others. Learning styles can be influenced by using both dominant and less dominant learning characteristics and preferences. By influencing the learning styles of learners, teaching strategies can be varied and adapted to influence the quality of the educational outcome. The opposite could also be valid. Teaching strategies may influence the learning styles.

Therefore, the issue of matching or mismatching learning styles with instructional mode must be approached carefully. Clarifying educational needs and proper negotiation around these needs is necessary to plan and organise instructional mode.

5.10.1 Effective teaching strategies

A teaching strategy refers to a set of teaching actions which are intended to attain specific desired

outcomes. The set of actions are planned and organised instructions, which involve educational art and skills, in order to reach an outcome (*International Encyclopedia of Education* 1985:5148). Teaching strategies include formal lectures, group discussions, role play and demonstration.

Research findings suggest that more mature learners learn more intuitively to adjust to different educators' learning styles and teaching styles. With this knowledge in mind, educators can show learners the variety and versatility of learning styles by providing experiences through different teaching strategies. The resulting awareness of learning styles can provide learners with the flexibility to expand their learning styles and to adapt learning styles to meet the requirements of the educational context in which they find themselves (Harrison 1992:33).

Although matching learning styles and teaching strategies does not guarantee success, it has proven to be beneficial. Simply put, education must be seen as a set of teaching and learning strategies for connecting people who have learning needs with the resources required to meet those needs. The educational experiences of learners will be significantly affected by the type of teaching strategy they are engaged in. Part of the educational experience, conveyed through a teaching strategy, is the learning strategy used to go through this experience. A learning strategy is defined as the sensory stimuli through which required conditions for perceptual stimulation, cue selection and translation are structured to give the learner the opportunity to attain a predetermined outcome or outcomes (Ostmoe et al 1984:27). It is assumed that certain potential attributes of a learning strategy may affect the achievement of learning outcomes due to differences in individual learning styles, modality strengths, and learning preferences. Because individuals differ in their approach to learning and no single learning strategy will provide optimum learning for all learners, knowledge of individual learning styles is necessary. Preferences for specific learning strategies may influence the degree of learning that takes place when learners are exposed to them. Novices in the learning process seem to be more positive towards a greater variety of learning strategies than independent learners who have established their learning strategies. However, no learning strategy is completely unacceptable to any learner, but influences the learner's attitude towards the learning material (Ostmoe et al 1984:29). Inevitably, this also influences educational experiences of learners.

5.10.2 Designing teaching strategies

For an educator to be effective, he or she must design teaching strategies to meet the needs of all the learners with regard to their individual learning styles. When developing educational plans for individuals or groups, strategies must be selected in such a way that learning is promoted among all groups of learners. Educators must be able to generalise and apply knowledge regarding the needs of individual learners to groups of learners.

Alternatives can be given to groups of learners and they can be allowed some leeway in selecting the means by which to learn particular learning material. In some situations learners must be given the freedom of choice in determining how they will learn the content (Ostmoe et al 1984:28). This implies that each learner has unique needs, preferences, attitudes, and learning styles, and that he or she must at least have a positive attitude towards the teaching strategy used in order for optimum learning to occur.

No one teaching strategy can be singled out as being applicable and ideal for all learning situations or for all learners. When using teaching strategies that go with different learning styles, it is ensured that a particular learner's mode of learning will coordinate with the education at least part of the time. Although it is important that coordination of learning styles and teaching strategy takes place, it is equally valuable that learners develop additional modes of learning through being exposed to different teaching strategies.

Different teaching strategies have different attributes. These attributes influence the level of participation of learners, approach and use of learning material, content, as well as the way in which the educational environment is structured. Table 5.4 depicts the potential attributes of selected teaching strategies.

Table 5.4   Potential attributes of selected teaching strategies

POTENTIAL ATTRIBUTES	Live lecture with visuals	Seminar/ discussion	Live demonstration with return practice	Textbook	Models/objects	16 mm film	Slides (multiple/individual)	Sound slide/filmstrip with built-in response	Audio recording	Computer assisted instruction	Games (individual or group)	Print Programmed instruction	Video conferencing	Video (lecture, interview)	Role play (group)	Audio conferencing
Provides primarily direct, "hands on" active participation and overt student response		X	X		X					X	X	X		X		X
Provides primarily indirect, abstract participation and covert response	X			X		X	X	X	X					X		
Provides color stimuli for differentiation	X	X	X	X	X	X	X	X	X	X	X	X		X	X	
Conveys actual movement	X	X	X		X	X				X	X			X	X	
Provides multi-sensory input	X	X	X		X	X		X	X	X	X			X	X	X
Most suitable for promoting practice of psychomotor skills			X		X	X					X			X		
Content can be easily repeated by student			X	X	X		X	X	X	X	X	X		X		
Provides immediate feedback, reinforcement and objectivity		X	X		X					X	X	X		X		X
Provides structured organization, step-by-step sequencing, explicit objectives, student response, feedback reinforcement		X	X							X	X	X		X		X
Promotes peer or instructor affiliation and human interaction	X	X	X								X			X		X
Suitable for large group (100+), teacher-directed learning	X			X		X	X	X	X			X		X		X
Facilitates face-to-face oral, two-way communication/interaction	X	X	X								X			X		X
Transcends barriers of time, space or size-expands or contracts length of presentation in relation to "real time": makes size manageable, magnifies or condenses				X	X	X	X	X	X	X	X	X		X	X	X
Reveals information bit-by-bit in sequence	X		X	X		X	X	X	X	X	X	X		X		X
Provides for alternative pathways or branching of content		X		X	X			X		X	X	X			X	X
Content is in a fixed sequence and not easily reordered by student	X		X			X		X	X			X		X		
Content can be easily reordered by student		X		X	X			X		X		X			X	X
Rate of presentation can be controlled by student		X	X	X	X			X		X	X	X			X	X

(Adapted from Ostmoe et al 1984:28)

5.10.3 Teaching strategies for the Kolb learning style model

The Kolb model of experiential learning is a model of four learning styles in four learning environments reflecting the learning characteristics and preferences associated with each of the learning styles. Along with the learning characteristics and preferences are preferences for certain teaching strategies. The teaching strategies are preferred not merely on the basis of "likes" and "dislikes", but on dominant and less dominant learning abilities. Without being too prescriptive and rigid, teaching strategies can be designed to meet these specific learning abilities.

Table 5.5 summarises the learning characteristics and preferences of the four learning styles - the divergent, assimilative, convergent and accommodative learning styles - along with the *characteristics* for effective teaching strategies, *without* specifically stipulating which teaching strategies should be used for which learning style. By not indicating specific teaching strategies, more creativity is left to the educator to adapt teaching strategies to accommodate all learning styles.

Learners with divergent and accommodative learning styles learn best from role play and small group discussions, videos and feedback. These learners prefer to learn by doing, through feeling or feelings. They prefer a trial and error method. Learners with a convergent learning style prefer to focus on hypothetical-deductive reasoning. Convergers have analytical skills and excel at planning, projecting outcomes, or performing similar tasks requiring precise attention to detail. Convergers are good at developing special solutions to practical concerns. They can be trained in problem-solving skills. (Poon Teng Fatt 2000:39). If a large group of learners prefer the convergent learning style (Linares 1999:413; Van Rensburg 1995:143), then reflective learning strategies such as the use of case studies and critical thinking activities may help to balance the converger's tendency for active experimentation versus reflective observation. More emphasis can also be placed on interpersonal relationships and concern for diversity in its many manifestations. This approach can become an important factor when educating learners for a human sciences profession, such as health care professionals. Assimilators prefer to reflect, need time to read in advance, to analyse data and present their reports without too many or rigid deadlines. They need time to observe role plays, videos and then discuss them in order to give and receive feedback. Assimilators are slower in decision-making, cautious, non-assertive, and low risk takers, and therefore lack direct participation in a classroom setting. Giving them more time to prepare may allow more flexibility for them to participate.

Table 5.5   Selection of effective teaching strategies

LEARNING STYLE	LEARNING CHARACTERISTICS AND PREFERENCES	CHARACTERISTICS OF TEACHING STRATEGIES
Divergent	• Values people • Wants to be involved • Emphasises feelings more than thinking • Emphasis on understanding rather than practical application of knowledge • Intuitive and artistic • Open-minded • Good at brainstorming • Values patience and impartiality • Imaginative • Awareness of meaning and values	Begin with what learner already knows. Get learners involved by letting them express their knowledge. Personalise learning by connecting it with something familiar in own life experience. Educator-learner interaction is important.
Assimilative	• Values facts and knowledge • Focuses on logic, ideas and concepts • Scientific as opposed to artistic • Values precision, rigor and analysis • Reasons by induction • Ability to create theoretical models • Emphasises thinking over feeling • Focus is on educator's delivery of content • Puts less emphasis on interaction • Values knowledge of expert • Good systematic planners • Emphasises reflection over action • More understanding than pragmatic • Awareness of abstract concepts	Learner wants factual information. Needs time to reflect on what has been learned. Integrates new knowledge with past experience. Integration through interaction.
Convergent	• Focuses on logic, ideas and concepts • Prefers knowledge that can be applied • Wants to see results • Actively influences others to change situations • Pragmatic • Emphasises thinking over feeling • Problem-solver • Decision-maker • Prefers technical hands-on activities • Doing as opposed to observing • Wants to see results	Activities must stimulate application of newly acquired knowledge and skills

LEARNING STYLE	LEARNING CHARACTERISTICS AND PREFERENCES	CHARACTERISTICS OF TEACHING STRATEGIES
Accommodative	- Intuitive - Emphasises feeling over thinking - Artistic as opposed to scientific - Values people - Involved - Open-minded - Good at carrying out plans and tasks - Risk-takers - Learns by trial and error - Action-oriented - Experiments and modifies - Explores options and modifications - Relies on others for information rather than analysing	Activities to connect newly acquired knowledge to own life and goals

(Linares 1999:413; Poon Teng Fatt 2000:39; Van Rensburg 1995:143)

Planning and organising teaching strategies include selecting learning activities that are used to reach the educational outcomes. Educators need to manage and monitor the selection and application of teaching strategies, if they support the contention of individual differences in the learning process.

5.11   LEARNING ACTIVITIES

Learning activities refer to those activities that take place when learning occurs, and includes engaging in discussions, performing laboratory exercises, using problem-solving techniques, reading textbooks and primary sources, attending a lecture, and studying for the examination. Performing these learning activities involves a variety of approaches. Pintrich and Johnson (1996:83) identify the key aspects for performing learning activities as knowledge of one's own cognition (including learning styles) and motivation. Characteristics of *how* a learner learns influence *what* the learner learns and *how well* he or she adapts to the learning environment. This will have an effect on how the learner *performs* during a learning activity. In order to enhance learning, the teaching-learning situation must be organised in such a way that it provides learning activities that are congruent with the learners' learning styles, or stimulate the development of less dominant learning characteristics and preferences present in their learning styles.

Learning activities can be grouped in terms of their relationship with learning styles. Just as certain learning styles are dominant in certain individuals, there are certain learning activities that are

dominated by explicit and implicit assumptions regarding learning styles. Certain learning activities are more congruent with certain learning styles. Individuals need to know the strengths and weaknesses of a certain learning style. This enables the learner to select applicable or specific learning activities. For example, the accommodative learning style points to the need to emphasise the link between the academic and experiential aspects of a learning environment. This implies that activities such as role play and demonstrations in real life will be suitable for this learning style.

Arndt and Underwood (1990:30) suggest that an educational programme should start with activities for the divergent learner, continuing with activities for the assimilator, converger, and finally the accommodator. The sequence of the activities will be:

- connecting to the learner's concrete experience (diverger)
- providing logical information (assimilator)
- providing opportunities to experiment with what has been learned (converger), and
- designing a plan to fit with reality (accommodator)

Evans (1997:196) states that to honour different learning styles is to give learners the freedom to learn in the way they wish. She does suggest, however, that guidelines should be given so that they engage in a variety of learning activities throughout their educational experiences. Learners are also encouraged to link observations to theory. Keeping journals and noting linkages challenge learners to use reflective observation and abstract conceptualisation in addition to active experimentation and concrete experience, thereby increasing the depth of the learning experience.

5.11.1 Designing learning activities

When designing learning activities, knowledge of the learning styles of the learners who are to engage in the learning activities gives structure to the planning and organising of the design process.

Mumford (1994:16) acknowledges the difficulties that accommodating different learning styles at the same time may create. The issues raised are whether the learning styles of individuals should be matched by means of customised programmes, or whether an attempt should be made to match all the learning styles in a given group of learners to a limited extent by means of a balanced approach to the design of learning activities. No definite answer can be given to that. What is important though, is that educators should accept that individual differences exist, and that these individual

differences go along with dominant and less dominant learning characteristics and preferences.

It appears that most learners tend to prefer active learning roles. For those learners who prefer active involvement in learning, the following activities are appropriate:

- role play situations where learners are given role play exercises where all learners are able to participate actively
- group discussions
- games
- case studies that are discussed in groups before a general class discussion is held

The way learners write their essays, reports or assignments reflects their learning styles. Results may well be due to learning styles rather than inability to apply what has been taught (Poon Teng Fatt 2000:40). Educators who accept individuality in learning styles may be in a better position to understand the learners and make the necessary adjustments to help them realise their own strengths and weaknesses in the learning process. If the educator outlines a scenario, for example, some learners (convergers) can apply their ideas by focusing on the situation, while others (assimilators) can reflect on the situation and create theories about it.

If a group of learners have a balanced learning style profile, a variety of teaching methods should be adopted to take advantage of the learners' ability to learn through diverse learning activities. If a learning style profile of a learner reveals weaknesses for one or more learning styles, the learner should be exposed to learning activities that are dominant of that particular learning style or styles. By exposing learners to a variety of learning activities, flexibility in the learning process is enhanced.

5.11.2 Selecting learning activities

Any learning area can be taught in a way that is congruent with any learning style. Learners who are empowered with knowledge of their own learning styles will seek learning activities that are compatible with their preferred learning styles. They may use more than one learning style, but they will differ in their ability to switch between styles. Higher education should foster learners' ability to move from one learning style to another as the learning situation warrants. This implies that educators must be trained to use teaching styles flexibly as well. The effort to understand learning

styles and teaching styles and to learn to use them flexibly requires that one first be able to identify individual learning styles.

Both educators and learners tend to exploit their preferred learning styles, which may or may not match. It is, however, natural for both educator and learner to seek learning activities that match their preferred learning styles. Educators tend to select learning activities that are congruent with their learning styles. Because of this phenomenon, sound knowledge of adaptive competencies related to learning styles is necessary. A variety of learning activities can be planned and organised for a diverse group of learners within an educational programme. Learners will be more motivated to perform such learning activities and will often be better at them.

5.12   ADAPTIVE COMPETENCIES RELATED TO LEARNING STYLES

Learners have certain competencies when engaging in the learning processes. These competencies are determined by learning styles. Exposure to particular types of learning environments fosters the development of the learning competencies emphasised in these learning environments.

Emphasis is placed on individual awareness of learning styles and available alternative modes of learning. Knowledge of differences in learning styles should encourage the design of instructional experiences to enhance individual strengths and develop less dominant orientation to a learning environment.

Knowledge can be grasped in different ways. Different instructional modes are useful to ensure that individual learning modes are addressed. Preference for a particular learning style is not static and may change over time. There is also no best or better learning style; all are of equal value and merely represent different ways of gaining knowledge (Arndt & Underwood 1990:29).

5.12.1 Adaptive competencies related to the Kolb model of experiential learning

The four learning styles identified by the Kolb model of experiential learning describe a corresponding typology of four learning environments that reflect the amount of emphasis placed on learning competencies associated with each of the four stages or modes of the learning cycle described by this model (see section 3.5.2.1).

The adaptive competencies related to the four learning styles of the Kolb model of experiential learning are as follows:

- The *diverger* emphasises experiencing concrete events, and the corresponding divergent-affective learning environment demands the use of competencies associated with being sensitive to people's feelings and values, listening with an open mind, gathering information, and imagining implications of ambiguous situations.

- The *assimilator* emphasises constructing theoretical explanations of concrete events and the corresponding perceptual learning environment that emphasises reflective observation and perspective-taking skills. Competencies associated with assimilators are organising information, building conceptual models, testing theories and ideas, designing experiments, and analysing quantitative data.

- The *converger* emphasises application of theoretical approaches to practical situations and the corresponding symbolic learning environment that emphasises abstract conceptualisation. Competencies associated with convergers are creating new ways of thinking and doing, experimenting with new ideas, choosing the best solutions, setting goals, and making decisions.

- The *accommodator* emphasises carrying out plans and getting tasks done, but is less concerned about having a theoretical rationale for the actions. The corresponding behavioural learning environment emphasises active experimentation. Competencies associated with accommodators are taking action in real life situations, committing them to objectives, seeking and exploiting opportunities, influencing and leading others, being personally involved in tasks, and dealing with people (Kolb 1984:68-69, 77-78; Laschinger & Macmaster 1992:259).

Although any learning environment has different degrees of orientation towards each of the four learning modes (concrete experience, reflective observation, abstract conceptualisation and active experimentation), one orientation tends to predominate (Laschinger & Macmaster 1992:259). Patterns evolve due to the combinations of learning modes created by different learning environments. The combination of learning modes and learning environment creates specific climates, namely:

- inquiry climate

  - created by a combination of perceptions and symbolic orientations
  - emphasis is on understanding why things happen
  - construct theory from concrete events

- mastery climate

  - created by a combination of symbolic and behavioural orientations
  - emphasis is on problem-solving in real life situations

- simulative climate

  - created by a combination of behavioural and affective orientations
  - emphasis is on providing actual experience in the professional work role

- aesthetic appreciation climate

  - created by a combination of affective and perceptual orientations
  - emphasis is on subjective appreciation and valuing of concrete experiences
    (Laschinger 1992:106)

To develop a full range of learning competencies necessary for lifelong learning and adaptation to changing learning environments, it is necessary to use a variety in learning environments in higher education programmes. This provides a basis for designing individualised learning experiences to promote the development of learning competencies.

5.12.2 Adaptive competencies related to the Riding and Douglas cognitive style model

The wholist-verbaliser cognitive styles are on two bipolar dimensions, namely the wholist-analyst style and verbaliser-imager style. The two dimensions affect learning in two separate ways. It is suggested that learning performance may be enhanced by accommodating the two dimensions of cognitive style by matching the mode of presentation of information to the verbal-imagery dimension and by providing a compensatory strategy for the wholist-analytical dimension by using different forms of advance and/or summary information (Sadler-Smith 1996:33).

The wholist-analytical dimension learners interact with the structure of presentation of information. Wholists may benefit from information in advance of learning where the structure of a topic that is to be learned is shown in terms of its components. The advance information provides a structural, analytical map for the wholist. Analytics may benefit from information in advance of learning where the overview of a topic that is to be learned is given. The advance information provides a map of the terrain in which the whole can be seen, and provides the holistic approach that the analytical learner finds difficult.

The verbaliser-imager dimension learners interact with the mode of presentation of information. Verbalisers may benefit from the presentation of information in a textual form. Imagers on the other hand may benefit from the presentation of information in a pictorial or diagrammatic form.

The Riding and Douglas cognitive style model explains the habitual or typical mode of thinking, perceiving, remembering and problem-solving of a learner, but excludes preferences for specific learning strategies (Sadler-Smith 1996:32-33). The model can be applied to a group of learners who are educated through an individualised approach to learning. Creative educators can also design different strategies and forms of learning material to reach learning outcomes, thus allowing learners to use learning material according to their learning styles.

5.12.3 Adaptive competencies related to the Gregorc learning style model

Strong emphasis is placed on the matching of instructional modes and materials to meet the range of individual preferences identified by the Gregorc learning style model. Gregorc (1979) also recommends that selected "non-preferences" be utilised at times to encourage learners to strengthen those areas (Dunn et al 1981:375).

Learners with a concrete sequential learning style enjoy learning step by step with a computer. Such learners prefer workbooks, textbooks, manuals, demonstrations, programmed instruction, computer-aided instruction, field trips, hands-on activities (Gregorc & Butler 1984:27).

Learners with an abstract sequential learning style sit still for a televised or videotaped lecture. Learners prefer lectures, audio tapes, textbooks, supplemental readings, guided self study, slides (Gregorc & Butler 1984:28).

Learners with an abstract random learning style demand creative, thematic uses of video instructional technology. Learners prefer television, movies, guided imagery, group discussion, assignments with reflection time, background music, short lectures with questions and answers (Gregorc & Butler 1984:29).

Learners with a concrete random learning style feel comfortable with the relative unpredictability of interactive video. Learners prefer independent study, computer and other games, simulations, open-ended problem-solving, mini-lectures and exploration, optional reading assignments (Gregorc & Butler 1984:29).

The Gregorc learning style model can assist the educator in selecting teaching strategies. Groups of learners may be divided according to their learning styles, and then exposed to teaching strategies that they are comfortable with, and also to those that are not congruent with their learning styles. The latter option is used to motivate the learner to adapt to less preferred situations. Groups can also be mixed, where learners can then support one another through the learning activities and tasks. In such a group, the learner with the learning style that suits the teaching strategy will typically take on a stronger role.

5.13   LEARNING STYLES AND THE PROFESSIONAL ENVIRONMENT

Higher education is currently overwhelmed with the notion of competencies in the working world or professional life, and how competencies should be reached. An even greater issue is, once competencies have been defined and determined for a particular profession, how should learning be best designed and managed to meet these specific needs. These are concerns that educators in higher education cannot ignore (Gilligan 1995:33). Higher education is thus part of this concern, and cannot function in isolation from the professional environment.

Since learning is a lifelong process and knowledge is gained in the educational environment as well as at work, there is reason to suspect a similar uniform correlation between learning styles and career paths. A professional career choice exposes one to a specialised thinking and learning environment as well as to generic professional problems. One becomes a member of a group of professional peers. Habits acquired through professional training and immediate normative pressures shape one's learning style (Kolb 1984:88; Laschinger 1986:289).

Because of the correlation between learning styles and thinking styles, learning styles can typically influence the activities of the professional environment or other situations such as in the broader community. In his theory of experiential learning, Kolb (1984:88) suggests that the structure of knowledge of various disciplines exerts a set of learning demands (environmental press) on the learner which reflects a particular view of reality and the methods of inquiry used to create knowledge. Individuals develop particular ways of dealing with the world and emphasise learning competencies most effective in acquiring the knowledge of the discipline within which they function. However, the task demands and pressures of a person's current job role have an influence on learning styles and tend to shape that person's adaptive orientation (Kolb 1984:90). Then, when learning styles match the demands of a given career specialisation, higher performance results (Kolb 1984:165). He furthermore speculates that individuals are attracted to particular disciplines because they perceive similarities between the learning demands of the disciplinary environment (environmental press) and their individual learning orientation (learning styles). Repeated individual-environment transactions in the specialised learning environments of professional educational programmes and the job roles result in the accentuation of individual learning styles of learners, who become highly skilled in the competencies required to meet the learning demands of these environments. Environmental press permits the diagnosis of gaps between an individual's level of skill on competencies associated with each learning mode and his or her perception of the importance of these competencies for successful functioning in a given environment. It provides a basis for designing individualised learning experiences to promote the development of learning competencies that need improvement. The notion of person-environment match/mismatch is thus an issue that needs careful attention. Kolb (1984:90) further maintains that when individual learning styles are not congruent with environmental press, learners can either change their learning styles or leave the discipline. Learning for and within a discipline, to a certain extent, therefore, shapes the development of congruent learning styles.

People will find that their success in their profession increases or wanes, and part of what causes this may be the fit of learning styles to certain requirements at a given stage within the profession. Typically, when one enters a profession, one would not be expected to make high level analytical decisions. If, however, one is strong in this area, it could have an influence on performance. The opposite is also true; if one prefers to approach a task step by step it may result in a false picture of not being able to think or analyse fast and at a high level. This fact may have implications for promotions. The result may be that people move into higher levels of management although they may not be appropriate for the posts. A person's flexibility will, however, also play a role in whether a

person can then cope in such a position. The problem may not be one of competence or ability, but rather of the match between an individual's learning style (and thinking style) and the requirements of a specific position. A person may therefore be in a position for which his or her learning style is not a good match (Sternberg 1997:92).

On the other hand, Fransman (1991:73) maintains that once a learner adopts a particular learning style in the early years, this learning style is, generally, perpetuated in higher education and in a profession, unless serious attention is given to the modification of the learning style in favour of something more meaningful, or where a learning style is forced or shaped by a profession. Thus, although there is some flexibility, no one learning style is completely flexible. Learning styles remain relatively stable, and therefore interventions in the educational or professional environment focus on adaptations rather than learning style changes.

The value of acknowledging learning styles in the professional environment can never be underestimated. Environmental press, individual strengths and weaknesses (dominant and less dominant characteristics), as well as other factors within society play a role in the continuous process of growing and development of an individual in the professional environment.

To put the above discussion into perspective, the debate around learning styles and profession was applied to the health care profession.

5.13.1 Learning styles of learners in health care professions

Health care professions, like other professions, have been placed in specific dominant learning style groups, often a very generalised conclusion. Several researchers have found that health care professionals had divergent or accommodative concrete learning styles. Learners in these two learning style quadrants express strong needs for organisation and concrete experience (Daly 1996:110; DeYoung 1990:65; Dobbin 2001:5; Duff, Johnston & Laschinger 1992:232; Haislett, Hughes, Atkinson & Williams 1993:64; Laschinger 1992:110; Laschinger & Boss 1984:375-380; Laschinger & MacMaster 1992:258).

Kolb (1984:89) also agrees that health care professionals are clearly concrete learners and fall mainly into the diverger category but also into the accommodator quadrant. Laschinger (1986:292;

1992:112) describes the health care profession as multi-dimensional and suggests this to be the reason for the different learning style profiles emerging in research. She also maintains that certain professions, especially nursing and medicine as a discipline, necessitate opposing learning modes, namely the concrete people-oriented component and the active use of scientific principles in practice. These opposing learning modes imply divergence as well as convergence. The divergent and convergent learning styles should not be perceived as oppositional. There is a place for both creative learning and learning by authority; the mastery of what is known and the creation of new knowledge; original answers and correct ones; conforming and non-conforming behaviour; and discipline and creative behaviour (Demetrulias & Shaw 1985:16-17). Davis (1990:406) explains the predominance for the two learning styles as a sensing, feeling, judging, feminist personality, and a subjective perceptual mode which emphasises non-visual sensory experience, and tactile imagery.

The findings of the study done by Davis (1990) agree with Kolb's contention that people in health care professions have concrete, people-oriented learning styles. Furthermore, it is also said that health care professionals rate abstract competencies significantly lower in importance for success, and that the more advanced the learners are, the greater the incidence of concrete learning styles (Daly 1996:110). In all the studies done on the learning styles of health care professionals, however, learners were also found who preferred abstract learning and self-structured learning.

In contrast to the above, a study on the learning styles of health care professions (specifically nursing students) at a distance teaching university, found that the predominant learning style of the respondents was the convergent learning style (Van Rensburg 1995:143). The respondents of the study were non-traditional learners, which meant that they were older learners who had already been in possession of a higher education qualification in health sciences (either a diploma or a basic degree). These findings do not support Kolb's hypothesis of a discipline-specific learning style where health care professionals are presumed to prefer a concrete orientation to learning. In a study done by Merritt (1983:371), it was found that students doing a basic health sciences programme had a greater preference for structure, affiliation, achievement, direct experience and imagery than the older learners who were in a post-basic programme. Other researchers have also arrived at conclusions describing their subjects as having predominantly abstract learning styles (Linares 1999:410; Rakoczy & Money 1995:170).

Health sciences education programmes always include a variety of learning environments to provide both theoretical and behavioural approaches to learning. This is necessary to provide individuals with reality-based clinical experiences to facilitate transition into the real world of health care. The problem-solving skills required from health care professionals also require a convergent learning orientation. Another specific task and important aspect of health care professionals' competencies is decision making. They often have to choose the best solution to a problem, set goals and make immediate decisions in a specific situation. These skills are associated with a convergent learning style (Kolb 1984:94-95; Laschinger 1992:105). Kolb (1984:206) also maintains that learners shift in their preferences for learning styles from more concrete to more abstract and from more reflective to more active, given the situation they are in. Health sciences (including nursing) necessitate opposing learning modes, namely the concrete people-oriented component and the active use of scientific principles in practice, which imply divergers as well as convergers (Laschinger 1986:292).

It was concluded that individuals cannot be categorised according to their academic disciplines or professions. Individuality in the learning process with regard to learning styles must be acknowledged. Although in general, different academic disciplines may favour different learning styles, individuality cannot be put second.

5.14   EFFECTIVE USE OF LEARNING STYLES IN A TEAM

There is no doubt about the potential value of learning styles in the construction of teams or in organisational behaviour, and the understanding of management issues. It provides the manager or team leader with an additional and conceptually distinct means of explaining individual differences in a group or team. In order to empower the manager or team leader to utilise individuals maximally, the need for a valid and reliable instrument for the assessment of learning styles is obvious.

The value of learning styles in relation to team composition and particular management tasks has been cited in various studies (Allinson & Hayes 1996:120; Hayes & Allinson 1994:54). The main problem with many of the established instruments that measure learning styles is that they are too cumbersome to be applied in large companies or on a regular basis where or when teamwork is initiated.

After many years of extensive research, it has been accepted that learning processes also occur in a profession or on the job (Mumford 1987:49). Mumford suggests that a recognition of learning styles

in the professional environment involves:

- helping managers or group/project leaders to know the stages of the learning process
- helping managers or group/project leaders to understand their own preferred approaches to learning
- assisting managers or group/project leaders to make the best use of their existing learning preferences or build additional strengths and overcome blockages
- helping managers or group/project leaders to carry their understanding of learning from study years to professional life (Mumford 1987:49)

During a team building project Thomas (1986:39) emphasised that knowing how team members learn can improve team assignments and team decisions. The increased focus on interdependency of organisational members requires team managers to have insight into the composition of the individual strengths of their team members so that they can be efficiently used. Thomas based these statements on the results of a survey done involving health care managers at a non-academic community hospital. It was concluded that if health care managers have knowledge of learning styles and how differences in learning styles actually influence working together, this could influence decisions in assigning managers to specific teams. It was also suggested that the managers might review their staffing procedures with the learning styles of the team members in mind. By making use of an inexpensive and simple tool the management team could gain insight into the individual learning characteristics and preferences of their team members (Thomas 1986:45). Decision-making styles are similar to learning styles.

When deciding on a team for a project, the following steps could be used to constitute the team:

- First the learning styles of individuals are identified and they are divided into groups so that each group has at least one individual with a specific learning style.
- Group members are asked to review their own learning style preferences.
- They are asked to exchange information about their preferences among themselves and to discuss the likely impact of this on them as individuals and on the group.
- An activity is then decided on and group members discuss how they think it should be approached, divided among them, and handled, taking individual differences into account.

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- Finally, they are asked to note their individual action points and correlate these with the characteristics of their own learning styles. The results of the analysis are discussed, uncertainties are cleared up and the members are ensured that the group activities are not rigid as they relate to learning style preferences.

This activity may help the manager or team leader to constitute a group where the strong points of one member complement the weak points of another. A group should function more effectively when a good mix of learning styles is present. This statement is substantiated by the research results of a study done by Mumford (1987:58), where individuals have been found to learn more from exposure to other learning styles than they do from being placed with predominantly similar individuals.

An important factor is the interest by managers or team leaders in their own learning processes. Even more important is their knowledge of learning styles, not only to identify them but also to improve on them.

In the professional environment, knowledge of learning styles thus gives project leaders or managers insight into the dominant and less dominant learning characteristics and preferences of team members. Emphasis may be placed on individuals' abilities to perform tasks that call on their most dominant learning characteristics and preferences, and at the same time embrace institutional commitment. By raising people's consciousness about individual differences, management can use resources maximally and develop strategies for new ways of approaching tasks and thus promoting professional and personal development (Carnwell 2000:1026).

From this discussion it seems clear that learning to learn has to be a clear overt part of any programme to eventually produce a professional practitioner of high standard who can function independently as an individual and as part of a team.

5.15 TEACHING LEARNING STYLES

For the most part, individuals acquire their learning styles through past experiences and socialisation with learning material. Learning styles are, however, teachable. One way of teaching learning styles is to give learners learning activities and tasks that require them to utilise the learning style that you as educator want them to develop. A wide variety of learning activities or tasks can be given to

stimulate other learning styles. The more learners use a particular learning style, the more comfortable they become with its use. Another way of teaching learning styles is by teaching the theory of learning styles. Once people are taught directly about the concept, they come to realise the existence and reality of these individual differences. This brings them to the realisation that because someone learns or approaches learning material in a different way from the way they do, it does not mean that the other person's learning style is better or worse. When one learns about one's learning style, one realises that there is nothing wrong with the way one learns. This can enhance self-efficacy and stimulate learners to make the most of their individual learning styles. In addition, learning cannot occur in the absence of self-efficacy.

Teaching an individual about the concept of learning styles and the phenomena that relate to the concept empowers him or her with knowledge of the self. Although learning style is regarded as an abstract concept, there are various characteristics of learning styles that are easily identifiable. When an individual has come to an understanding of *how* he or she learns, including the obvious and less obvious learning characteristics and preferences, that self-knowledge contributes to self-actualisation.

5.16   CONCLUSION

The educational environment has two equally important role players, namely the learner and educator. Furthermore, learning styles are a reality that influences the educational environment. Educators not only employ a model to teach information, concepts, skills, the analysis of values, and other content objectives, but also guide learners to use their learning characteristics and preferences for self-development. As an educator, one needs to use educational skills in such a way that one capitalises on the characteristics of the learners in order to help them achieve control over their academic growth. Successful preparation of learners can be achieved through a climate which fosters individuality, promotes learning and enhances the lifelong learning skills required for continuous professional development.

The recognition and acceptance of learning styles lead us to conclude that learning styles must also be assessable. In order to promote learning styles in higher education, a means of assessing/identifying learning styles must be available. Phase 2 of this research encompassed the construction of a learning style instrument. In the following chapter the construction of this instrument is discussed.

CHAPTER 6

CONSTRUCTION OF AN INSTRUMENT FOR LEARNING STYLE ASSESSMENT

6.1   INTRODUCTION

Phase 2 of the research consisted of the construction of a new learning style instrument. The aim of this chapter is to explain the process of construction. The process involved an exploration of the importance, advantages and disadvantages of assessing learning styles, the implications of using a learning style instrument, and an analysis of existing learning style instruments. This was followed by a discussion of the reasons for constructing the new instrument, and an account of the process that was used to construct the new learning style instrument.

Assessing learning styles focuses on an understanding of similarities and differences in how learners approach the learning process. One of the aspects of reaching the goal of learning style promotion in higher education is the assessment of learning styles. Learning style assessment provides information to assist in understanding the learning differences of a diverse group of individuals.

6.2   ASSESSMENT OF LEARNING STYLES

If one cannot measure learning styles, it is hard to demonstrate that they even exist. Learning styles are measurable. Assessment of learning styles is just as important in education as understanding and making sense of the theory of individual differences in learning styles. The use of a learning style instrument can increase satisfaction and improve interactions for learners and educators (Sternberg 1997:89). Assessment of learning style offers methods for analysing differences in learning, which are important in providing appropriate instruction. To Grimes (1995:422), learning style assessment provides diagnostic and prescriptive information. Diagnostic information includes the identification of the different learning styles of a diverse group of learners. Prescriptive information includes the specific learning characteristics and preferences, and has implications for modification of traditional educational programmes.

Newcomers to the concept of learning style are sometimes overwhelmed by the cognitive reasoning around the concept. They need not be. The feeling of unfamiliarity can be overcome by developing

an awareness of one's own learning style, and building in some flexibility and adaptability. This awareness is created by assessing one's own learning style, and understanding the learning characteristics and preferences of different learning styles.

The impact of learning experiences contributes to the development of a learner into a professional person or practitioner. A learning style instrument provides a means of identifying learning activities that need to be developed and a means of assessing perceptions of changes in levels of skill in different learning activities in the learning process. This identification of learning activities can form part of the basis for planning learning experiences by structuring learning environments that emphasise the use of a variety of learning activities. Learning experiences facilitate the transition from learner to professional person or practitioner.

Various learning style instruments exist. However, many of these instruments are not used because the analysis of the instruments is difficult and not always possible without the help of the developer of the instrument or an expert on the instrument. Assessment of learning styles is therefore often neglected for this simple reason.

There are also ways of doing a quick assessment of learning styles. A quick assessment normally involves showing learners a list of teaching strategies during an orientation and training programme. They have to select those that are their preferred method of learning. By doing this quick assessment, they can be grouped into different learning style categories (Chase 1995:47). Quick assessment is not accurate and does not identify individual learning characteristics and preferences, and is therefore not of much use. Learners also often select a teaching strategy that involves the least effort. Quick assessment of learning styles is therefore not recommended for higher education because of its low value.

The results of learning style assessment are indicators of how an individual currently translates information presented within an educational experience. Initial identification of learning styles and the matching of educator behaviours could significantly impact on academic achievement early in a programme (see section 5.4). The educational environment would benefit from a discussion of learning styles, a self-assessment instrument, and educators who are able to exhibit a wide range of teaching styles (Harrison 1992:33). Claxton and Murrell (1987:v) expressed a pressing need for an instrument that will also take background differences, such as language and culture, into account.

Language inevitably plays an important role in learners' mastery and command of information and skills. The importance of the language medium of education was confirmed in a study done by Fraser and Nieman (1996:194). Perhaps the greatest single advantage in using a learning style instrument is that the educator becomes more aware of learners as individuals, with diverse backgrounds.

While different learners use different learning styles, professional life may encourage certain learning formats and suppress others. If in a group, practice, institution or company, for example, the norm is to attend large meetings for continuing education, the learner who best learns on his or her own may suffer. The learner who learns well in a group setting may need to make adjustments in a remote situation. Learners who prefer the theoretically based approach of lectures may not benefit substantially if education is offered in a case study format. Because of factors such as these, assessment of individual learning styles can be very helpful in a continuing education situation. This assessment can assist a professional person in choosing learning activities that are most appropriate when engaging in continuing education or in-service training.

In order to enhance the quality of education, a number of innovations are finding their way into the educational system. These innovations include adaptive teaching which is designed to be adjusted to the individual needs of the learner with regard to study materials, programmes for learners on instructional knowledge, and the use of different teaching strategies. To empower learners on instructional knowledge they must also be able to identify their own position with regard to their preferences for certain teaching or instructional methods.

6.3 IMPLICATIONS OF LEARNING STYLE ASSESSMENT

The implications of learning styles for higher education became evident in the previous chapters. In order to promote and accommodate learning styles in higher education, learning style has to be assessed. However, this is not merely a process of identifying a learning style and then applying the knowledge. Careful attention must be given to the advantages and disadvantages of the assessment, and also to the selection of the instrument. A suitable instrument is necessary if the assessment is to be of any value.

6.3.1 Advantages and disadvantages of using a learning style instrument

A learning style instrument is useful to gauge the profile of a learner or a group of learners who are in a learning situation or who are required to undertake group or project work. The advantage for an individual learner lies in self-knowledge and for the educator it lies in knowledge of the learners he or she is dealing with. For group or project work the advantage is that the group as a whole may have a balanced profile or may be more represented on some learning styles and less on others. Balanced groups can be formed so that the advantages of different learning styles can be employed by the group and the educator. In this way learning experiences are enriched. It is acknowledged, however, that learning style profiles cannot be the sole criterion for group formation.

The disadvantage of using a learning style instrument lies in the danger of stereotyping a learner on the basis of a learning style instrument, and this must be avoided. It may result in a self-fulfilling prophesy, where the learner assumes that he or she is not capable of acquiring other learning styles or adapt to situations. Learners must know that both dominant and non-dominant learning characteristics and preferences are necessary in the learning process. The same argument applies to where a group works together. An individual cannot refuse to participate in group work because the activities are not congruent with or dominant of his or her learning style.

Careful consideration must be given to the reasons for assessing learning style. It is not merely an exercise to identify "interesting" characteristics. Learning style assessment entails abstract conceptualisation and must be approached in a professional manner.

6.3.2 Selecting an instrument

Using a learning style instrument is not only relevant to educators in the field of higher education, but also to any other individual who is engaged or intends to get engaged in the learning process. Terms that are used in the field of education are not always part of layman's language. Not all learners or other users of a learning style instrument will necessarily be able to understand the context of terms such as "intuitive" or "receptive". For someone who is not directly involved in learning as a concept or in the educational field it may be impossible to place such terms in context. This is an important aspect when deciding on a suitable learning style instrument. In this research, a specific requirement for an instrument was that the items or questions constituted in the learning style instrument must be

in the form of full sentences in order to make the meaning of the item or question more contextual and understandable.

Another important aspect is the population who are going to use the instrument. A population may be very diverse with regard to language differences. The South African and African learner population, for example, comprises learners with a variety of first languages. South Africa has eleven official languages but the language of higher education in this country is mainly English. Most of the learners from the South African population thus study in a language other than their first language. The same argument also applies to educators in this country.

The level of difficulty with regard to language is another important aspect to consider when selecting a learning style instrument. Thus, an important requirement for making the use of a learning style instrument more accessible, valuable and user-friendly is recognition of differences among individuals. The linguistic differences among a population should not deny each user an equal opportunity when using such an instrument.

Before a decision can be made on whether an existing instrument can be adapted, changed or used, certain aspects have to be considered. In this research, attention was given to the following aspects:

- Access to existing instruments: Some instruments are copyrighted and may not be used for ethical and legal reasons. The licenced instruments require approval and the payment of a fee. Some of the instruments may also only be used by registered psychometricians. Access was an important aspect in deciding on an existing instrument as it was important that the instrument be readily available, affordable and simple enough for self-assessment by adult learners.
- Level of sophistication of instrument: In some instances access to highly sophisticated instrumentation or technology is necessary to use or analyse an instrument. Such instruments were specifically excluded as they impeded self-assessment, and were therefore not regarded as suitable for a diverse population who do not always have access to technology.
- Validity and reliability: These characteristics are essential parameters. Not all instruments have been tested for validity and/or reliability, or reports on these characteristics are not available. Thus, those instruments with inadequate reports on validity and reliability were not considered.

- Relevance of instrument: An instrument may have been developed for a highly technological environment, management situation or for the learning environment. Instruments cannot always be applied to all situations or contexts without some adaptation. This is often a problem where the population has diverse characteristics. In this research, an instrument that was applicable to higher education was needed.

The following step was to analyse the existing learning style instruments in order to make a decision as to whether an existing instrument could be adapted, changed or used as is.

6.4   ANALYSIS OF EXISTING LEARNING STYLE INSTRUMENTS

The following learning style instruments were analysed. Where possible, primary sources and the instrument itself were analysed. Not all the instruments were available for analysis, therefore secondary sources also had to be used. The names of the instruments were used as they appear on the instruments or in the literature, hence the different terms such as "questionnaire", "instrument", "inventory", "delineator", and "tool".

6.4.1   Kolb Learning Style Inventory

The Kolb Learning Style Inventory (Kolb 1984:68-69) was created to assess individual orientation towards learning. This Learning Style Inventory measures a person's relative emphasis on each of the four modes of the learning process, which are concrete experience, reflective observation, abstract conceptualisation and active experimentation. Two combination scores that indicate the extent to which the person emphasises abstractness over concreteness, as well as the extent to which that person emphasises action over reflection, are also measured (Kolb 1984:67-68). The inventory comprises lists of words, such as "logical", "analytical", "feeling", "intuitive", which respondents are required to rank according to how they feel the words best describe their learning style. The words are grouped in nine sets of four words, that describe the four learning modes. Individuals are required to rank the words within each set according to how well they characterise their learning orientation. This procedure yields scores that relate to each of the four learning modes (concrete experience, reflective observation, abstract conceptualisation and active experimentation) respectively. Using these, two other scores are computed. The first score indicates the position on the abstract-concrete dimension of the Kolb model of experiential learning, and the second score

indicates the position on the active-reflective dimension of the model. Thus it becomes possible to identify an individual's learning style (Kolb 1984:68).

The development of a learning style instrument begins with a matching of responses to key words, phrases, or scenarios that are related to a set of cognitive performance data or personal characteristics. A factor analysis is then done to demonstrate reproducibility in learning style assessment. After extensive study of learning style instruments, Baker et al (1985:1495) found that the Kolb Learning Style Inventory is the only instrument for which a match between factors and learning styles exists. This conclusion was drawn after the instrument, together with other instruments, had been studied in a comparative analysis to find some common conceptualisation of learning styles.

When analysing the Kolb Learning Style Inventory, Allinson and Hayes (1988:271) criticised the words used because single words are open to different interpretations and it may be difficult to understand some of the terms (words) used. These arguments support the argument advanced in this research that the instrument should contain full sentence items or questions.

Different views on the construct validity and reliability of the Kolb Learning Style Inventory have been discussed in the literature. Shortly after the development of this instrument, Atkinson (1988:756) had already raised a concern that the instrument was biased and that it could give an artificial picture of how individuals learn. He also identified a low test-retest reliability as well as a weak stability. Allinson and Hayes (1988:270) refer to eight other studies that reported the test-retest correlations to be moderate, although the findings as to internal consistency were more encouraging. The construct validity also came into dispute and the face validity appeared to be unsatisfactory. Marshall and Merritt (1986:257) as well as Honey and Mumford (Mumford 1987:51-52) developed new learning style instruments in reaction to criticism of the construct validity of the Kolb Learning Style Inventory.

In their research on the academic success of learners in different study directions, Welman and Huysamen (1994:263) made use of the Kolb Learning Style Inventory. The construct validity and reliability of this instrument were tested. According to their study, the Kolb model of experiential learning had some weaknesses and the Learning Style Inventory lacked construct validity and reliability. They did not, however, reject the Kolb model of experiential learning but suggested that

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a new learning style instrument, based on the Kolb model of experiential learning, could be designed.

In a study undertaken by Moelwyn-Hughes and Sayed (1993:17), the findings showed that the Kolb Learning Style Inventory lacked construct validity and reliability. They have therefore also abandoned the use of this instrument. Concerns have also been raised by Linares (1999:409) about the ipsative format, lack of construct validity, and measurement difficulties. On the other hand, Forney (1994:338) described the instrument as having construct validity after having conducted a factor analytic study of the instrument.

Major criticisms of the Kolb Learning Style Inventory seem to have been ignored, although specific studies which were undertaken to investigate the measurement properties of this instrument have shown serious instrument weaknesses. In spite of numerous charges against the Learning Style Inventory, it is the most frequently used method of measuring learning style in health sciences education (DeCoux 1990:202; Linares 1999:408; Moelwyn-Hughes & Sayed 1993:15).

This instrument should be used with caution as a means of informing adults about how they learn best because of its lack of validity and reliability. A further criticism against this instrument is that it uses words only to describe a learning preference. Users of the instrument might not always be able to rank order the words according to how well each word is perceived to characterise the individual's learning style because of semantic insecurity in the individual.

6.4.2   Marshall and Merritt Learning Style Questionnaire

The Marshall and Merritt Learning Style Questionnaire was designed by Marshall and Merritt (1986) to assess individual learning styles within the Kolb model of experiential learning. They realised that there was a need for a new instrument for assessing the constructs defined in this model (Marshall & Merritt 1986:257). Criticism arising from different research projects against the Kolb Learning Style Inventory used in his experiential learning model encouraged these two researchers to design a more adequate instrument, based on the Kolb Learning Style Inventory (Linares 1999:409; Marshall & Merritt 1986:257).

The newly designed Marshall and Merritt Learning Style Questionnaire is a 40-item semantic differential scale (40 word pairs which are given in a semantic differential format), with ten item pairs

designed to measure each of the information processing modes, based on Kolb's experiential learning model. A five-point response mode is allocated to each of the forty items. The items indicate which words are characteristic of the respondent (Linares 1999:409; Marshall & Merritt 1986:258). The scores classify users of the instrument into one of four learning styles as described in the Kolb model of experiential learning.

The Marshall and Merritt Learning Style Questionnaire was developed from an initial experimental instrument called the Learning Style Questionnaire Experimental form (LSQ-E) which consisted of 100 semantic differential word pairs (Marshall & Merritt 1986:259; Marshall 1987:422). Each of the four learning modes (concrete experience, reflective observation, abstract conceptualisation and active experimentation) in the Kolb model of experiential learning were assessed by 25 word pairs. A five-point scale was used to rate the consistency with which the word pairs characterised a particular learning style. Randomly selected university students were given the instrument to complete. A statistical analysis determined the ten highest loading items for each of the four learning modes of the Kolb model of experiential learning. The selected 40 items were again factor-analysed and the alpha reliability was determined for the four learning modes and the two bipolar dimensions (Linares 1999:409; Marshall & Merritt 1986:259; Marshall 1987:422).

Marshall and Merritt (1986) undertook a study to validate the instrument. Results of this study suggested that the instrument was valid. The Marshall and Merritt Learning Style Questionnaire, as a 40 item semantic differential scale, was given to 543 learners at two universities. The study suggested that the instrument is construct-valid and reliable. High reliability was demonstrated in three of the four learning modes as well as for both bipolar dimensions. Construct validity was also demonstrated. Because of its normative format, the Marshall and Merritt Learning Style Questionnaire can be used for statistical research as well as for individual learner diagnostics.

Marshall and Merritt (1986:262) maintain that their instrument could be used as a teaching tool in situations where learners are taught how to integrate the learning processes and learning style. On the basis of this statement the instrument was selected for use in a previous research study on the learning styles of nursing students at a distance teaching university (Van Rensburg 1995:84). This statement also prompted consideration of the instrument for use or adaptation.

During a previous research study (Van Rensburg 1995:139) the Marshall and Merritt Learning Style Questionnaire was presented to experienced educators to test the face and content validity. A factor analysis was performed on the inter-correlation of the 40 items of the Learning Style Questionnaire. Both a four-factor and a two-factor analysis were obtained, using the principle factors method (Van Rensburg 1995:135). The decision to extract two and four factors was based on the work done by Marshall and Merritt (1986:257-262) who followed this procedure when the reliability and construct validity of their learning style instrument were investigated. The factor solutions were rotated according to the varimax criterion, to obtain a maximally interpretable rotated solution. On inspection of these solutions it appeared that the two-factor solution made most theoretical sense (Van Rensburg 1995:135). This finding was in accord with the findings of Marshall and Merritt (1986:260).

Items with a factor loading higher than 0.30 were regarded as being representative of that factor. However, items with a factor loading between 0.20 and 0.30 were also evaluated on theoretical grounds and were included when it was found that they were descriptive of the factor. In this way the items representative of the two factors were identified. Factor one, consisting of 17 items, is represented by the abstract conceptualisation and concrete experience dimensions or learning modes (ACCE). Factor two, consisting of 14 items, is represented by the active experimentation and reflective observation dimensions or learning modes (AERO). Nine of the 40 items were excluded in the final factor analysis (Van Rensburg 1995:140-142).

An inspection of the items of each factor revealed the same picture as Marshall and Merritt (1986:260-262) described in their research. Although not all the items of the Learning Style Questionnaire were included as representative of a factor, the predominant picture was in accordance with the Kolb model of experiential learning (Van Rensburg 1995:142).

The Marshall and Merritt Learning Style Questionnaire has an acceptable two-factor construct validity which was confirmed by the results of the factor analysis. The factor analysis determined the extent to which the items that loaded on the same factor also belonged according to theoretical expectations of the learning modes they described.

To determine reliability, the Cronbach's Alpha was used to estimate the internal consistency (Van Rensburg 1995:136). Each of the two factors identified (ACCE and AERO) constitutes a scale. It

was decided to calculate the Cronbach's Alpha for each of these scales. The coefficients were found to be 0.87 for factor one (ACCE) and 0.85 for factor two (AERO) (Van Rensburg 1995:143). It was concluded that the reliability of these factors was satisfactorily high. These scores therefore provided support for the reliability of the Marshall and Merritt Learning Style Questionnaire.

Because nine of the items were excluded on statistical grounds in the final analysis of the previous research study, it was then recommended that a new learning style instrument should be developed, which could be based on the Marshall and Merritt Learning Style Questionnaire (Van Rensburg 1995:165).

6.4.3   Daly's Learning Style Inventory

Daly (1996:107, 112) conducted a study which focused on the development of guidelines for a training programme for health care managers in a newly formed integrated delivery system. The learning styles of the respondents were identified and described according to the Kolb model of experiential learning and graphically plotted in the appropriate learning domain.

The Learning Style Inventory used in the study by Daly (1996:111) is a short forced-choice self-descriptive instrument in which respondents are asked to rank each of nine sets of four words from most characteristic to least characteristic in a way that best describes their learning styles. Each adjective in each of the nine sets of words corresponds to one of the four learning modes described in the Kolb model of experiential learning and measures a learner's emphasis on the four learning abilities. Certain items in each column are dummy adjectives and are not totalled when scoring down the column (Daly 1996:112).

In determining the learning styles, the respondents' collected data have to be plotted on a graph or by a statistical software package, which makes self-assessment by the learner difficult. An explanation of the meaning of the adjectives will in many instances have to be given as the learners might not know the meaning of some of these adjectives, for instance "pragmatic" or "conceptualisation". However, the use of this Learning Style Inventory by any adult educator will greatly help to transfer information to the learner, depending on how they perceive and process knowledge (Daly 1996:120).

Because of the difficult process of analysis required by this instrument and the fact that a computer is necessary, it is not a suitable instrument. Self-assessment is an important criterion in deciding on an instrument and many adult learners do not have ready access to a computer, especially in South Africa and other African countries.

6.4.4   Gregorc Style Delineator

The Gregorc Style Delineator (Carroll 1992:115) addresses both learning preferences and personality characteristics, which makes it ideal for a facilitator programme. The instrument identifies learner preferences that can guide a facilitator in finding ways of teaching each individual learner and also identifies personality aspects important in the personal relationship between facilitator and learner. Carroll (1992:116) describes it as an easy-to-use instrument because it can be completed in five minutes and it is self-scored. It does not rely on a computer or complicated scoring template. The instrument consists of ten columns of four words or phrases, which are ranked numerically with the number 4 representing the word or phrase that is the most powerful descriptor and the number 1 the less descriptive of the respondent's self (Duncan 1996:40).

This instrument can assist in the quick matching of learner and educator. The learner can determine his or her own learning style. The educator can use the instrument to explore different ways of teaching. It can also be used where the educator identifies mismatch problems. Both learner and educator can complete the instrument and determine their dominant styles. Although it is not practical to match learning and teaching styles in all cases, a sensitivity for the learning style of the learner can minimise conflicts and facilitate learning.

Although the purpose of this research was not to develop an instrument to determine ethnic or gender differences, the Gregorc Style delineator was considered for possible use or adaptation, because of the fact that it is a fairly quick way of assessing learning styles. However, the instrument focuses too strongly on ethnic differences in learning styles as well as gender differences (Matthews 1991:229). Therefore, this instrument was not ideal for possible use or adaptation.

6.4.5   Honey and Mumford Learning Style Questionnaire

Honey and Mumford (Mumford 1986:8) used the Kolb model of experiential learning as a basis from

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which they developed their own Learning Style Questionnaire to identify learners' individual strengths and weaknesses for each stage of the learning cycle in order to identify learning styles. The structure of the questionnaire implies four independent scales which are represented, confusingly, quasi-orthogonally. The scales activist/theorist and reflector/pragmatist are not bipolar dimensions of learning styles, because the four learning styles are independent of one another. The four learning styles are broadly equivalent to the four stages of Kolb's learning cycle. Activists learn through involvement in new experiences, becoming bored with implementation and long-term consolidation. Reflectors learn by observing events from different perspectives, collecting and analysing data about them. Theorists learn through integrating observations into a conceptual framework, relying on rationality and logic to achieve a synthesis. Pragmatists learn by testing ideas, theories and techniques to see if they work in practice, using them as a basis for decision-making and problem-solving.

The Honey and Mumford Learning Style Questionnaire (Mumford 1986:7) has a total of 20 items for each of the four learning styles. The questionnaire is an 80-item self-report type of questionnaire which has been designed to identify an individual's relative strengths in each of the four learning styles (activist, reflector, theorist and pragmatist styles) (Sadler-Smith 1997:53). The items are in the form of a statement with which the user has to indicate a level of agreement or disagreement. A five-point Likert scale is used for each item which avoids options like *do not understand* or *unsure* (Moelwyn-Hughes & Sayed 1993:15-16). They base their 80 items on recognisable statements of managerial behaviour for which the answers scored are a starting and not a finishing point. Their preference is to focus on observable behaviour rather than on the psychological basis for behaviour, and to identify learning styles that are meaningful to the managerial population. They maintain that the majority of the items are concerned with behavioural nature and include general trends in an individual's behaviour (Moelwyn-Hughes & Sayed 1993:15; Mumford 1986:7).

Honey and Mumford (1982) found the Kolb Learning Style Inventory unacceptable, questioning the use of the one-word descriptors as a basis for attributing learning styles (Allinson & Hayes 1988:271). The instrument differs from the Kolb Learning Style Inventory in two ways. In their research Honey and Mumford encountered problems with the procedure and face validity of the Learning Style Inventory designed and used by Kolb (Moelwyn-Hughes & Sayed 1993:15; Welman & Huysamen 1994:263). The instrument lacks construct validity and therefore its use was subsequently abandoned. The Kolb Learning Style Inventory is based on only 36 words and not on sentences. Furthermore, these words do not describe management activities.

A study done by Ronan (1996b:91) offered evidence to support a high degree of reliability. These findings confirm those of Allinson and Hayes (1988:276). The findings failed, however, to establish a link between learning styles and academic achievement. Van Schalkwyk and Schepers (1991:21-23) state that it is difficult to determine validity as there are not enough other instruments with which it can be compared. They also found that the categories that were identified after using this instrument did not necessarily fit into any of the four learning styles of the Honey and Mumford learning style model (Mumford 1986:8).

Criticism against Honey and Mumford's Learning Style Questionnaire is that it is too management-bound to be of specific assistance in higher education. The instrument does not convince one beyond question that it is valid and reliable enough to be related to learners' approaches to learning.

6.4.6   The Myers-Briggs Type Indicator (MBTI)

The Myers-Briggs Type Indicator (Beyler & Schmeck 1992:714) was originally designed to classify individuals on the basis of Jung's system of psychological functions, namely introversion versus extroversion, sensing versus intuition, and thinking versus feeling. A fourth dimension was added to measure one's overall preference when first taking in new information, which is judging versus perceiving. The Myers-Briggs Type Indicator establishes four bipolar preferences with an individual having preferences on each of the poles. The four dimensions include preferences on how individuals derive energy (introvert or extrovert), how individuals receive information (sensing or intuitive), how individuals process information (thinking or feeling), and how individuals make decisions (judging or perceiving) (Worthington & Clay 1995:96-97). Although these preferences are used from time to time, this instrument asserts that individuals have natural tendencies to revert to varying degrees to one end of each pole.

The Myers-Briggs Type Indicator is a thoroughly researched and well-documented instrument, which is described as being reliable and valid. It has specifically been used in the workplace to determine employee creativity, to improve career counselling, to evaluate employee stress, to develop team building, to assess racial and ethnic differences, and to assess organisational leadership (Worthington & Clay 1995:96). This instrument is also used to predict how individuals teach, learn, lead others, and relate to others (Pankratius 1997:70).

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The results of a study done by Beyler and Schmeck (1992:716) using the Myers-Briggs Type Indicator supported the construct validity of at least one of the continua on which individuals were assessed. It was necessary, however, for the researchers to continuously maintain motivation and attention from the subjects used in the study because of the sheer size of the instrument.

It is described as unnecessarily long and sophisticated, and so complex that it may cause confusion to the user (Allinson and Hayes 1988:271). Allinson and Hayes (1996:121) criticise this extensively applied instrument because of its length and the time it takes to be administered. Questions have also been raised over the validity and usefulness of the Myers-Briggs Type Indicator, because no convincing evidence could be found to establish that an individual who used this instrument would indeed be able to predict important behavioural conditions (Pankratius 1997:70).

The Myers-Briggs Type Indicator was considered for use or adaptation because of its ability to predict how individuals teach, learn, lead, and relate to others. The instrument does not, however, meet the specific needs of this research as it is mainly used as a personality type instrument and not specifically as a learning style instrument, although it has been correlated with other learning style instruments, and with teaching and learning preferences. It is not a self-report instrument and the results need to be interpreted by someone well trained in using this instrument.

6.4.7 Rezler and French Learning Preference Inventory

The Rezler and French Learning Preference Inventory was designed by Rezler and French (1975) to measure the learning preferences of learners in the allied health professions. The inventory contains six dimensions, namely:

- an abstract dimension which assesses preference for learning theories, principles, and concepts
- a concrete dimension which assesses preference for learning practical skills
- an individual dimension which assesses preference for working alone
- an interpersonal dimension which assesses preference for working in harmonious relationships with others
- a learner-structured dimension which assesses preference for autonomy and self-direction, and
- a teacher-structured dimension which assesses preference for learning in an organised, teacher-directed class (DeYoung 1990:65)

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Although the Rezler and French Learning Preference Inventory assesses different learning preferences, and therefore was considered for use or adaptation, no information on the reliability and validity of the instrument was found. It also does not meet the specific needs of this research as it is not a self-report instrument. Because no research results that include research on or with this instrument could be found, it could not be changed to a self-report instrument.

6.4.8 Canfield Learning Style Inventory

The Canfield Learning Style Inventory (Matthews 1991:229; Matthews & Jones 1994:236) is a self-report instrument with 30 items that allows learners to describe what features of their educational experiences they prefer. The responses are ranked on a four-point scale. The items include questions on conditions of learning (goal setting, organisation, peers, competition, instructor, detail, independence, authority), preferred areas of interest (qualitative, people, numeric, inanimate), preferred modes of learning (reading, iconic, listening, direct experience), and expectations for academic grades (what symbol, total expectation). The instrument identifies nine categories of learning styles. The instrument has validity and rather high reliability. The validity of the instrument lies in its ability to discriminate meaningful group differences in learning styles. Matthews (1991:232) describes it as having an affective design. The differences in learning styles, according to this model, represent levels of motivation, judgment, values, and emotions that move a learner to respond in a particular learning environment.

The Canfield Learning Style Inventory has mainly been used to determine preferences for the purpose of individualised instruction, and some motivational and environmental factors present in the formal instructional situation (Merritt & Marshall 1984:79). It is also widely used to determine differences of learners based on gender and age (Merritt 1983:370-371). It focuses to a great extent on social interactions, pertinent information such as age, race, gender, and marital status. This instrument will be suitable for situations where the above information is important, for example, in the selection of candidates for different directions of study in education. It is also used as a tool for assisting educators in developing instructional materials, as an aid in understanding learners' difficulties in completing academic units, and as a guide for counselling.

The Canfield Learning Style Inventory focuses on gender and age issues, and subsequently social interaction issues. For the purpose of using or adapting the instrument, it was found not to be suitable because it does not fit the framework within which this research was conducted.

6.4.9   Riding's Cognitive Style Analysis

Riding and Douglas (1993) developed a learning style assessment instrument. The Riding's Cognitive Style Analysis is a computer-presented test designed to measure two fundamental dimensions of learning styles, namely wholist-analyst and verbal-imagery. It assesses the two dimensions through computer-presented true-false statements for verbal-imagery, and through perceptual tasks for wholist-analyst (Allinson & Hayes 1996:121; Presland 1994:180).

Only two sources could be found that discussed this instrument. Because the instrument is computerised, it may have applications for adults, especially in modern technological development globally. However, the learner population in developing countries such as South Africa and other African countries do not readily have access to technology such as computers. A further problem was that the instrument itself was not available and could therefore not be suggested for use in this research.

After a thorough theoretical analysis of existing learning style instruments, the decision to construct a new learning style instrument was made. In the next section the motivation for adaptation and development of the new learning style instrument is discussed.

6.5   MOTIVATION FOR CONSTRUCTING A NEW LEARNING STYLE INSTRUMENT

After a theoretical analysis of existing learning style instruments, and bearing in mind the results of a previous research study, a need for a learning style instrument, which is valid, reliable, convenient, and specifically designed to meet the needs of a linguistically diverse learner population in higher education was identified. Although an important step forward in the assessment of learning styles would be further validation of the most promising instruments already available, the lack of instruments suitable for the specific application in this research warranted the need for a new learning style instrument. To meet this need, a learning style instrument was constructed through a process of adaptation and development. Adaptation means the process of producing an instrument that is

changed or modified to suit new conditions or a different purpose (McLeod 1986a:9). Development means that an instrument has grown from a fact or an event that changes a situation (McLeod 1986a:233).

6.6   THE PROCESS OF CONSTRUCTION

A systematic process of adaptation and development was followed during the construction of the new learning style instrument. The new instrument is known as the *Learning Style Assessment Tool*. A tool is something used as a means of achieving an end. It is also described as a medium for measuring a concept, an addendum or supplement for support in a profession (McLeod 1986a:913). The *Learning Style Assessment Tool* can and must serve as a supplement to the profession of an educator as well as a medium to measure learning styles and to support the learner in the learning process.

The process of construction entailed the selection of an existing instrument that could be adapted and developed into a new instrument. After the analysis of the existing learning style instruments, the process that was followed included certain steps:

- Selection of an existing valid and reliable instrument that could be used as a basis for the construction of a new instrument. The existing instruments were analysed to determine their uses, strengths, weaknesses, applicability, validity, and reliability. All instruments had to be suitable for the purpose of assessing learning styles in higher education. The analysis of existing learning style instruments was discussed in section 6.4.

- Adaptation of existing instruments to suit the purpose for which they are intended. After the analysis of the instruments, the appropriateness of each instrument was considered. Not one of the instruments that were analysed complied with the specific need that it had to be presented in a simple, understandable language for use by a linguistically diverse group of learners.

- Linguistic assessment. The difficulty level of the language used in existing learning style instruments was assessed, as this was a major issue in the decision to develop a new instrument. Van Ede (1996:154) identifies important requirements for evaluating the language of an instrument.

They include the following:

- Sentences should be simple and short.
- Items should be written in the active voice.
- Items should not contain metaphors and colloquialisms.
- Adverbs and prepositions such as "beyond" and "frequently" must be avoided.
- Vague terms such as "perhaps" or "probably" must be avoided.

The terms and concepts used in the instruments were not always clear or formulated in simple, understandable language. For the purpose identified in this research, the formulation and construction of items had to be changed.

- Psychometric characteristics. Psychometric characteristics include validity and reliability of the instruments. To determine the validity of existing instruments, one has to ask the following question: "Does the instrument really measure what it claims to measure?" For the purpose of this research it was important that the instrument really measures learning styles in the context of higher education. To determine whether a minimal level of reliability is constituted in an instrument, one has to be assured that the same results/findings will be obtained each time the instrument is used.

6.7   THE NEW LEARNING STYLE INSTRUMENT

The new learning style instrument, was constructed to comply with learner needs in higher education and to eventually assist in the application of the conceptual model that forms part of this research. The aim was to construct an instrument that addresses all the specific needs of a diverse population in higher education. It was also aimed at being user-friendly, in that it will enable an individual to understand the instructions and how they are analysed.

In order to make the instrument user-friendly the items were formulated in full sentence statements to clarify the adjectives that describe the learning characteristics and preferences of each learning style within the learning context. An important advantage of the newly developed *Learning Style Assessment Tool* must be the fact that it can be completed in a short period of time, that the scores obtained can be mapped directly onto the Kolb model of experiential learning cycle, learning styles

can be identified immediately, and that the results can be used or applied immediately.

6.7.1 Analysis of adjectives

In order to clarify the adjectives that are mostly used to describe the different learning styles, the meanings of the adjectives within the context of learning styles and the process of learning are given:

abstract: having no reference to specific examples, not applied or practical: theoretical, hard to understand

accepting: to take or receive something, to approve or give an affirmative reply, to take on responsibilities or duties, to consider as true or believe in (a theory or philosophy)

active/acting: working or doing something, to be involved by performing an action

analytical: capable of analysing or examining something in detail, to break down a whole into components, someone with an analytical mind

aware: having knowledge: aware of an error one has made, informed of current developments

careful: cautious in action, exact and thorough in one's work

conceptualisation: to form a concept out of observation, experience or other information

concrete: relating to a particular instance, specific as opposed to general, relating to things capable of being perceived by the senses as opposed to abstractions

consider: to think carefully about a problem or a decision, to take aspects into account when making a judgment

deliberate: carefully thought out in advance, intentional; consider something deeply, think over something

demonstrative: expressing feelings easily or unreservedly

discriminating: to recognise, understand or distinguish the difference between different things,

distant: remote in matter, abstracted or absent

doing: to perform an action

emotional: determined by emotion rather than reason, demonstrative and sentimental in action

evaluative: to judge or assess, to ascertain or determine the amount or value of something

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examine:	to scrutinise or inspect carefully or in detail, to investigate
execute:	to complete, carry out or perform an activity, to accomplish something
exercise:	to put into use, to practise using something
exhibit:	to show or demonstrate something, make something clear
experience:	direct personal participation or observation, a particular feeling that a person has undergone, accumulated knowledge especially of practical matters
experimentation:	the act of conducting an investigation planned to provide evidence for or against a hypothesis, an attempt at something new or original
feeling:	mental impression, a state of mind, a sentiment: a feeling that the project is feasible, intuitive appreciation and understanding
future-oriented:	oriented towards something that is yet to come or be
hunch:	an intuitive guess or feeling
impartial:	not prejudiced towards or against any particular side, fair, unbiased
impulsive:	actions based on sudden desires or inclinations, spontaneous, acting for a short time and not continuous, actions without forethought
instinct:	inborn intuitive power, the innate capacity to respond to a given stimulus in a relatively fixed way
instinctive:	intuitive action
intellectual:	a person who uses his intellect, a person who enjoys mental activity
intense:	a person characterised by deep or forceful feelings
intuition:	knowledge or perception not gained by reasoning and intelligence; instinctive knowledge or insight
intuitive:	not empirically or discursively, knowledge obtained by intuition
involved:	to include or contain as a necessary part, to concern or associate significantly
logical:	capable of or characterised by clear or valid reasoning
methodical:	orderly or systematic
objective:	existing independently of perception, undistorted by emotion or personal bias
observation:	detailed examination of phenomena through watching
observing:	to see, perceive or notice, pay attention to or to watch something carefully
operative:	using force or influence, capable of producing a result, actual rather than theoretical
participation:	to be actively involved in something
passive:	not participating perceptibly in an activity

perception:	insight or intuition gained by perceiving, the process of interpreting information from the outside world
performing:	to carry out an action
planning:	to make a plan to do something
ponder:	to give deep consideration to something
practical:	concerned with experience or actual use, not theoretical, more concerned with or relevant to practice than theory
pragmatic:	advocating behaviour that is dictated more by practical consequences than by theory
predictable:	something that can be stated or declared about in advance, foretellable
premonition:	an understanding or conception, an early warning of a future event
present-oriented:	oriented towards the existence at the time at which something is spoken or written, oriented towards actions or events occurring at the time of utterance
productive:	having the power to produce
questioning:	interrogative form of words in order to elicit information or evoke a response, to express uncertainty about the validity or truth
rational:	using reason or logic in thinking out or solving a problem
reason:	to think logically, draw logical conclusions from facts, to work out a problem
receptive:	able to apprehend quickly, tending to receive new ideas or suggestions favourably
reflecting:	to think, mediate or ponder
relevant:	having direct bearing on the matter in hand
reserved:	cool or formal in manner
resolving:	to decide or determine firmly, to find an answer or solution to something
responsible:	able to take rational decisions without supervision, accountable for one's own actions
risk-taker:	someone who proceeds in an action without regard to the possibility of danger involved
sensing:	the ability to perceive, to apprehend in advance, a mental awareness, sound judgment
sensitive:	affected by external conditions or influences
sentimental:	tending to indulge the emotions excessively, easily influenced by something

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solve:	to find the explanation for or solution to something, to work out the answer to something
spontaneous:	performing through natural processes without external influence, to do something voluntarily
tentative:	provisional or experimental
thinking:	to ponder a matter or problem, using intelligent thought
watching:	to observe closely or attentively
view:	observing, taking into consideration, an opinion
witness:	somebody who observes or watches

(McLeod 1986a; McLeod 1986b)

The adjectives above are all descriptive of the four learning styles identified by the Kolb model of experiential learning.

6.7.2 Characteristics associated with learning styles

The characteristics associated with the learning styles of the Kolb model of experiential learning are described by the adjectives and used to construct the items. The adjectives are given in the context of contrast (the extent to which an individual emphasises abstractness over concreteness (ACCE), and the extent to which an individual emphasises action over reflection (AERO) in learning). They are:

✦ **Concrete experience (CE)**

spontaneous (in contrast with questioning)

sensing (in contrast with thinking)

premonition (in contrast with reason)

perceptual (in contrast with questioning, intellectual)

emotional (in contrast with rational)

impulsive (in contrast with planning)

feeling (in contrast with thinking)

intuitive (in contrast with reasoning)

perception (in contrast with reason)

hunch (in contrast with logical)

✦ **Reflective observation (RO)**

observation (in contrast with participation)

reserved (in contrast with demonstrative)

watching (in contrast with acting)

observing (in contrast with doing)

witness (in contrast with exhibit)

ponder (in contrast with do)

passive (in contrast with active)

view (in contrast with execute)

reflecting (in contrast with performing)

reflective (in contrast with productive)

✦ **Abstract conceptualisation (AC)**

deliberative (in contrast with reason)

consider (in contrast with impulsive)

reason (in contrast with hunch)

analytical (in contrast with emotional)

careful (in contrast with emotional)

logical (in contrast with sentimental)

thinking (in contrast with instinctive)

resolving (in contrast with feeling)

intellectual (in contrast with emotional)

evaluative (in contrast with sensitive)

✦ **Active experimentation (AE)**

active (in contrast with reserved)

participation (in contrast with observation)

acting (in contrast with reflecting)

perform (in contrast with examine)

operative (in contrast with watchful)

produce (in contrast with watch)

involved (in contrast with distant)

doing (in contrast with watching)

solve (in contrast with reflect)

exercise (in contrast with view)

6.7.3   Construction of items for the instrument

The new instrument is mainly based on the Kolb Learning Style Inventory and especially the Marshall and Merritt Learning Style Questionnaire. Both these latter instruments are based on the Kolb model of experiential learning. Adaptations were made to the two instruments where problems were identified with the validity and reliability of these instruments. The items of the new learning style instrument were formulated in such a way that they accommodate the diverse linguistic needs of a learner population with a variety of first languages. In other words, careful attention was given to the level of English in order to make the items understandable for a person with a first language other than English (see section 2.3.2.1).

The new Instrument is based on the factor and content analysis of especially the Marshall and Merritt Learning Style Questionnaire (see section 6.4.2). The statistical technique, called factor analysis, groups variables that describe a component, to enable the researcher to validate the hypothetical assumptions underlying the existence and importance of the components (in this case learning styles). A factor analysis identifies groupings of variables that are highly correlated with one another (Babbie & Mouton 2001:472; Neuman 2000:502).

A thorough theoretical analysis of the items used in the Marshall and Merritt Learning Style Questionnaire was done. The results of a previous research study were also used to ensure that all items were analysed thoroughly (Van Rensburg 1995:142). The nine items that had a factor loading lower than 0.20 during the factor analysis of the previous research study (Van Rensburg 1995:140-142) were again evaluated theoretically and found to be descriptive of the factors in a specific learning mode. Because the new instrument contains full sentence statements which make the items clearer, these nine items were included in the new instrument as well. This meant that all 40 items

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of the Marshall and Merritt learning Style Questionnaire were found valid to use in the new learning style instrument.

The new instrument consists of 40 sentence items, written in simple and understandable language, using opposites on the two dimensions of the Kolb model of experiential learning to explain the items. As a result, the instrument contains 40 items that measure an individual's relative preference for each of the four learning modes in the Kolb model of experiential learning (concrete experience, reflective observation, abstract conceptualisation, active experimentation) (see section 3.5.2.1).

6.8 LEARNING STYLE ASSESSMENT TOOL

The new learning style instrument is known as the *Learning Style Assessment Tool*. The construction of the instrument was based on a factor and content analysis. The *Learning Style Assessment Tool* is a comprehensive self-assessment instrument for the identification of how individuals prefer to learn. The final instrument is contained in annexure A.

The instrument contains 40 items. For each item the user must agree to what extent the item describes his or her learning characteristics and preferences. There cannot be a correct or incorrect response. All the responses are equally acceptable. The aim of the instrument is to describe how an individual prefers to learn, not to evaluate learning abilities. It therefore explains how information is processed. Individual learning styles determine the responses and place the user in one of the learning styles identified by the Kolb model of experiential learning.

Instructions are given as to how to use and analyse the new instrument. Accompanying guidelines for the interpretation of the results enable the user to identify his or her strengths and weaknesses (dominant and non-dominant learning characteristics and preferences) with regard to individual learning styles and approaches to the learning environment.

To complete the instrument, the user must complete the items by indicating the level of agreement on how he or she prefers to learn or approach the learning environment, using the numerical values provided to score their preferences. After completion the user obtains a total score for each of the learning modes of the model. The total score for each learning mode is obtained by adding the numerical values assigned to the items in a particular learning mode. For example, the user adds the

numerical values assigned to all the items on the concrete experience mode. This is done with all four the learning modes.

The four totals (scores) represent the user's relative emphasis on the different learning modes of the Kolb model of experiential learning. The concrete experience and abstract conceptualisation modes form the ACCE dimension and the reflective observation and active experimentation modes form the AERO dimension.

Combination scores of the learning modes form the four learning styles identified by Kolb (1984). Combination scores are computed by subtracting the concrete experience score from the abstract conceptualisation score (AC minus CE), and the reflective observation score from the active experimentation score (AE minus RO). The combination scores measure the extent to which an individual emphasises abstractness over concreteness (ACCE), and the extent to which an individual emphasises action over reflection (AERO) in learning. Using the combination scores, the instrument delineates four different types of learners. The *diverger* who relies upon concrete experience and reflective observation, the *assimilator* who relies on reflective observation and abstract conceptualisation, the *converger* who relies on abstract conceptualisation and active experimentation, and the *accommodator* who relies on active experimentation and concrete experience.

The *Learning Style Assessment Tool* has three sections, namely a section that contains the response continuum, a section that explains the scoring procedures, and the section that identifies and explains the different learning styles.

6.8.1 Response continuum

The response continuum is contained in Section A of the instrument, and consists of the 40 items. Of these 40 items ten are associated per learning mode of the Kolb model of experiential learning. The items listed below are associated with the specific learning modes. The numbers of the items as they appear in the instrument are indicated after each item.

An important aspect to note is that those items that were changed after the evaluation of the instrument (phase 4 of the research) were marked with an asterix (*). The corrected version of an item as it appears in the instrument (the final instrument) was placed in brackets directly below the

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initial item.

Items associated with each of the learning modes are:

✦   **Concrete experience (CE)**

spontaneous (in contrast with questioning)

• I prefer to make a decision spontaneously rather than first questioning the situation or problem. (Item 1)

sensing (in contrast with thinking)

• I can apprehend in advance when I have to make a decision and do not have to think a problem over. (Item 5)

premonition (in contrast with reason)

• I will rather react on intuition than think it over logically. (Item 9)*
  (When I have to solve a problem, I rather react on intuition than think it over logically.)

perceptual (in contrast with intellectual)

• I interpret information on intuition and not by using intellectual reasoning. (Item 13)

emotional (in contrast with rational)

• My decisions are determined by emotion rather than using logical thinking. (Item 17)

impulsive (in contrast with planning)

• My actions are spontaneous and sudden, and I do not plan them ahead. (Item 21)

feeling (in contrast with thinking)

• I prefer to feel that something is correct and not instead of make a decision on intelligent thoughts. (Item 25)*
  (I prefer to feel that an answer is correct and not make a decision based on intelligent thoughts.)

intuitive (in contrast with reasoning)

- I gain knowledge through instinct rather than drawing logical conclusions from facts. (Item 29)

perception (in contrast with reason)

- I use insight to gain knowledge rather than thinking logically about it. (Item 33)*

  (I use insight to select an answer rather than thinking the answer over logically.)

hunch (in contrast with logical)

- If I have a suspicion that an answer is correct, I will choose that answer, instead of being sensible and finding the logical answer. (Item 37)*

  (I will choose an answer based on a suspicion that it is correct, and not because it is the logical choice.)

✦ **Reflective observation (RO)**

observation (in contrast with participation)

- I prefer to observe when an activity is done rather than participating in the activity. (Item 2)

reserved (in contrast with demonstrative)

- I am cautious and formal when I am part of a group rather than expressing my feelings easily. (Item 6)

watching (in contrast with acting)

- I will observe an activity closely rather than being involved in performing the action. (Item 10)

observing (in contrast with doing)

- I will rather watch how someone demonstrates an activity than doing it myself. (Item 14)

witness (in contrast with exhibit)

- When a procedure is demonstrated I prefer to be the bystander and not the one demonstrating it. (Item 18)

ponder (in contrast with do)

- I will think something over very carefully instead of just doing it. (Item 22)

passive (in contrast with active)

- I do not want to participate in an activity, unlike other people who always want to do the activity. (Item 26)

view (in contrast with execute)

- I prefer to watch while others complete the task. (Item 30)

reflecting (in contrast with performing)

- I prefer to discuss the steps of a procedure rather than doing the procedure myself. (Item 34)

reflective (in contrast with productive)

- It is better to mediate a problem instead of producing a solution to the problem immediately. (Item 38)

✦ **Abstract conceptualisation (AC)**

deliberative (in contrast with reason)

- I will give careful thought to a decision rather than making a logical decision. (Item 3)

consider (in contrast with impulsive)

- I will consider an answer first and will not give an impulsive answer. (Item 7)

reason (in contrast with hunch)

- I will choose the logical explanation to a problem instead of making my choice based on a hunch that the explanation will be correct. (Item 11)

analytical (in contrast with emotional)

- My decisions are based on a thorough investigation of possible answers rather than letting my emotions influence my thinking. (Item 15)

careful (in contrast with emotional)

- When I perform a task I am very cautious and exact, and will not let my emotions influence me. (Item 19)

logical (in contrast with sentimental)

- While working on a problem I am capable of keeping a clear mind, and am not easily influenced by sentimental feelings. (Item 23)

thinking (in contrast with instinctive)

- When I have to make a decision I think a problem over, and do not act on instinct. (Item 27)

resolving (in contrast with feeling)

- When I select an answer I prefer to make a firm decision rather than relying on my feelings that the answer is correct. (Item 31)

intellectual (in contrast with emotional)

- When I write a report I think it through academically and do not let my emotions influence my thoughts. (Item 35)

evaluative (in contrast with sensitive)

- When I select an answer I first judge all the answers to ascertain the value of each one, and am not affected by external influences. (Item 39)

✦ **Active experimentation (AE)**

active (in contrast with reserved)

- I prefer to participate actively in a task rather than remain in the background to observe. (Item 4)

participation (in contrast with observation)

- When I am part of a group that has to perform a procedure, I want to participate and not be the one who has to observe the procedure. (Item 8)

acting (in contrast with reflecting)

- I want to do the experiment while somebody else has to give feedback on the experiment afterwards. (Item 12)

perform (in contrast with examine)

- I will complete an assignment rather than examining the completed assignment. (Item 16)

operative (in contrast with watchful)

- I prefer to make decisions rather than closely observing somebody else making them. (Item 20)

produce (in contrast with watch)

- I will produce a plan rather than watching over someone else doing it. (Item 24)

involved (in contrast with distant)

- When decisions are made while working on a project, I want to be part of it and not remain at a distance. (Item 28)

doing (in contrast with watching)

- I prefer to write a report rather than overseeing it being done. (Item 32)

solve (in contrast with reflect)

- I will find the explanation for a solution, while another person deliberates it/thinks it over. (Item 36)

exercise (in contrast with view)

- When a new procedure is developed, I prefer to practise using it rather than observe and give my opinion on it. (Item 40)

6.8.2   Scoring procedures

The *Learning Style Assessment Tool* is a self-assessment instrument. The scoring procedures are included in the instrument as Section B. The instrument contains four learning modes. There are ten

items associated with each learning mode. The user then has to enter each score obtained for each item in the space provided on the scoring grid. The scores for each learning mode are obtained by adding the numerical values assigned to the items in a particular learning mode. For example, the user adds the numerical values assigned to all the items on the concrete experience learning mode. This is done with all four the learning modes. Four scores are obtained for the four learning modes of the Kolb model of experiential learning. A combination of these learning modes form the four learning styles identified by Kolb (1984). To obtain the scores for the two dimensions (ACCE and AERO), the score for the abstract conceptualisation learning mode is deducted from the score obtained for the concrete experience learning mode, and the score for the active experimentation learning mode is deducted from the score obtained for the reflective observation learning mode.

6.8.3   Identification of learning styles

In Section C of the *Learning Style Assessment Tool* the user plots the scores obtained for the two dimensions (ACCE and AERO) on the diagram that is provided. The two scores are joined by drawing two straight lines that form a 90 degree angle. The lines will join in one of the four quadrants of the Kolb model of experiential learning. This point where the lines meet will identify the learning style as either a convergent, a divergent, an accommodative, or an assimilative learning style.

This section of the instrument includes an explanation of the learning characteristics and preferences of each learning style. The explanation is based on the theoretical analysis in phase 1 of the research (see sections 3.5.2.1; 5.10.3 and 5.12.1). Information includes how the user (learner) prefers to learn, approaches the learning environment, and what type of learner he or she is. Based on these learning characteristics and preferences, the learner and educator can plan the educational environment, build on the strengths (dominant characteristics and preferences) of the learner, and develop the weaknesses (less dominant characteristics and preferences) of the learner. A situation of "learning how to learn" is created, and the learner is empowered with self-knowledge.

6.9   CONCLUSION

Like any assessment, learning style assessment is useful to various degrees depending upon the specific instrument chosen. More importantly, its effectiveness is determined by exactly who uses

it, for what purpose, and how much they practice with the instrument they use. The *Learning Style Assessment Tool* was constructed to serve as a supplement to the profession of an educator as well as a medium to support the learner in the learning process. Acknowledgment of individual differences in the learning process is supported by the ability to assess these individual differences. This ultimately contributes to learning style promotion in higher education.

In this chapter the process of constructing a new learning style instrument was discussed. The need and importance, as well as the advantages and disadvantages, of a new instrument were discussed. An analysis of existing learning style instruments was done. The structure and scoring procedures of the new instrument, the *Learning Style Assessment Tool*, were explained.

The following chapter deals with phase 3 of the research during which the conceptual model for learning style promotion in higher education was developed.

CHAPTER 7

A MODEL FOR LEARNING STYLE PROMOTION IN HIGHER EDUCATION

7.1 INTRODUCTION

The aim of the research was to present an analysis of the concept "learning style", and to construct a learning style instrument and a conceptual model that address the implications of the concept for higher education. In this chapter the inclusive aim of this research is actualised by the construction of the model that promotes learning styles in higher education. The purpose of the model is to provide an organised frame of reference that guides all aspects of the learning process and provides for systematic education as well.

The construction of the model arose from this research after an analysis of the literature on the phenomena of interest had been undertaken. The model is based on assumptions derived from the analysis of the literature. The model evolved from inductive and deductive reasoning. During the inductive reasoning stage the phenomena of interest were analysed to determine relevant concepts and to explore the phenomena. During the deductive reasoning phase, the researcher, in an attempt to ascertain a comprehensive presentation of the phenomena of interest, synthesised the information that had been gathered. An instrument was developed to serve as a tool to implement and realise the inclusive aim of the research. The model for learning style promotion in higher education is the formal presentation of the researcher's representation of accommodating learning styles in the learning process.

Most educators are familiar with the educational process. Most concepts in the model are not new to educators, and the concepts emphasise the importance of the learner in the learning process. The model is applicable to all areas of higher education, including health sciences education.

Educators who are willing to implement the model in higher education have already reached an understanding of the importance of individuality among both learners and educators. To gain a deeper understanding of the phenomena integrated in the model, educators need to engage in reading about learning styles. This research report (thesis) will enable them to identify learning styles, and should contribute to the level of understanding of this concept.

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7.2   MODEL

A model is a representation of a structure or a certain pattern (McLeod 1986a:544). Chinn and Kramer (1995:75, 216) define a model as a symbolic representation of perceptual phenomena in words, numbers, letters or geometric forms. Bigge (1980:9) describes a model as a simplified depiction of what a researcher thinks certain aspects of reality may be like. Burns and Grove (1993:171) describe the visual presentation of concepts as a logical structure of research findings. In the context of this research, a model represents concepts which are presented in words. Such conceptual models are usually in graphic form and attempt to represent abstract concepts such as learning (Quinn 1995:312). Conceptual models are a systematic construction of ideas. They can neither be proved nor disproved, and are no more than possible assertions (Bigge 1980:9).

Models organise and integrate information (Slavin 1991:170). Models provide a sense of understanding as to how theoretical relationships develop and are useful in illustrating these relationships. Models can be presented as part of a theory or be constructed to illustrate connections between theories (Chinn & Kramer 1995:76, 216). Theories, on the other hand, involve the introduction of unobservable phenomena into explanations and become an important way of explaining the nature of concepts (Quinn 1995:308). Chinn and Kramer (1995:72) define theory as "a creative and rigorous structuring of ideas that project a tentative, purposeful, and systematic view of phenomena". Models are symbolic representations of highly abstract concepts and relationships. Theories, on the other hand, involve more specific concepts and their nature.

According to Bigge (1982:231-232), a model enables people to predict, interpolate, and extrapolate further knowledge. To interpolate one changes position through the application of new knowledge, and to extrapolate is to go beyond the information that is given. A model also enables the user to make predictions about what comes next by matching what is presently being experienced. Therefore, models, in essence, are expectancies, which motivate one to go far beyond the information which is given and not simply deal with what is in front of one. De Vos et al (1998:12) describe model construction as a process of "scientific endeavour" and "scientific revolution". Thus, the development of a conceptual model directs the researcher to decide which variables are most important, which relationships are likely to be most meaningful, and consequently what information should be collected and analysed.

The thinking processes that preceded the construction of the model in this research included analysing, defining, sorting, classifying, patterning and relationship-seeking. The construction of this model forced the researcher to reason both inductively and deductively about learning styles, learning in higher education, the educational importance of learning styles, and the assessment of learning styles. The reasoning was necessary in order to identify important concepts, draw meaningful relationships between these concepts, and to develop a means to assess learning styles. This model should lead the user to go far beyond merely educating learners, and instead take a deeper look at the individuals within the educational environment.

7.3   BACKGROUND TO THE MODEL

A conceptual model "represents reality and can be used as a guide in planning for educational experiences in adults" (Langenbach 1988:2). Although the concepts are abstract, they have their virtues and stimulate imagination beyond the bounds of traditional reality. Abstract concepts require increasing maturity (Woolever & Scott 1988:334). It is from the abstract domain that we derive a methodological soundness that stimulates creative and significant ideas, which brings conceptual coherence to science.

7.3.1   Aim of the model

The aim of the model is to promote learning styles in higher education that will enable learners and educators to be aware of and accommodate individual differences within the learning process in any learning environment for higher education. Learning styles are important for education as they are the education-relevant expressions of the uniqueness of the individual.

7.3.2   Rationale of the model

Every learner is unique. Individuals approach learning or receive and process information differently. A learner and learning cannot be separated. Individual differences in the learning process are expressed in learning styles. Learning styles address the process of data handling, which is the *how* of learning. This process is an individual process of perceiving, thinking, problem-solving and interaction with others. Learning styles remain fairly constant throughout an individual's life and are not amenable to major change.

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It is important that the educator should have knowledge of how individuals learn. The implications of this knowledge are reflected in how educators should teach and facilitate learning. An awareness and understanding that different learner characteristics influence the exchange of information will assist in promoting education and learning experiences. Knowledge of the concept *learning style* is of particular significance in promoting learning and transformational learning experiences (Reilly & Oermann 1992:36). The value of the concept *learning style* is that it is learner-focused, not educator-focused. The educator is merely a secondary focus. Only after the focus is directed towards the learner and learning does emphasis shift to how the educator can use teaching styles to accommodate learner needs.

The learning situation is approached differently by learners. Educators may be aware of this but they nevertheless continue to plan their education and teach an entire group at the same time, in the same way and in the way they as educators prefer to learn (Carroll 1992:117). Learners, however, deserve to be taught in a way that best suits their needs. Educators should recognise, accept and take into account these individual differences.

The failure to take learning styles into consideration can lead to a deterioration in the learning experiences of deeper learning (Mockford & Denton 1998:13). Opportunities for creative thinking can be reduced or even lost. The focus of learning should be not on assessment and achievement of certain goals but on a deep approach to learning. Learners should be allowed the opportunity to explore and be guided through a reflective exploration, with necessary guidelines on what output is required to reach a goal.

Recognition of learner differences and the ability to educate individual learners are important components of successful education. Educators who take into account learners' individual learning styles will be stimulated to introduce knowledge, content and subject matter by using a variety of teaching methods. Each learner's abilities and strengths should be used to enrich a curriculum. Learners who need more support in a specific thinking or information processing skill can be helped to change a weakness or less strong ability into a learning strength.

The aim of education is to promote learning. This requires educators to incorporate diversity into their model or style of teaching. Educators need to be aware of their students' individual learning styles as well as their own so that they can adapt their particular model of teaching to complement

the learner group. It was established that those individuals who were taught through methods that complemented their learning characteristics, which include learning styles, became increasingly motivated and achieved better academically.

An educational institution has a moral obligation to assist learners to obtain the academic skills necessary for success. Learners need to be developed and supported to reach the goal of academic excellence. An academic mission includes a commitment among educators and learners to develop individual potential to the full.

Learning style differences result in learners' having preferences for and achieving through selected educational methods. Each educational institution has a philosophy about how students learn and educators teach. Awareness of learning styles within the model of education as applied to curriculum and teaching style can help promote understanding and enhance learners' attitude towards and performance in the learning environment. Educators need to recognise their responsibility to a diverse learner corps. They must be aware of their own strengths and weaknesses within the context of learning styles to be able to recognise the existence of differentiation in learning styles.

There is a definite need for the implementation of learning style research in higher education. The implementation can be guided by a systematic presentation of important concepts. A conceptual model will provide a schematic, visual presentation of the abstract concepts which are presented in words. A sound cognitive basis is necessary for the application of the results in higher education. This information and implementation have implications for the process of education and learning.

The cognitive basis that guides higher education, includes the following:

- Learner individuality expressed in learning styles is a reality.
- No learning style is either better or worse than another.
- How individuals learn, is important to the educator.
- The educator's own predominant learning style will influence the teaching-learning process.
- Learning style assessment is important to become more sensitive to learner individuality.
- A critical approach to education is necessary.
- Higher education can be enhanced through the promotion of learning styles.

Higher education has become more open and flexible. Flexibility is emphasised, new demands are placed on learners' appreciation of reality, their knowledge accessing modes and expected measures of accountability. This also implies a flexibility in terms of thinking. Learners have to be supported, educated, and given the opportunity to match their thinking to the complexity of the learning task or process. Furthermore, there is an increasing commitment to accountability with regard to the success of higher education programmes, including nursing education programmes (Warrener 1998:24). Learning style analysis contributes to higher education in that it develops learners' awareness of their own learning styles, permits some flexibility in instructional procedures, and gradually improves resources for different learners. Learners will benefit by utilising an instrument to identify learner-specific characteristics and preferences. Learner-specific education is the individual's awareness of unique learning styles and needs. Learning style awareness and accommodation is necessary to prepare a systematic, tailored, education plan that best addresses the individual's needs.

7.4   THEORETICAL ASSUMPTIONS FOR THE MODEL

The *model for learning style promotion in higher education* is based on the Kolb model of experiential learning, theories of learning and recognition of individuality in the learning process. Through inductive and deductive reasoning, the following theoretical assumptions are accepted and stated for this model:

- Learning styles are a recognition of individuality.

- The process of perceiving and organising information and learning experiences is unique in each individual.

- Learning styles are attributes, characteristics, and qualities of individuals that interact with instructional circumstances in such a way as to produce differential learning achievements.

- Learning styles remain relatively stable, and therefore interventions in the educational or professional environment focus on adaptations rather than learning style changes.

- Individuals cannot be categorised into specific learning styles according to their academic disciplines or professions.

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- No one learning style can be regarded as correct or better than another, therefore one learning style cannot be valued more highly than another.

- The determinants that play a role in the recognition of individuality in the learning process include theories and models of learning styles, theories of learning, teaching styles, instructional modes, the learning environment, and learning style assessment.

- Higher education provides a learning environment that creates an opportunity to advance, develop and enrich learners, both intellectually and in society, with the emphasis on learning and on outcomes.

- Health sciences education takes place in the context of higher education, and prepares learners to function independently.

- Knowledge of learning styles provides a potentially powerful basis for educational guidance.

- Learning is an active process, entails absorbing, discovering and constructing meaning, and is a lifelong, cyclic experience which takes place through thinking, feeling, perceiving and behaving.

- Learning encompasses individual preferences for a grasping dimension of concrete understanding versus abstract understanding, and a processing dimension of being actively involved versus reflecting over something.

- Learning includes reflection that includes an act of thinking about what one has learned as well as how one learns and approaches the learning environment and learning content.

- Theories of learning that focus on individual differences of learners improve learning.

- Although the educators of adult learners teach, instruct and educate, their aim is rather to facilitate learning.

- Adult learners are unique, motivated and independent learners who want to apply what they learn as soon as possible, know detail, participate actively, use life experiences, and want to be regarded as individuals with their own characteristics.

- In higher education there is an awareness of individual differences in learners (including their individual learning styles), the context of learning, and the short and long term outcomes of learning, that develops the capacity for metacognition. Metacognition enables learners to analyse their own learning processes to determine the learning approaches for each task, promoting quality learning.

- Intrinsic and extrinsic motivation must be present in the learning process to reach an optimal level of academic achievement.

- Learners must be guided to learn effectively.

- The learning environment is an environment that is characterised by valuing learning, exhibiting a caring relationship with all concerned, providing freedom for individual differences, and fostering the development of individuals to independent learners with new patterns of thinking, feeling and doing.

- Knowledge of learning styles is necessary to facilitate learning in higher education and contributes to quality improvement in higher education.

- The acknowledgment and promotion of learning styles in higher education contributes to effective and quality learning, and ultimately to academic achievement.

- Differences in the learning process lead to qualitative differences in the level of learning.

- The educator contributes to the quality of learning.

- All educators have an individual style of teaching which is influenced by their learning styles.

- Higher education functions interdependently with the professional environment, and is concerned with how individuals are best prepared for a particular profession by designing and managing learning to meet specific needs.

- Knowledge of learning styles in the construction of teams has organisational and managerial value.

- Learning styles are teachable through repetitive experiences in a particular learning style and through theoretical knowledge of learning style theories.

- Learning styles are measurable and must be assessed to be of value in higher education.

7.5 DESCRIPTION OF THE MODEL

The *model for learning style promotion in higher education* is described in its entirety which encompasses contextuality, visual presentation, concepts and interrelationships. The model is the final synthesis of the research findings. The interpretation of the findings led to a logical structure of meaning that is depicted visually.

7.5.1 Context of the model

The context of this model is higher education. The model can thus be implemented in any higher education situation, including health sciences education, where adult learners are being prepared for the professional environment. Furthermore, the model can be implemented in any educational situation in the professional environment, where learning takes place.

7.5.2 Structure of the model

The structure of the model refers to the arrangement of the concepts in that it gives overall form to the conceptual relationships within it, and represents the researcher's perception of the realisation of *learning style promotion in higher education*, the required conditions, the methods and outcomes. The visual presentation of the model improves insight into and understanding of how concepts are organised, how they are interrelated, and how the structure flows from the relationships between the

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concepts.

7.5.2.1 Visual presentation

The *model for learning style promotion in higher education* is presented visually. The central focus of the model is individuality, expressed in learning styles, which, within the learning environment, enables the adult learner to function independently. The visual presentation illustrates the conceptual relationships within the model. The structures used to indicate meanings, positions and interrelationships between concepts include circles, triangles, rectangles and eclipses. Arrows indicate a continuous process and imply continuous movement and change brought about by the learning process. The relationship between the role players, namely learners and educators, is also illustrated by an arrow. Arrows further imply that learning never comes to an end, because one's need for knowledge, development and experience continues to expand. The circles illustrate an ongoing process and the inclusion of different variables that show coherence. Circles and arrows also illustrate the experiential learning cycle, as depicted in the Kolb model of experiential learning, which forms the theoretical framework of this research. The role players are represented by triangles, which indicate the interrelationships between important concepts, including the main concept of this research. Rectangles have been used to explain different levels of a concept. An eclipse has been used to represent the integration of the main concepts as part of higher education. The colours used in the visual presentation of the model were carefully selected to illustrate relationships between concepts by using specific colours for specific concepts.

The visual presentation of the concepts and conceptual relationships further validates the meaning of the concepts and helps to minimise any bias inherent in the user's views of meanings between concepts (Chinn & Kramer 1995:86). The visual presentation thus further clarifies the concepts and their interrelationships.

The structure of the model is divided into the goal (learning style promotion), process (learning process), role players (learner and educator), context (educational environment for higher education) and dynamics (environment) of the model. These parts formed a conceptual framework from which the conceptual model evolved. The major and related concepts are included in the different parts of the model. Owing to the high level of interrelationships between the major and related concepts, the model should be visualised as multidimensional.

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7.5.2.2 *Major and related concepts*

The structure of the model contains the working definitions for, and discussion of, the main concepts of the model. Furthermore, the working definitions of the related concepts are integrated into the discussion of the model. The theoretical analysis (chapters 3, 4 and 5) and the construction of a learning style instrument (chapter 6) resulted in the selection of the following concepts as underlying the phenomena of the *model for learning style promotion in higher education*.

The following major concepts form the central concepts underlying this model, namely:

- individual learning styles
- learner
- educational environment for higher education

The following related concepts were identified and presented, namely:

- learning style assessment
- learning environment
- learning process
- educator
- teaching style
- motivation
- academic achievement
- approaches to learning
- dimensions of learning
- metacognition
- meaningful learning
- learning theories

The working definitions and descriptions of the above-mentioned concepts which make up the structure of the model are discussed and graphically presented in the following section.

7.5.3 Explanation of the concepts and relationships

The model utilises three components, namely the learner, the setting and the concept. For the purpose of this research the learner will be the adult learner; the setting will be a place for higher education (wherever the model is applied) and the concept is the knowledge base of learning styles. The conceptual model will accommodate individual differences within the learning process in higher education.

The outcome of the relationships between the different concepts is effective learning. Although the outcome is not visually presented as a part in the conceptual model, it forms a strong interrelationship with all the parts that led to the construction of the model.

7.5.3.1 Goal: Learning style promotion

A goal refers to the aim towards which an endeavour is directed (McLeod 1986a:361). The goal of this model is learning style promotion in higher education. Reaching this goal will result in effective and quality learning by maximising the learning potential of learners, promoting metacognition, increasing the level of motivation in learners and educators, developing and utilising educators to their full potential, creating a conducive learning environment within a flexible educational environment, and will ultimately bring about academic achievement. To reach this goal individuality in the learning process, expressed in learning styles, must be identified. This awareness inevitably also requires a means to assess learning styles. Before learning styles can be assessed, a sound knowledge of what learning styles are is necessary.

In addition, knowledge of learning styles is of little or no value if the assessment of these individual differences is not possible. Therefore, knowledge of learning styles and learning style assessment are equally important in reaching the goal of learning style promotion.

- **Learning styles** are defined in various different ways. It is a comprehensive term, referring to the internal organisation and perception of information, as well as to external factors influencing learning, such as socialisation and training within professional environments. Learning styles are described as attributes, characteristics, and qualities of individuals that interact with instructional circumstances in such a way as to produce differential learning

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achievements.

Learners are categorised in terms of the educational conditions under which they are most likely to learn and the amount of structure they require for learning to occur. The concept of learning style encompasses sensory partiality, perceptual preferences and the environmental factors that are most conducive to learning. A clear explanation of what a specific learning style entails will then depend upon the learning style model that is adopted (see sections 3.3 and 3.4).

In this research the Kolb model of experiential learning was adopted to classify and describe learning styles. The **Kolb learning style model** that emanates from the Kolb model of experiential learning, identifies four different learning styles, namely the divergent, the assimilative, the convergent and the accommodative learning styles (Kolb 1984).

The **experiential learning cycle** has four different learning modes (also referred to as learning abilities), which are required by the four-stage cycle. The learning modes are *concrete experience* (where learning takes place through taking hold of tangible experiences with events), *reflective observation* (where learning takes place by the transformation of experiences through the intellectualisation of information), *abstract conceptualisation* (where learning takes place through the grasping of experiences by reliance on symbolic representation of events), and *active experimentation* (where learning takes place by the transformation of experiences through the behavioural extension of information) (see section 3.5.2.1).

The learner with a **divergent** learning style grasps information through tangible experiences and transforms it through intellectualisation. The dominant learning abilities are concrete experience and reflective observation. Their imaginative abilities and awareness of meaning and values are the great strengths of this learning style. These learners view concrete situations from many perspectives and then organise the many relationships into a meaningful *gestalt*. They therefore adapt rather by observation than action. They perform better in situations where alternative ideas and implications are generated, such as group discussions and brainstorming sessions. They are people-oriented and creative learners (see section 3.5.2.1).

The learner with an **assimilative** learning style processes information through symbolic representation and intellectualisation. The dominant abilities are abstract conceptualisation and reflective observation. Their abilities lie in reasoning inductively and creating theoretical models. These learners assimilate disparate observations into an integrated explanation. They are less focused on people and more concerned with ideas and abstract concepts. Their concern with ideas is more because of their logical soundness and precision, than because of their practical value (see section 3.5.2.1).

The learner with a **convergent** learning style processes information by grasping it through symbolic representation and transforms it through behavioural extension. The dominant learning abilities are abstract conceptualisation and active experimentation. Problem-solving, decision-making and the practical application of ideas are great strengths of this learning style. These learners do best in situations where there is a single correct answer or solution to a question or problem. They organise their knowledge in such a way that it can be focused on specific problems through hypothetical-deductive reasoning, logical and analytical thinking, with a narrow focus on practical thinking (see section 3.5.2.1).

The learner with an **accommodative** learning style grasps information through tangible experiences and transforms it through behavioural extension. The dominant learning abilities are concrete experience and active experimentation. Performing activities, carrying out tasks and plans and getting involved in new experiences are the great strengths of this learning style. These learners do best when seeking opportunities and taking action and risks. They organise their information by adapting to changing immediate circumstances. Problem-solving is approached in an intuitive trial-and-error manner, while relying on others for information, rather than on their own analytical ability (see section 3.5.2.1).

By supporting preferred ways of learning, the learning process is promoted. The emphasis thus lies on *how* individuals learn and not on what they learn, although both these aspects are important to reach an optimal level of learning. In order to accommodate and promote learning styles in the learning process, they must be assessable.

- **Learning style assessment** focuses on an understanding of similarities and differences in *how* learners approach the learning process. Learning style assessment provides information to

assist in understanding the learning differences in learners. Learning styles are measurable. Assessment of learning styles is just as important in education as understanding and making sense of the theory of individual differences in learning styles.

The use of a learning style instrument can increase satisfaction and improve interactions for learners and educators. Assessment of learning styles offers methods for analysing differences in the learning process, which are important in providing appropriate instruction. The results of learning style assessment are indicators of how learners translate information presented within an educational environment, which could significantly impact on academic achievement.

Perhaps the greatest single advantage in using a learning style instrument is that the educator becomes more aware of each learner as an individual learner. Thus, in order to enhance the quality of learning and education, an instrument to identify learning styles is of vital importance (see section 6.3.1). However, careful consideration must be given to the reasons for assessing learning styles. It is not merely an exercise to identify "interesting" characteristics.

Learning style assessment entails abstract conceptualisation and must be approached in a professional manner. Using a valid and reliable instrument is thus necessary. To adhere to this need, a learning style instrument was constructed to complement the goal of this model (see section 6.8 and annexure A).

Figure 7.1 visually presents the identification and assessment of learning styles within the context of higher education, using the Kolb model of experiential learning.
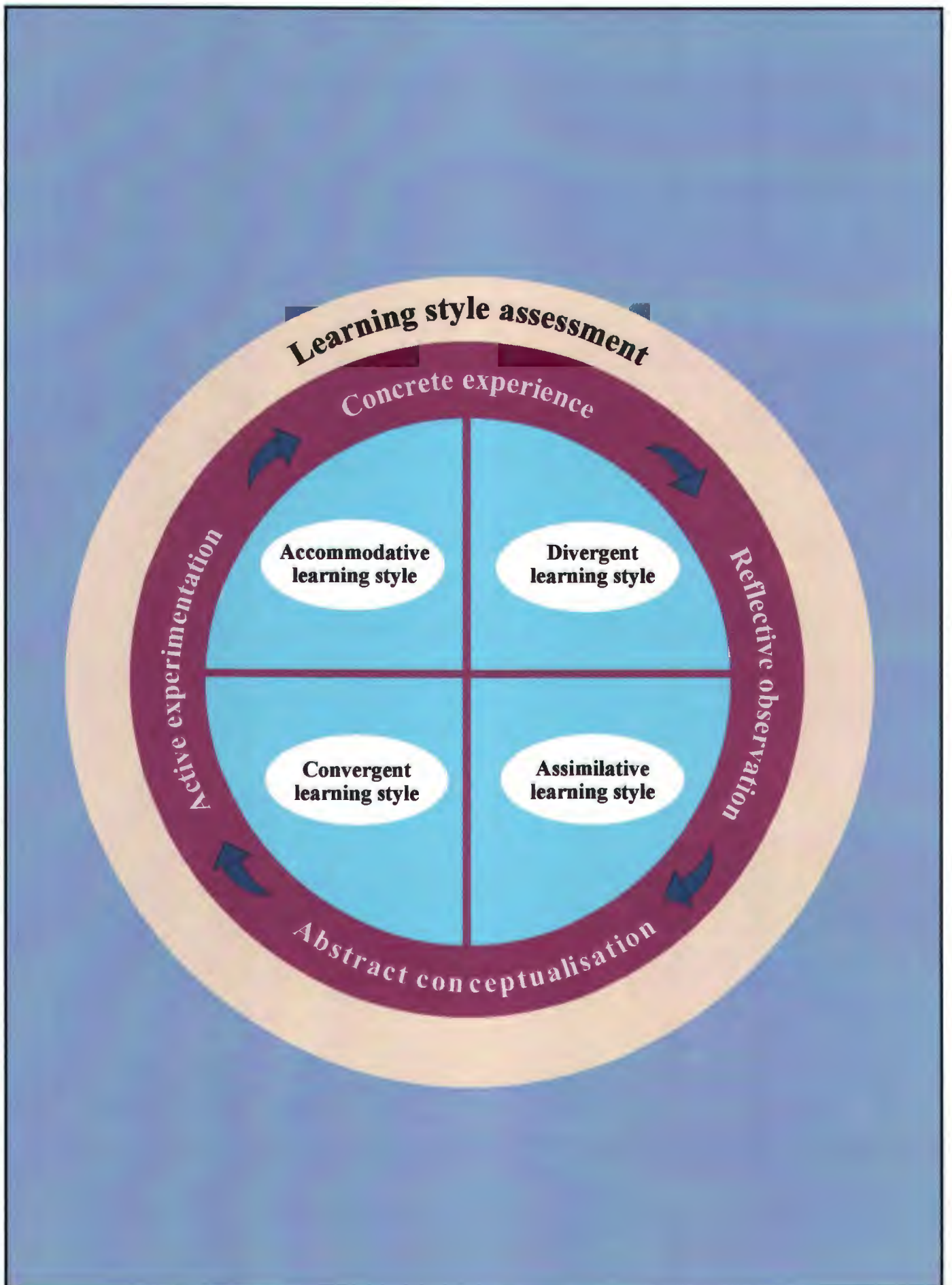
Figure 7.1
Learning style assessment according to the Kolb model of learning styles

7.5.3.2 Process: Learning process

Process refers to a series of actions which produce a change or development. A process is also a method of doing something (McLeod 1986a:673). Learning is a process of interaction between a learner and the environment.

The **learning process** is an active process by which individuals construct their own knowledge based on their existing knowledge and through interaction with information and the world around them. This process entails absorbing and discovering information, constructing meaning, and interpreting newly constructed knowledge. Learning is a lifelong, cyclic experience that serves as a constant modifier of new knowledge through thinking, feeling, perceiving and behaving.

During the learning process **theoretical** objectives and outcomes, and **practical** objectives and outcomes must be met in order for actual learning to take place. The theoretical and practical objectives and outcomes may be reached at the same time as the learning needs of both components may be integrated. The theory component may be addressed using a whole range of **instructional modes**. For the practical component it is recommended that the **experiential learning cycle** is used (see section 4.6.1).

The learning process in higher education needs an eclectic approach to learning and encompasses components of different **learning theories**, namely behaviouristic, cognitive, humanistic, social and phenomenological learning theories and their views regarding the learning process.

The learning process is **behaviouristic** in that it requires skills through repetition, and uses reinforcement to strengthen behaviour or repeat positive behaviour. The behaviour is then rewarded through feedback and by setting objectives and determining the outcomes thereof. The behaviouristic approach to the learning process contributes to the formation of new behaviour through an association between a stimulus and a response in the learning process. The learner is manipulated and governed by the external environment. The learning that occurs, the product of experience, is relatively permanent and changes an individual's behaviour or knowledge (see sections 4.3.2 and 4.4).

The learning process is **cognitive** in that it emphasises how an individual learns and how thinking processes develop. The cognitive learning process demands an active and accountable participant

in learning new knowledge and gaining new skills. The cognitive approach to learning includes concepts of discovery learning, reception learning and conditions for learning. Discovery learning requires active participation of the learner that stimulates and promotes thinking, showing and using insight, and problem-solving. Reception learning is based on existing knowledge, where the learner is given the opportunity to reflect on knowledge, and then selects information on the basis of what is needed in the learning process. Conditions for learning are part of the learning process, because it sets out the relationship between the events of learning and instruction. The relevance of these conditions for learning lies in the fact that the educational processes (instruction) support the learner through the learning process. The learning process is a holistic approach in which perception, speech and action serve as instruments of mental internalisation. The learner is the central element of the learning process. The focus is on what happens to the learner and *how* the learner engages in the learning process and not on the product of education. Learners are the active constructors of learning and the educators the facilitators of the learning process (see sections 4.3.3 and 4.4).

The learning process is **humanistic** in that it is based on the learner's natural need to learn. The learning process is directed by what a learner wants to learn, how he or she wants to go about learning, and when learning should take place. Intrinsic motivation is important in this approach to the learning process. Individuality in the learning process is fostered where both learners and educators are active co-participants in the learning process. Learners move through the learning process by participating actively, being motivated, independent and self-actualised (see section 4.3.4).

The learning process is **social** in that the learner learns vicariously by being exposed to a caring role model. The more positive the experiences of the role models are, the more learning takes place. The learner is thus guided through the learning process by what is observed, through direct experiences and observation. Minimal instruction accompanies the process that takes place. The learning process includes questioning, intuiting, seeing patterns and finding meanings, investigating, strategising and creating; learners are thus freed from prescriptive confines of learning (see section 4.3.5).

The learning process is **phenomenological** in that it is a continuous process. The factors that contribute to making the process successful are the fact that learners want to learn, they learn by doing, they want continuous feedback, and they digest information to make sense of the learning experience and feedback. The learning process recognises the uniqueness of the individual and the

mental capacities that enable a learner to grasp meaning from experiences in a creative way; make choices and decisions based upon thoughtful deliberations; and be the source of one's own responses to events in both the internal and external environment. The learning process is an internal process deriving from behaviour change (see sections 4.3 and 4.4).

The learning process is an **experiential learning cycle** as described by Kolb (1984) and involves a four-stage cycle. The cycle involves four adaptive learning modes, namely concrete experience, reflective observation, abstract conceptualisation and active experimentation. For the learning process to be effective, the learner has to move through the complete cycle. Experiential learning is important in the adult learning process because of its learner-centred and individualistic approach to the learning process. Experiences are used as a foundation for learning, in which experiences are transformed into ideas which can again be used to select and integrate new experiences. The focus is on the learning process. Most learners have a preference for one or more of the adaptive learning modes, which also indicates a preference for a specific type of learning environment. These preferences classify learners into the four different learning style groups identified by Kolb (1984). The learning styles are divergent, assimilative, convergent and accommodative learning styles (see section 4.6).

The learning process is **meaningful** when the thinking processes of the learners are more than just rehearsing, copying or playing a passive role in the educational process. Learners must be motivated and must assume responsibility for their own learning. A meaningful learning process takes learners to a logical conclusion where all three of the domains of learning (cognitive, psychomotor and affective) are affected by recognising similarities and relationships between new information and existing knowledge (see section 4.5).

When learners are aware of the learning process and how they learn, they have reached a level of **metacognition**. These learners are able to plan, execute plans, monitor and evaluate their learning. Metacognition has two main components, which are knowledge of learning and regulation of learning. These components lead to quality learning (see section 4.7).

The learning process stimulates social interaction (as in **collaborative** learning) and creates relationships in which learners are supported to reflect on their own learning. The learning process

furthermore places a responsibility on the learner (as in **cooperative** learning) and develops the learner into an independent learner with a high academic self-esteem. The learning process is further enriched by leaving the learner to take more initiative (as in **individualised** learning) resulting in richer learning opportunities for learners to become self-directed (see sections 4.8, 4.9 and 4.10).

For the learning process to be effective different types of interrelated thinking are necessary. **Effective learning** has five dimensions of learning (see section 4.12.1). Acknowledging and accommodating individual differences in the learning process makes the learning process a more favourable event for the learner.

Finally, the learning process must be managed. This can only be done if the educational process is built on a sound model of the learning process that provides for the individual differences in learners, expressed in learning styles.

The learning process as part of the model is depicted in figure 7.2.
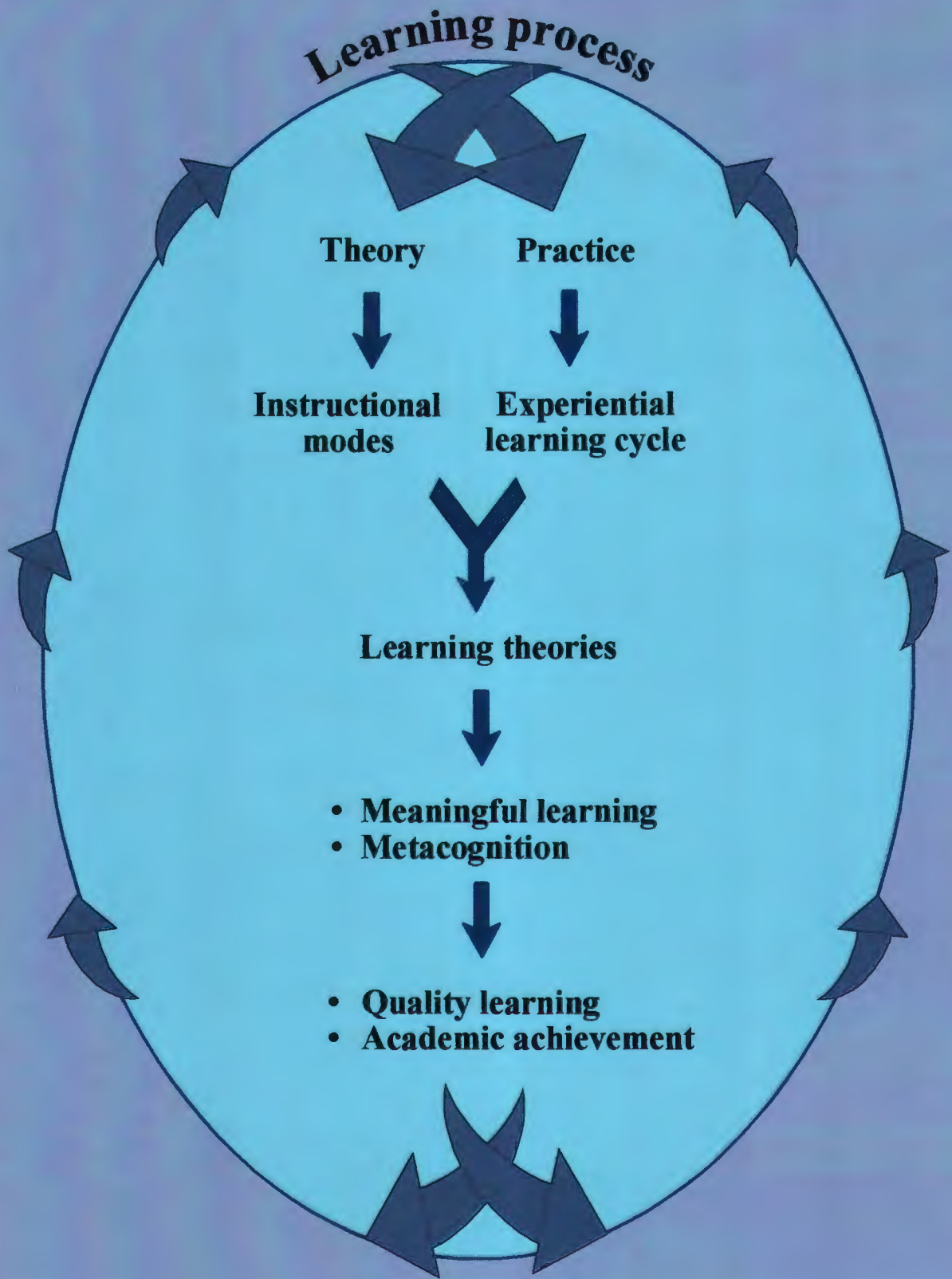
Figure 7.2
Learning process

7.5.3.3 Role players: Learner and educator

The role players in this model refer to the recipient and the agent (Dickhoff, James & Wiedenbach 1968:425). The recipient refers to the learner and the agent refers to the educator.

- The **learner** is the receiver of the activity, namely education. A learner is an individual who is involved in any kind of formal or non-formal education and training. For the purpose of this research the learner is the adult learner in the context of higher education.

  Adult learners have a need to be regarded as individuals with their own characteristics, accumulated experiences, and with specific life roles and tasks. They have a desire and tendency to self-directness, are motivated learners, have a rich resource of experiences for participating in the learning process, have specific learning needs according to which they participate in the learning process, and they apply new knowledge and skills, thus reaching a level of effective learning, and eventually achieving academically (see section 4.3.1).

  Individuality, expressed in **learning styles**, is a reality. Acknowledgment and accommodation of learning styles in the learning process is the main issue concerning this research. Learning styles form an integral part of any learner and must be promoted in higher education so that the eventual result is an independent, self-actualised learner, who engages in deep learning.

  Motivation is vital for success in adult learning. Intrinsic and extrinsic motivation are both necessary in order to reach the ultimate goal of motivation to learn. Intrinsic motivation refers to motivation that is directed at the act of learning, with factors such as interest, needs, curiosity and enjoyments that bring a sense of accomplishment. Self-directed, independent learning is promoted. Extrinsic motivation is not directly related to learning, and is influenced by incentives, punishment, or the way in which the learner wants to please. The learner is more concerned about the gain than the activity itself (see section 4.11).

  Academic achievement demonstrates the ability to complete learning activities and tasks in the learning process, and is a holistic demonstration of cognitive, psychomotor and affective activities. Academic achievement is measurable and observable, and gives an explanation of how individuals gain and retain knowledge in the learning process. Although a preference for

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one learning style or another is not a major factor in academic achievement, the acknowledgment of the existence and the accommodation of different learning styles are, however, part of the comprehensive process to ensure the creation of well-constructed knowledge. Learning style information assists in understanding and enhancing learners' academic achievement in higher education. Acceptance of learning styles as individual differences in learners contributes to the development of the self esteem of a learner, and ultimately to academic achievement (see section 5.4).

The concepts directly related to the learner are illustrated in figure 7.3.

Figure 7.3
Learner

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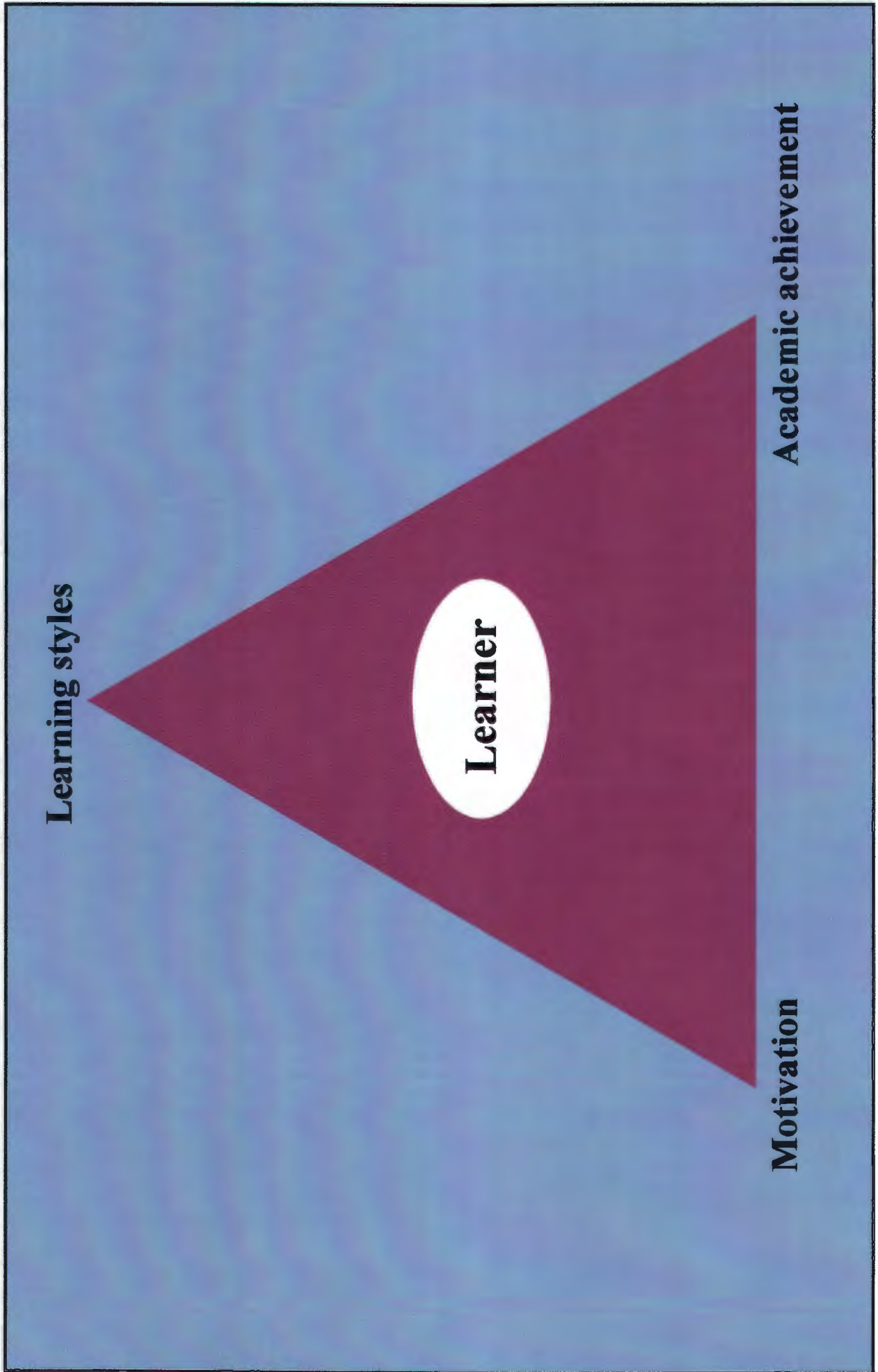
- The **educator** is the agent who performs the activity, namely education. For the purpose of this research education includes teaching, training, instruction and facilitation of learning, with the emphasis on facilitation of learning.

The educator contributes to quality of learning. Ensuring quality learning puts a great responsibility on the educator. Quality learning can only result from proper planning, organising and structuring the educational environment. Various aspects, such as the learning styles of both learners and educators, teaching styles and instructional modes, influence the educational environment. It is important for the educator to know his or her learning style in order to plan and approach the educational process within the educational environment in such a way that it promotes quality learning. Therefore, as individuals, educators have their own **learning styles** which have to be considered in the process of ensuring quality learning (see sections 5.6 and 5.9).

Teaching styles are important in the light of the fact that learners will respond differently to different teaching styles. A teaching style refers to the way in which information is conveyed to the learner. The information is received by the learner in a de-constructed format, after which a constructive process takes place. The term "teaching style" also refers to the way in which educators differ in facilitating learning and presenting learning material to learners. Teaching styles are thus also influenced by individual differences among educators, which implies that teaching styles and learning styles are interrelated (see section 5.7).

Educational instruction is guided by a goal of quality or effective learning. Differences in learning styles and teaching styles are used to create multidimensional educational instruction. Educational instruction refers to teaching methods and teaching strategies, and is influenced by processes of learning such as experiential learning. Furthermore, the levels of skills at which a learner is operating are also important in planning, organising and structuring educational instruction (see section 5.8.1 and table 5.1).

The concepts directly related to the educator are illustrated in figure 7.4.

Figure 7.4
Educator

- The **learner-educator relationship** is directly related to the learning process. The aim of this relationship should be promoting growth and development, improving functioning and activities through support, promoting independence, and accepting individual differences. The learner-educator relationship is that of acknowledgment and mutual respect for individual differences in the learning process. When acknowledging individuality in learning styles in both learner and educator, as well as the relationship between learning style and teaching style, the most successful combination is formed in terms of academic achievement. This combination can either be a match or a deliberate mismatch between the learning styles of learners and educators, or learning styles and teachings styles. What is important though, is that the match or mismatch needs proper planning, organising and structuring of the educational environment to ensure quality learning, education and ultimately academic achievement (see section 5.9).

The interrelationship between the learner and the educator is visually represented by means of arrows. This relationship is characterised by mutual acknowledgment and respect.

7.5.3.4 Context: Educational environment for higher education

A context refers to the circumstances that are relevant to a situation (McLeod 1986a:185). The context of the model is the **educational environment of higher education**. The educational environment of higher education provides a learning environment that creates an opportunity to advance, develop and enrich learners, both intellectually and in society, with the emphasis on learning and on outcomes. The context of higher education ultimately prepares learners to function independently.

The **learning environment** has an impact on the learner, and the learner affects the learning environment. In this learner-to-environment relationship, individual differences, expressed in learning styles, are important as these differences influence the learning process. The learning environment thus influences the approaches to learning. The key elements of the learning environment include structure, analytical ability, responsiveness to affective considerations and responsibility. The need for external structure, responses to provided structure and the ability to create structure where none is provided, can be expected to vary in learners. A critical aspect of higher education is the description of known learning characteristics and preferences of the learners and the attempt to

discover particularly significant characteristics and preferences which can serve as central organising principles for the educator. The role of the educator, then, is to manage the learning environment created by the educational environment of higher education, as the educational environment inevitably plays an important part in how learners learn and ultimately achieve (see section 5.3.2).

The learner-to-environment relationship is visually presented by the eclipse surrounding the environment and the learner (visually presented by a triangle).

The Kolb model of experiential learning identifies four learning environments that are associated with the four learning styles identified by this model. The divergent learning style prefers a learning environment that emphasises concrete experience, the assimilative learning style prefers a learning environment that emphasises reflective observation, the convergent learning style prefers a learning environment that emphasises abstract conceptualisation, and the accommodative learning style prefers a learning environment that emphasises active experimentation. Although the learning styles emphasise specific learning environments, all learners move through all the phases of the experiential learning cycle when learning takes place (see sections 3.5.2.1 and 4.6).

The eclipse used in figure 7.5 to illustrate the context of higher education includes the other concepts in the model, namely the Kolb model of experiential learning, the role players, the learning process, and the approaches and dimensions of learning (the internal environment).

Higher education

Learning environment

Internal environment

Figure 7.5
Educational environment for higher education

7.5.3.5 Dynamics: Environment

Dynamics refer to those forces that produce change in any field or system (McLeod 1986a:265). Dickhoff et al (1968:422) refer to the dynamics in a model as the energy source for the activities that take place. For the purpose of this model dynamics refer to the dynamic nature of the environment that influences learning (the activity), which is both internal and external. Environment is described as surroundings or conditions (McLeod 1986a:283), internal is described as situated in the inside (McLeod 1986a:445), and external as coming or acting from without (McLeod 1986a:298). The environment thus includes surroundings or conditions that come from within and the outside, and that have an effect on learning and the learning process.

- The **internal environment** in this model refers to the inner nature of the individual, especially the internal processes that take place in the learning process (see section 7.5.3.2). The internal processes also refer to learning approaches and the different dimensions of effective learning, developing the learner to an independent learner, eventually leading to metacognition.

  Learning approaches emphasise the relationship between learning intention, the learning process, and learning outcomes in a specific context (Gravett 2001:33). An individual will approach learning in a particular way as a result of the demands or requirements of the learning environment. It is not a permanent characteristic of an individual, but describes a relationship between a learner and a specific learning endeavour. It explains how and with what intention the learner deals with the learning activity or task. Differences in the learning process lead to qualitative differences in the level of learning. Learning styles are also described as clearly identifiable, qualitative distinctions in learning approaches or levels of learning which are classified as deep learning, surface learning and strategic learning (see section 5.5). *Deep learning* is based on high levels of intrinsic motivation, striving for new ideas and materials through a variety of strategies in the search for understanding. Deep learning approaches include critical thinking and reflection. They are characterised by an active search for meaning. *Surface learning* takes place when the learner only puts in the minimal effort to avoid failure. The focus is on the assessment requirements and very limited decision making takes place. *Strategic learning* emphasises the product of learning rather than the process of learning. The focus is on achievement of more success with a strong

element of competition involved. The approaches to learning identify the abilities of learners to approach the learning environment and learning material. Learners' intention of understanding meaning of a concept, and abilities to reason, are identified. Their approaches in terms of predominant motivations and intentions are revealed. This enables the educator to determine the learning experiences and learning process that takes place within the context of styles of learning (see section 5.5).

Dimensions of effective learning are described as the types of thinking that occur during effective learning (see section 4.12.1). Although there is no agreement as to the exact process or sequence of events relative to the learning process, there is agreement as to some basic types of thinking that occur during effective learning. A framework that identifies five dimensions of learning was developed. Although the dimensions are presented in a linear fashion, it in no way implies a linear process, but rather the interrelationship between the five dimensions. **Attitudes and perceptions** of learners and their **habits of mind** form the backdrop of any learning experience. A learner comes to a learning situation with attitudes and perceptions (*dimension 1*) about factors like acceptance, safety and comfort. Negative attitudes and perceptions relative to any of these factors will negatively affect the learning process. Certain attitudes and perceptions will therefore constitute the context within which learning occurs. Correspondingly, a learner must utilise certain positive mental habits, such as sensitivity to feedback and accuracy during an effective learning experience. These mental habits *(dimension 5)*, like attitudes and perceptions, form part of the context of learning. The use, or lack of use of these habits drastically affects the learning process (Marzano 1992:8). Learning is a matter of **acquiring and integrating new knowledge** (*dimension 2*), given the existence of the types of thinking in *dimensions 1* and *5*. New information is incorporated into the existing knowledge base. *Assimilation* takes place. This knowledge, however, changes over time and new knowledge structures are formed that are not only additions to existing knowledge, but new entities with unique distinctions. *Accommodation* occurs. **Extending and refining knowledge** (*dimension 3*) and **using knowledge meaningfully** (*dimension 4*) now play a major role. The shift from assimilation to accommodation is an integrated one involving the types of thinking in *dimensions 2* to *4*, as illustrated by interlocking circles. This shift can be thought of as occurring on something of a continuum, where all the types of thinking in these three dimensions are used. When learners acquire and

integrate knowledge, they also start to extend and refine that knowledge. Extending and refining knowledge is a further aspect of using knowledge meaningfully (Marzano 1992:9).

- The **external environment** is determined by factors outside the individual, and includes the learning environment, instructional modes (see section 5.10), learning activities (see section 5.11) and requirements from the professional environment (see section 5.13). The external environment is furthermore determined by legislation governing higher education (see section 1.10.5).

Higher education should promote and encourage deep learning by using appropriate instructional modes such as problem-solving and project work. This will again encourage independent learning. Although deep, surface and strategic learning approaches are all necessary, learners must be encouraged to strive for a deep understanding of learning material. Understanding approaches to learning contributes to establishing general principles to guide effective education and learning (Entwistle & Tait 1995:100). Together with the acknowledgment of learning styles and the assessment thereof, an analysis of the educational environment serves as a starting point to discover whether the desired approaches to learning are being supported. The general principles derived from this discovery will then allow educators to decide for themselves how they should modify, if necessary, their arrangements in the educational environment to provide a learning environment which supports high-quality learning. Above all, learners must be encouraged to reflect on their own styles of learning, and on which skills and strategies they need to improve their learning and approaches to the learning process.

Figure 7.6 illustrates the environment of the model including the external and internal environment in higher education.

Higher education

Learning approaches

Attitudes and perceptions

Use knowledge meaningfully

Extend and refine

Acquire and integrate knowledge

Habits of mind

Metacognition

Learning environment

Figure 7.6
External and internal environment in higher education

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7.6   CONSTRUCTING THE MODEL FOR LEARNING STYLE PROMOTION IN HIGHER EDUCATION

The complete conceptual model was constructed from the different parts through a process of synthesis. The different parts consist of the goal, process, role players, context and dynamics which are all interrelated, as discussed in the previous sections. The process of synthesis enabled the researcher to combine the major and related concepts and their interrelations into a complex whole. The model, as a complex whole, is aimed at leading the user to a level of deep understanding of individuals within the educational environment of higher education.

Figure 7.7 is a visual presentation of the *model for learning style promotion in higher education.*
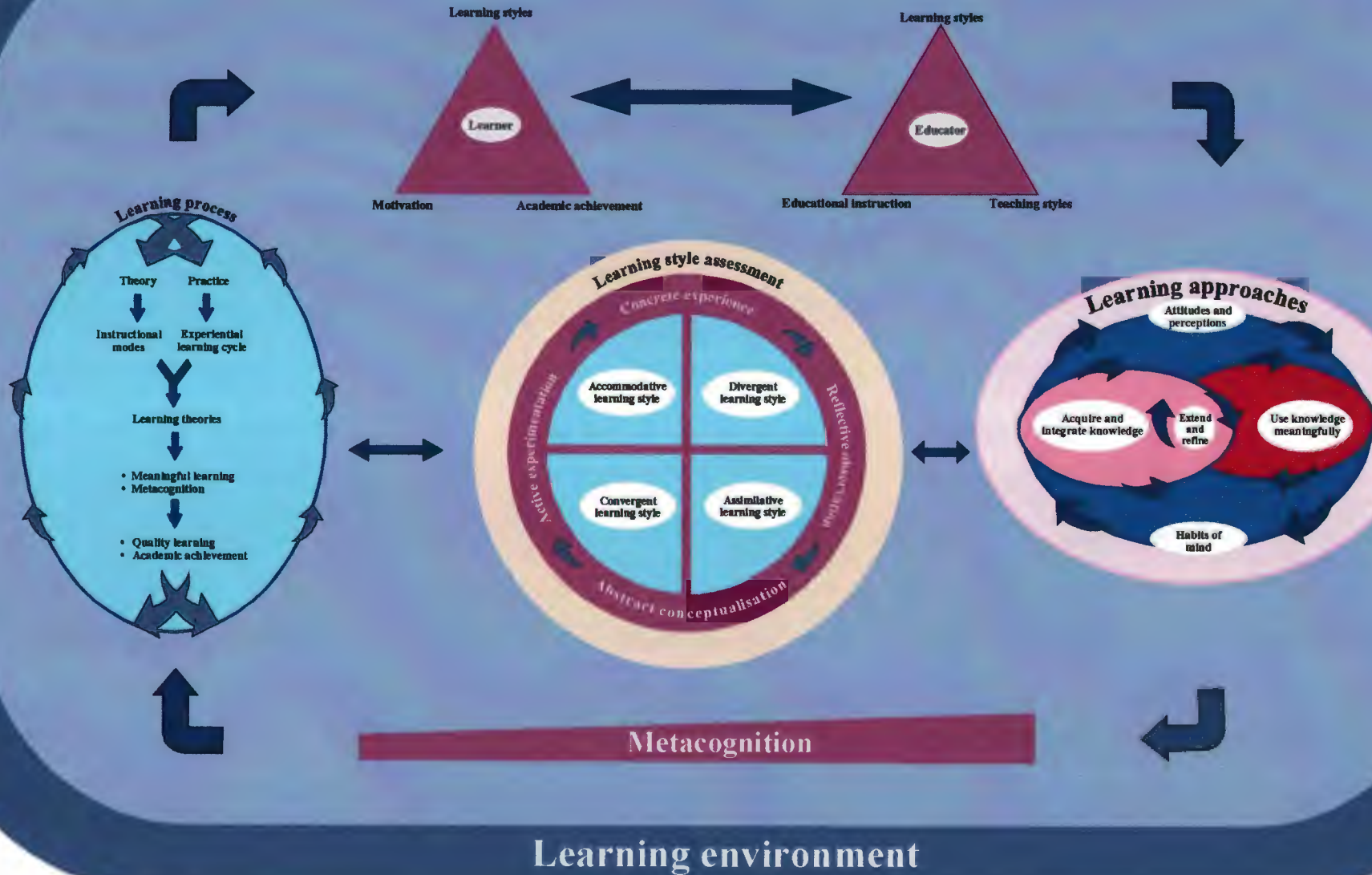
Figure 7.7
A model for learning style promotion in higher education

7.7   CONCLUSION

In this chapter the process of constructing the *model for learning style promotion in higher education* was described. By first explaining the different parts of the model, the process of synthesis was made clearer. The construction of the model completes the third phase of this research.

The *model for learning style promotion in higher education* presents a challenge to all educators in higher education to approach the educational environment with new enthusiasm, more flexibility and impartially. For learners, the model can enable them to understand their individuality in the learning process, guiding them to effective and quality learning, and ultimately to a high level of academic achievement.

Phase 4 of the research, which entails the evaluation of the newly developed learning style instrument and the model, is discussed in chapter 8.

CHAPTER 8

EVALUATION OF THE LEARNING STYLE INSTRUMENT
AND THE CONCEPTUAL MODEL

8.1   INTRODUCTION

Phase 4 of the research encompassed the evaluation of the new learning style instrument and the conceptual model. The present chapter is devoted to the analysis, interpretation and discussion of the responses received by the participants. The purpose of this chapter is to present the information which was obtained from the responses and use this to refine the tool and the model for implementation.

8.2   AIM OF THE EVALUATION

Evaluation refers to the process of judging or assessing the worth of something (McLeod 1986a:290). The aim of the evaluation of the learning style instrument and the conceptual model was to identify gaps, inconsistencies and also the value and potential contributions of the instrument and the model to higher education.

8.3   EVALUATION OF THE LEARNING STYLE INSTRUMENT

Evaluation of an instrument serves the purpose of clarifying the psychometric characteristics (validity and reliability). Validity refers to face, criterion-related, construct and content validity. Reliability refers to stability, representative and equivalence reliability. These aspects were discussed in section 2.3.2.3.

The *Learning Style Assessment Tool* was presented mainly for determining validity as it was not the purpose of this research to determine the reliability of the instrument. The instrument was therefore exposed to different categories of participants for evaluation. The participants consisted of key participants (learners) and general participants (educators, a linguist, a statistician, psychologists). Purposive sampling was used to select the participants (see section 2.3.4.2).

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Although the purpose of the evaluation was not to measure the reliability of the instrument, as reliability tests have to take place over a period of time, in more than one research project, and be compared with results of another reliable instrument, the Cronbach's Alpha coefficient as reliability coefficient was used to estimate the internal consistency of the items on a scale (in this instrument the items were grouped on four scales representing the four learning modes). The Cronbach's Alpha is a widely used reliability index that estimates the internal consistency, which is based on the intercorrelation of all items on a scale when examined simultaneously. The indexes of internal consistency range in value between 0.00 and 1.00 with 1.00 denoting perfect internal consistency and 0.00 no internal consistency. Therefore, the higher the reliability coefficient, the more accurate or internally consistent the measure (Woods & Catanzaro 1988:250). Wilson (1993:155) claims that the Cronbach's Alpha coefficient is the preferred measure of internal consistency because it provides one value for an entire set of data, and is equal in value to the distribution of all possible split-half coefficients associated with a particular set of test data.

8.3.1 Method

Two questionnaires containing both closed-ended and open-ended questions were designed. Questionnaire 1 was designed for the key participants (learners) and questionnaire 2 was designed for the general participants. These two questionnaires only differed on the biographic data, and were both for the purpose of evaluating the instrument (see annexure B).

The questionnaires consisted of two sections. **Section 1** of both the questionnaires contained questions on biographic data. The purpose of this information about the key participants (learners) was to determine the institution where the learners are registered, and their level and field of study. The purpose of this information about the general participants was to determine their profession, the type of institution they are employed at, and their professional role at that institution. The general participants were also asked about their knowledge of the concept *learning style*. **Section 2** of both questionnaires was identical. It contained questions on the structure, content, practical implementation and validity of the instrument. At the end of the questionnaires the participants were granted the opportunity to make any comments they wished to regarding the instrument.

Each participant received a learning style instrument and a questionnaire. A covering letter explaining the purpose of the evaluation of the instrument after it has been used was attached to the

questionnaires. The importance of the participants' contribution to the evaluation of the instrument was emphasised. Special attention was given to ethical aspects such as confidentiality and voluntary participation. The participants were requested to complete the learning style instrument and assess their own learning styles.

Written permission was requested from the educational institution where the group of sixty learners were registered to include these learners in the evaluation phase (see annexure B).

8.3.2 Procedure

The population from which the sample of key participants was drawn was learners at higher education institutions. The population from which the sample of general participants was drawn consisted of professionals known to the researcher from her professional experience as an educator and researcher. A purposive sampling technique was used to select the participants. The researcher used her own judgment to select the participants who had the most characteristic attributes and represented the different categories as indicated in section 2.3.4.1 to evaluate the instrument. Although this is a subjective method of sampling, it was necessary to include both learners and experts to do the evaluation. The general participants (experts) were selected on the basis of their expertise in higher education, research, or their professional expertise (linguist and statistician) and knowledge of learning styles or instrument development.

Participants who were sampled to evaluate the instrument were:

- sixty-five learners at higher education institutions (60 learners were part of one group and five were approached individually)
- six educators in the field of higher education
- one linguist
- two psychologists
- one statistician

The *Learning Style Assessment Tool*, together with the covering letter and either questionnaire 1 or questionnaire 2, were personally handed to the participants.

Seventy-five participants returned the completed questionnaires. The response rate, therefore, was 100%. Apart from receiving the completed questionnaires back, the researcher also engaged in discussions with 73 (97%) of the participants, which included the group of 60 learners, who were approached as a group. The discussion time was very valuable as important information was gathered by allowing participants to ask more questions, which elicited more discussions.

8.3.3 Findings

The data that were gathered consisted of biographic data and data on the instrument. All the participants (75, 100%) completed the first section on the biographic data. The responses to sections two to six differed. It will therefore be noted that the number of participants who completed a specific item differed. Of the 75 participants who completed the questionnaires, not all supplied information for all the items. The number of participants who completed an item was given and percentages were calculated accordingly.

The biographic data that were obtained described the participants in terms of their role in higher education. Of the 75 participants, 65 (87%) were key participants (learners) and 10 (13%) were general participants (experts).

The biographic data that were gathered were discussed separately for the key participants and the general participants.

8.3.3.1 Biographic data of the key participants

The biographic data obtained from the key participants (65, 100%), are discussed below.

The higher education institutions where the learners were registered were as follows:

- 60 (92%) participants were learners at a college.
- 4 (6%) participants were learners at a university.
- 1 (2%) participant was a learner at a technikon.

The fields of study of the participants were as follows:

- 61 (94%) participants were learners in health sciences.
- 3 (4%) participants were learners in psychology.
- 1 (2%) participant was a learner in mathematics education.

The levels of education of the participants were as follows:

- 60 (92%) participants were at second-year level of a diploma course in health sciences.
- 4 (6%) participants were at the undergraduate level of education.
- 1 (2%) participant was a doctoral student.

8.3.3.2 Biographic data of the general participants

The biographic data obtained from the general participants (10, 100%) are discussed below.

The professions of the participants were as follows:

- 6 (60%) participants were educators in the field of higher education.
- 2 (20%) participants were psychologists.
- 1 (10%) participant was a linguist.
- 1 (10%) participant was a statistician.

The types of institution where the participants were employed were as follows:

- 8 (80%) participants were employed at a university.
- 2 (20%) participants were employed at a college.

In the explanation of their professional role, the participants commented as follows:

- 10 (100%) participants were educators in the field of higher education – this means that the psychologists, linguist and statistician were also educators in higher education
- 3 (30%) of the participants were educators in the field of health sciences

- 3 (30%) of the participants were educators in the field of psychology, including the statistician
- 2 (20%) of the participants were educators in general education
- 1 (10%) participant was an educator in linguistics
- 1 (10%) participant was an educator in communication studies

With regard to knowledge of the concept *learning style*, the participants responded as follows:

- 10 (100%) participants indicated that they were familiar with the concept *learning style*
- 8 (80%) of the participants indicated that they had a basic knowledge of the concept
- 1 (10%) participant had done research on the concept and had expert knowledge of the concept
- 1 (10%) participant had been involved in various research projects on the concept, but only had basic knowledge of the concept

Obtaining the biographic data of the participants highlighted the importance of their contribution towards evaluating and finalising the new learning style instrument. All the participants were regarded as important role players in higher education and the process of learning style promotion in higher education.

The items that evaluated the structure, content, practical implementation and validity of the instrument were identical for all the participants (key and general participants). These findings were therefore discussed together.

All the items were analysed statistically. The participants were also granted the opportunity to comment on each of the items in the questionnaire. These comments were analysed qualitatively by grouping the same themes that emerged from the comments.

8.3.3.3 Structure of the Learning Style Assessment Tool

Five items regarding the structure of the instrument were included in the questionnaire. Table 8.1 summarises the statistical analysis of these items.

Table 8.1   Structure of the Learning Style Assessment Tool

ITEMS	Strongly agree		Agree		Neutral		Disagree		Strongly disagree	
	n	%	n	%	n	%	n	%	n	%
2.1 The instructions are clear (n=75)	32	43	33	44	9	12	1	1	0	0
2.2 The items are clear (n=75)	30	40	34	45	9	12	2	3	0	0
2.3 The language used in the items is easily understandable (n=75)	31	41	30	40	12	16	2	3	0	0
2.4 I was able to do the analysis without difficulty (n=75)	26	35	37	49	10	13	2	3	0	0
2.5 The length of the instrument is reasonable (n=75)	37	50	34	45	3	4	1	1	0	0

From the statistical analysis, it is clear that the majority of participants agree or strongly agree that the structure of the instrument is clear, acceptable and understandable.

The comments that were written after the items were completed, however, indicated that the scores were difficult to plot on the diagram. Five participants (7%) commented that it was difficult to understand the instructions on the plotting and 2 (3%) indicated that they had to read the instructions for the plotting very carefully, several times. This concern was again raised during the discussions with the participants, especially with the group of 60 learners. Subsequently, changes were made to the instructions in order to simplify the plotting of the scores on the diagram (see section 8.3.4.1 and annexure A).

8.3.3.4 Content of the Learning Style Assessment Tool

Five items regarding the content of the instrument were included in the questionnaire. Table 8.2 summarises the statistical analysis of these items.

Table 8.2   Content of the Learning Style Assessment Tool

ITEMS		Strongly agree		Agree		Neutral		Disagree		Strongly disagree	
		n	%	n	%	n	%	n	%	n	%
3.1	There is bias towards a specific learning style (n=66)	13	20	6	9	17	26	20	30	10	15
3.2	The choice you have to make in an item is realistic (n=69)	29	42	30	44	9	13	1	1	0	0
3.3	The explanations of the learning preferences and characteristics of the learning styles are clear (n=69)	25	36	32	47	11	16	1	1	0	0
3.4	There are items that you think should not be included in the instrument (n=68)	5	7	4	6	13	19	18	27	28	41
3.5	There are additional items that you think should be included in the instrument (n=64)	3	5	5	8	12	19	17	26	27	42

As the number of participants who responded to the five items differed, the percentages are not reflected in the discussion below. The reader must therefore refer back to the table for the percentages that reflect the various responses.

The results obtained from item 3.1 were inconsistent with the comments made about the item, such as that "all learning styles were "treated equally in the questionnaire". The participants who strongly agreed that there is bias towards a specific learning style also made positive comments that the choices they had to make were realistic. The responses to the other items with regard to the content of the instrument also did not correspond to the responses on item 3.1. From the discussion the researcher had with the group of 60 learners, it became clear that these learners did not understand the meaning of the term "bias". Therefore, the results obtained in this item had to be disregarded.

From the statistical analysis, it is clear that the majority of participants agree or strongly agree that the content of the instrument allows for realistic choices and that it explains the learning preferences and characteristics clearly. Although nine participants agreed and strongly agreed that some of the items should not be included in the instrument, these items were not identified. Those participants who indicated that additional items should be included in the instrument did not write down any

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additional item or items. Three participants did, however, indicate that more items would provide more "insight" or "self-knowledge".

8.3.3.5 *Practical implementation of the Learning Style Assessment Tool*

Six items regarding the practical implementation of the instrument were included in the questionnaire. Table 8.3 summarises the statistical analysis of these items.

As the number of participants who responded to the six items differed, the percentages are not reflected in the discussion after the presentation of the statistical analysis. The reader must therefore refer to the table for the percentages that reflect the various responses.

Table 8.3   Practical implementation of the Learning Style Assessment Tool

ITEMS		Strongly agree		Agree		Neutral		Disagree		Strongly disagree	
		n	%	n	%	n	%	n	%	n	%
4.1	It is important that you know your learning style (n=75)	45	60	25	34	4	5	1	1	0	0
4.2	Knowledge of your learning style will influence the way you approach the learning process (n=75)	37	50	30	40	4	5	3	4	1	1
4.3	The instrument has the potential to be used in higher education (n=75)	41	55	23	31	8	10	2	3	1	1
4.4	The instrument is too difficult to use for someone who does not have knowledge of the concept learning style (n=73)	3	4	13	18	15	21	20	27	22	30
4.5	Knowledge of a group's learning styles will be of value when you work in a group (n=67)	25	37	29	43	5	8	4	6	4	6
4.6	Knowledge of your and your team members' learning styles will be of value when you have to manage a project in future (n=68)	36	53	19	28	8	12	5	7	0	0

From the statistical analysis, it is evident that knowledge of learning styles is important in the learning process. The majority of the participants also strongly agreed or agreed that the instrument has the potential to be used in higher education as well as in group or team work. The statistical analysis of item 4.4 showed that the instrument was evaluated as not being too difficult to use by someone who does not have knowledge of the concept *learning style*.

The comments that were written after the items had been completed were very positive. Ten participants described the use of the instrument as a contribution to knowledge of the self that will contribute to better performance. One of these ten participants indicated, however, that accompanying information on study skills is necessary to implement the learning style information in higher education.

During the discussion with the group of 60 learners, various comments were made regarding the role of the educator in promoting learning style awareness. It was clear that they interpreted the assessment of learning styles as a form of support from the educators. Learning style assessment was also described as being an expression of interest by the educators in the learners as individuals.

8.3.3.6 *Validity of the Learning Style Assessment Tool*

Six items regarding the validity of the instrument were included in the questionnaire. Table 8.4 summarises the statistical analysis of these items.

As the number of participants who responded to the six items differed, the percentages are not reflected in the discussion. The reader must therefore refer to table 8.4 for the percentages that reflect the various responses.

Table 8.4   Validity of the Learning Style Assessment Tool

ITEMS	Strongly agree		Agree		Neutral		Disagree		Strongly disagree	
	n	%	n	%	n	%	n	%	n	%
5.1 The instrument measures learning styles (n=67)	23	35	32	48	10	15	1	1	1	1
5.2 There are a sufficient number of items to clearly explain your learning style (n=68)	16	24	39	57	10	15	3	4	0	0
5.3 The instrument appears to be relevant to measuring learning style (n=68)	20	30	40	59	7	10	1	1	0	0
5.4 The description of your learning style given in section C of the instrument corresponds to your typical learning preferences and characteristics (n=70)	21	30	34	49	13	19	1	1	1	1
5.5 I agree that the descriptions of the other learning styles, as given in section C of the instrument, are less dominant of my learning style (n=70)	15	21	20	29	28	40	6	9	1	1
5.6 I understand what a learning style is (n=67)	36	54	30	45	1	1	0	0	0	0

The validity of the instrument is the extent to which the items adequately reflect the real meaning of the concept *learning style*. Mainly content validity was measured in that the items were directed towards measuring how representative the content of the instrument is of the concept and whether the entire meaning of the concept had been captured. The statistical analysis presented in table 8.4 indicated that the instrument is regarded as being valid as the majority of the responses fell into the "strongly agree" and "agree" category.

Comments, together with the statistical analysis, indicated that participants were very excited about the descriptions of their learning characteristics and preferences as these descriptions were real representations of how they prefer to learn. These comments contributed to the face validity of the instrument. Face validity refers to how others judge and agree on the meaning concerning a particular concept and is described as not technically being a form of validation, since it does not refer to what an instrument actually measures, but rather to what it appears to measure. However, face

validity is an important criterion as it may cause resistance on the part of the users of an instrument, which may in turn adversely affect the results obtained. Therefore, it is important that an instrument should appear to be relevant to the concepts it measures.

8.3.3.7 General comments on the Learning Style Assessment Tool

The participants were granted the opportunity to write any comments that could contribute to the finalisation of the instrument. The comments were analysed qualitatively and grouped into themes. The themes that emerged were study skills, gratitude, support, time and language.

- In one comment a need was expressed that the study skills that are useful for each learning style should accompany the instrument. Further comments indicated that the identification of learning styles should be done before learners enter higher education to prepare them for the learning process by equipping them with the correct study skills.

- The use of the instrument made the participants feel that it was an indication of *caring* by the educator, which elicited a sense of gratitude. The instrument was described as interesting and a way of broadening one's self-knowledge.

- The use of the instrument was described as a form of study support which could contribute to motivation and performance. It was also described as being a tool for support in the practical field where groups and teams work together and are dependent upon one another.

- Comments were made on the time it took the participants to complete the instrument. From these comments it became evident that users of the instrument need between 30 and 35 minutes to complete the whole exercise of assessing their learning styles.

- A concern was expressed that the language used in the instrument was difficult and subsequently a proposal was made that the instrument be translated into Afrikaans.

8.3.3.8 Cronbach's Alpha coefficient

The Cronbach's Alpha coefficient as a reliability coefficient was used to estimate the internal

consistency of the items. Reliability refers to the dependability or consistency of the instrument. It refers to the consistency with which the instrument measures learning styles, and suggests that the same results recur under identical or very similar conditions.

Sixty completed instruments were used to determine the Cronbach's Alpha coefficient on the four learning modes represented by the four learning styles identified by the Kolb learning style model. The results of the statistical analysis are given in table 8.5.

Table 8.5   Cronbach's Alpha coefficient for each of the four learning modes

SCALE: LEARNING MODES	NUMBER OF ITEMS	CRONBACH'S ALPHA
1 Concrete experience	10	0.7408
2 Reflective observation	10	0.6494
3 Abstract conceptualisation	10	0.7444
4 Active experimentation	10	0.5989

Although the number of completed instruments used in the Cronbach's Alpha is fairly small, the results indicated that the instrument has an acceptable level of internal consistency. In the social sciences, a Cronbach's Alpha of 0.6 is regarded as acceptable in measuring internal consistency (Grobler & Myburgh 2001:10). Further tests on larger numbers of completed instruments are however necessary to verify these results.

8.3.3.9 Calculation of scores

The instrument is a self-assessment instrument which requires the user to do mathematical calculations. In order to determine whether the participants were able to do the calculations and whether errors in the calculations caused incorrect results, the scores obtained by the participants were also calculated by computer and then compared to the manually calculated scores. This exercise was done to establish the practically significant differences in scores obtained by participants and computations. According to Van Aardt et al (1993:228), this type of exercise contributes to construct validity.

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To determine if any differences existed in the scores that were obtained by the participants and those scores obtained through computerised calculations, the data of sixty completed instrument's were used. The responses of the participants to each item were captured on computer. Subsequently, the scores were obtained for each of the four learning modes and the two dimensions of the Kolb model of experiential learning. The scores of the participants and those calculated by the computer were compared to determine whether the participants were able to do the calculations and what the level of accuracy was.

Table 8.6 depicts the number of participants who obtained the same score as in the computer scoring procedure.

Table 8.6   Differences between computer and learner scores

SCALE: LEARNING MODES	FREQUENCY	PERCENTAGE (%)
Concrete experience	51	85
Reflective observation	53	88
Abstract conceptualisation	49	82
Active experimentation	50	83
ACCE dimension	41	68
AERO dimension	45	75

Although not all the participants calculated their scores correctly, the differences mainly ranged between 1 and 3, but never exceeded 5. Although it could make a difference to what learning style is identified, such a small difference in score should not make a major difference. It was thus concluded that the scoring procedures of the instrument can be regarded as easy enough for the instrument to be a self-assessment instrument.

8.3.3.10 Linguistic evaluation

Items used in the instrument were phrased in user-friendly language in order to make it more accessible. In order to clarify the adjectives that are mostly used to describe the different learning styles, the meanings of the adjectives within the context of learning styles and the process of learning were given. Then, the characteristics associated with the learning styles of the Kolb model of

experiential learning were described by the adjectives and used to construct the items. The adjectives were used in the context of contrast (the extent to which an individual emphasises abstractness over concreteness (ACCE), and the extent to which an individual emphasises action over reflection (AERO) in learning). In some items synonyms for the adjectives were used, as it was important to use easy everyday language.

The instrument was presented to a linguist for an evaluation of the language and grammar of the items. Subsequently, the phrasing of four of the items were changed as suggested. The changes are indicated in section 8.3.4.2.

After the evaluation of the instrument, certain changes were made to increase the validity and usability of the instrument. Although the instrument will have to be exposed to different reliability tests in order to increase the reliability of the instrument, this instrument was found to be valid and can thus be used in higher education to assess learning styles.

8.3.4 Modifications made to the Learning Style Assessment Tool

After the questionnaires had been analysed, modifications were made to the instrument. These modifications were integrated into the final instrument (see annexure A for the final instrument).

8.3.4.1 Changes made to instructions

The instructions for completing the instrument were changed as follows:

- Two examples were attached to the instrument that indicate what the plotting of the scores could look like. The users are referred to these examples, should they not understand how to plot and join the two scores obtained, or what the final plotting would look like.

- The suggested time frame of completing the instrument was changed from 25 minutes to 35 minutes.

8.3.4.2 *Changes made to items*

Changes were made to four items. The original items as well as the changed items are presented in table 8.7.

Table 8.7   Changes made to the items in the Learning Style Assessment Tool

ORIGINAL ITEMS		CHANGED ITEMS	
9	I will rather react on intuition than think it over logically.	9	When I have to solve a problem, I react on intuition than think it over logically.
25	I prefer to feel that something is correct and not instead of make a decision on intelligent thoughts.	25	I prefer to feel that an answer is correct and not make a decision based on intelligent thoughts.
33	I use insight to gain knowledge rather than thinking logically about it.	33	I use insight to select an answer rather than thinking the answer over logically.
37	If I have a suspicion that an answer is correct, I will choose that answer, instead of being sensible and finding the logical answer.	37	I will choose an answer based on a suspicion that it is correct, and not because it is the logical choice.

The final instrument is contained in annexure A.

8.4   EVALUATION OF THE CONCEPTUAL MODEL

The model was presented to experts for evaluation. Reigeluth (1983:26) and Chinn and Kramer (1995:135-136) set criteria for the analysis and evaluation of a theory but these criteria are also applicable to evaluating a model. Parse (1987:5-9) identifies criteria for evaluation such as semantic integrity, logic, and practical implication and application.

In order to evaluate a model, it is necessary to analyse it. Various checklists for analysing models and theories exist. Criteria for evaluation were compiled from these checklists (Chinn & Kramer 1995:135-136; Fawcett 1984:38; Parse 1987:5-9; Quinn 1995:313-314; Reigeluth 1983:26).

Fawcett (1984:38-39) describes the *analysis* of a conceptual model as an objective breakdown of statements into component elements. Through analysis, concepts, relationships between concepts and any hierarchy of ideas contained in the conceptual model, are explicitly identified. Statements are clarified and organised, through recognition of stated and unstated assumptions, identification of

motives, and comprehension of the interrelationships between concepts and propositions of the model. Analysis of a conceptual model is achieved by evaluating exactly what the researcher has presented, rather than making inferences about what might have been meant by any statement or by referring to other evaluators' interpretations of the researcher's work. Thus, analysis of a conceptual model requires a nonjudgmental, detailed examination of the model.

Fawcett (1984:43) describes the *evaluation* of a conceptual model as a judgmental process for determining the value and logical structure of the model by evaluating it against certain external criteria and certain standards. The evaluator is allowed to draw judgmental conclusions about its validity by comparing the content of the model with specific criteria. These criteria focus on the explication of assumptions, comprehensiveness of concepts and propositions, logical congruence, social considerations, theory-generating capabilities, and contribution to educational knowledge.

According to Chinn and Kramer (1995:127), criteria for analysis and evaluation are guided by the following questions:

- How clear is the model?
- How understandable is the model?
- How extensive is the model?
- How accessible is the model?
- How important is the model?
- How relevant is the model?

The above sources were used to compile components for the process of analysis and evaluation and formulate questions.

8.4.1 Method

A questionnaire (questionnaire 3) was designed for the evaluation of the model. **Section 1** of the questionnaire contained biographic data questions to determine the professional status of the experts in higher education, the type of institution where they were employed, and their professional experiences with model development or evaluation. **Section 2** of the questionnaire contained questions that were specifically asked to address the identified components necessary for the

evaluation of a model. The questions addressed the semantic integrity, logic and structural clarity, visual presentation of concepts and interrelationships, and the practical implications of the model. All the questions regarding the model were open-ended questions which gave the participants the opportunity to comment freely (see annexure C).

A covering letter explaining the purpose of the evaluation was attached to the questionnaire. The importance of the participants' contribution to the evaluation of the model was emphasised. Special attention was given to ethical aspects such as confidentiality and voluntary participation.

8.4.2 Procedure

The model was distributed to participants who were identified as experts. Experts included educators in the field of higher education and a graphic designer. The population from which the sample of participants was drawn consisted of professionals known to the researcher from her professional experience as an educator and researcher. A purposive sampling technique was used to select the participants. The researcher used her own judgment to select the participants who had the most characteristic attributes and represented the different categories as indicated in section 2.3.4.1 to evaluate the model. Although this is a subjective method of sampling, it was necessary to include experts on model development or evaluation who are involved in higher education to do the evaluation.

Participants who were sampled to evaluate the model were:

- seven educators in higher education
- one graphic designer

The *model for learning style promotion in higher education*, a complete explanation of the process of construction of the model, including the explanations of concepts and the interrelationships between concepts, the covering letter and questionnaire 3 were personally handed to the participants.

The response rate was 100%. The researcher also engaged in discussions with the participants, during which very valuable comments were made. These comments were integrated into the evaluation of the model.

8.4.3 Findings

The data that were gathered consisted of biographic data and data on the model.

8.4.3.1 Biographic data of participants

The biographic data of the participants (8, 100%), are discussed below.

The involvement of the participants in higher education was as follows:

- 7 (88%) participants were educators who also act as supervisors to post-graduate students who conduct research as part of their studies
- 1 (22%) participant was a graphic designer, employed at a university – the participant had previous experience in designing conceptual models for researchers

The type of institution where the participants were employed was as follows:

- 8 (100%) participants were employed at a university

The professional experiences of the participants regarding model development or evaluation was as follows:

- 6 (75%) participants had previous experience in designing a model as part of a research project
- 7 (88%) participants had previous experience in evaluating models
- 5 (63%) participants were supervisors to post-graduate students who were developing models as part of their research projects
- 1 (22%) participant had experience in the graphical design of a model

8.4.3.2 Evaluation of the model

Fourteen items intended to help evaluate the model were included in the second section of the questionnaire. The written and verbal comments were analysed qualitatively. The following is a

summary of the comments received on each of these items.

- *In the explanation of the model, the major concepts, related concepts and interrelationships between concepts are described. Please give your views with regard to the clarity, congruency and consistency of the explanations of the concepts, and the explanation of the relationships between the concepts.*

The participants described the explanation of the concepts and the interrelationships as being clear, congruent and consistent, with a logical flow. A few concepts needed further discussion, however, to clarify the flow of the learning process. It was also strongly recommended that arrows be used to indicate the interrelationships between the structures that depict the learning process, learning style model and the learning approaches in the model.

- *The five parts of the model are individually presented before the model is presented as a whole. Please comment on the explanation of each part and the compatibility and coherence of the structures presented by the parts in comparison to the explanations given on the parts.*

The presentation of the parts of the model were successfully introduced in a logical manner. The evaluators were able to systematically build comprehension of the "whole". The parts, with their separate visual presentations, explained the concepts that form the complete model systematically. It was commented that the concept of effective learning was not clearly depicted in the model or as an outcome of the learning process.

- *The five parts form a whole when the complete model is depicted. Please comment on the whole structure of the model with regard to the representation of the concepts, the flow of the model, and the sequence of the presentation of the parts.*

Because the model represents a process, the sequence of the parts was not regarded as important. Because learning and education form an ongoing and interrelated process, the model was described as a logical presentation of this process. The presentation of the parts before the complete model was constructed clarified the process of the construction clearly. However, one of the participants commented that it would have been more logical to present

the complete model and then discuss the parts.

- *An important requirement for the model is that it must be simple enough to use. What is your view with regard to the number of concepts and relationships in the model, and the understanding of the processes that are depicted by the model?*

Although there are various concepts and relationships within the model, it cannot be simplified, because of the complex and abstract nature of the major concept, namely, *learning style*. Too much simplicity may compromise the ability of the model to incorporate various dimensions of learning and education. Educators should be knowledgeable about dimensions of learning and education.

- *The model was designed for the educational environment of higher education. In your opinion, is this model applicable to higher education? Please give your reasons.*

The model was described as being applicable to higher education, but together with a learning style assessment instrument, to maximise its value. Very positive feedback was received on the acknowledgment of motivation and academic achievement in the higher education environment.

- *Does the model have potential to influence educators in higher education to be more flexible and creative in their education? Please give your reasons.*

Participants regarded the potential of the model as an opportunity to be creative and increase learner support. The potential of the model in higher education was emphasised by all participants, except one who indicated that one would first have to read the thesis to gain a thorough understanding of the potential of the model.

- *What would you say the most important contribution is that this model can make to the educational environment of higher education?*

The model focuses on the reality of individual differences among learners and educators. Educators must be well aware that they should not enforce their individual characteristics and

preferences when facilitating learning. Implementation of the model will improve effectiveness of learning as well as the overall approach to higher education.

- *Can the model be used in the practical field of your programme, or be adapted to suit your field of education? Please explain your answer.*

The possibility of applying the model to the practical field of educational programmes was positively emphasised. The reasons were the experiential learning approach used in the model as well as the influence it may have on the motivation of learners. The fact that individual needs are addressed was also commended.

- *Can the model be implemented in a team approach? Please explain your answer.*

With the changes in higher education to a problem-based approach, team approaches to education have gained ground. The value of being able to identify the different learning characteristics and preferences of group members was highlighted. One participant felt, however, that the discussion and presentation of the model do not address teams or groups.

- *Can the model be implemented without any additional costs in material and human resources? Please explain your answer.*

Different views on this question were received. Strong views were expressed on the responsibilities of educators to engage in continuous learning and personal development. On the other hand, if educators need more training on the knowledge base of learning styles or learning style assessment, training would imply additional costs. Another view was that learning style instruments must be made available, which could also imply additional costs.

- *Can the model be implemented without additional training of the educators using it? Please explain your answer.*

Educators will need to engage in continuous education or specific training to implement learning styles in higher education. The responses thus emphasised the role of a need for education and training on the concept and not the use of the model.

- *Does the model correspond to the needs of the adult learner? Please explain your answer.*

The model definitely addresses the needs of an adult learner in that it supports the learner to a level of metacognition, with high levels of motivation and academic achievement, to eventually reach a level of effective learning.

- *The method used to develop this model was an analytical research study. Please comment on the validity of the model with regard to the methods used to develop the model, its defensibleness as a qualitatively different approach to education, and the theoretical assumptions accompanying the model.*

The clear descriptions of the concepts and interrelationships indicated a thorough analytical process. The fact that the model was subjected to experts for evaluation was regarded as a sound research practice. It was also mentioned, however, that no opinion can be given with regard to the research process followed as this would have required the evaluator to read the complete thesis.

- *What is your personal view of the model? Your comments may be based purely on feelings.*

The model was described as logical and creative, with depth. One participant also mentioned that the refinement of the discussions of the concepts will raise the quality of the model even higher.

8.4.3.3 Conclusions of the evaluation of the model

The conclusions that were drawn from the findings are discussed below:

✦ **Appropriateness**

Appropriateness refers to the purpose of the model, whether it addresses the needs of the learners and the philosophy of higher education. Furthermore, the purpose refers to the assumptions of the model and whether these assumptions fit reality.

It was clear from the evaluation that the model corresponds to the specific needs of adult learners. The model has been designed to facilitate learning, increase motivation and academic achievement, to reach a level of effective learning. By empowering learners with knowledge of their own learning styles, metacognition is also enhanced. The underlying assumptions formulated for the model are logical and applicable to the higher education environment.

✦ Comprehensiveness

Comprehensiveness refers to the completeness of the model. The different parts that form the structure address the concepts and interrelationships in the model. The model allows for a variety of educational approaches as well as different learning characteristics and preferences. It also addresses the desired outcome of higher education, which is effective learning. (Although not separately indicated in the model, it is described as an interrelated process and outcome.)

✦ Adaptability

Adaptability refers to the flexibility of the model, whether it can be adapted to different educational approaches and environments, and whether it can be combined with other models. The model offers flexibility within the learning process, learning approaches and individual differences. It can be used where learners are involved in group work or team work. Different educational models can thus be used together with this model. Learning theories can be integrated into the model, depending on the level of development of the learners. It can also be combined with any other learning style models. The implementation will, however, depend on the enthusiasm, creativeness and knowledge of the educators.

✦ Practicality

The practicality of the model refers to the costs of and special training required for implementing the model. Training and continuous education may require additional costs, but these costs can be justified against the responsibility of each educator to engage in continuous education and training. With some enthusiasm and creativity, reading on the phenomena of interest will also contribute to their knowledge. The learning style instrument that was developed in this research will be available for use. Only photocopying costs will be involved, as it is a self-assessment instrument.

✦   **Validity**

Validity refers to whether the model has been developed by using appropriate methods, which will determine whether the model is internally valid and whether the structure is valid and sound. The construction of the model was based on a thorough theoretical analysis of the major and related concepts, their interrelationships and underlying assumptions. The model was presented to experts for evaluation, after which suggested refinements were made. The model has, however, not yet been tested in the practical field of higher education and therefore no research is available to verify its validity in higher education. The construction of the model was part of qualitative research, and its validity therefore refers to the extent to which the research findings represent reality. The findings of this research showed consistency with various other studies and sources. The model can thus be regarded as having internal validity.

8.4.4   Modifications made to the model

Modifications to the model included refinements regarding the explanations of concepts, some additional explanations and minor changes to the visual presentation of the model. The desired outcome of higher education, which is effective learning, was described as being an integrated relationship between the concepts. The fact that the model must be seen as multidimensional and depicts an ongoing process was mentioned.

8.5   CONCLUSION

In this chapter phase 4 of the research was discussed. The *Learning Style Assessment Tool* and the *model for learning style promotion in higher education* were presented to selected groups of participants for evaluation. Valuable information that was gathered during the evaluation of the learning style instrument and the conceptual model was used to modify the instrument and the model in order to present the final products. Both the instrument and the model were found to be acceptable and valid for implementation in higher education.

The following chapter serves as the conclusion of this research in that the findings, conclusions, limitations, implications and recommendations for further studies are discussed.

CHAPTER 9

SUMMARY OF FINDINGS, CONCLUSIONS, LIMITATIONS, IMPLICATIONS AND RECOMMENDATIONS

If a man does not keep pace with his companions, perhaps it is because
he hears a different drummer. Let him step to the music which he hears,
however measured, or far away (Thoreau 1963:246).

9.1   INTRODUCTION

The background to this research is based on a recognition of individual differences among learners in the context of higher education. These individual differences are expressed in learning styles. The focus of the background is therefore on *how* learners learn, and ultimately on the promotion of learning styles in higher education.

The concept of quality in higher education is complex and includes internal and external quality. Internal quality develops as an individual gains self-knowledge and reaches a level of self-actualisation. External quality refers to quality in the educational environment that leads a learner to reach a level of internal quality. Some of the significant changes that have taken place in higher education over the past years are that learners are more liberated in that they ask for a say in the educational programmes and they are requesting quality as consumers with all the rights and protection of consumers (Vroeijenstijn 2001:66). Therefore, learners' individual needs must be addressed, including their need to learn *how* to learn and a need for acceptance of their individual differences as expressed in learning styles.

Learners and learning cannot be separated. All learners, irrespective of age and intellectual capacity, learn in ways that differ dramatically. Learners have a need to be valued as individuals with their own individual characteristics and differences. Learners therefore deserve to learn in a way that best suits their needs. Individual differences in the learning process are a reality. Educators must recognise, accept and take into account these individual differences of learners that bring about individual preferences. Modern education promotes innovative, creative approaches to education that enhance the ability to learn more efficiently and effectively, and ultimately promote quality in learning. Providing high quality education therefore requires the acceptance of individual differences among learners.

Education should be aimed at promoting learning. In order to do so, educators should incorporate diversity into their model of education or styles of teaching. Educators need to accept learners' individual differences as expressed in learning styles, as well as their own, to enhance quality in higher education.

The aim of higher education, then, is to provide an educational and learning environment which will be conducive to giving the learner an opportunity to experience a variety of learning styles. This aim leads to learning style promotion in higher education. In such an educational environment learners would have optional approaches as to how they approach the learning process.

This chapter deals with the findings, conclusions, limitations, implications and recommendations of the research study.

9.2   AIM AND OBJECTIVES OF THE RESEARCH STUDY

This research study focused on individual differences among learners as expressed in learning styles and how they can be accommodated in the learning process and learning environment, and more specifically promoted in higher education. The researcher was guided by the following questions:

- What is the educational importance of learning styles?
- How can learners and educators be made aware of their individual learning styles?
- How can different learning styles be promoted in the learning process and learning environment of higher education?

The aim of the research study was to present an analysis and exploration of the concept *learning style*, and to develop a learning style instrument and a conceptual model that address the implications of the concept in higher education. The aim of exploring the concept was to encourage educators as well as learners to identify their learning styles even before entering the learning environment. The use of learning style instruments in the admission procedures of entering learners will help to identify their specific strengths and learning gaps, in that they identify learning characteristics and preferences. For the educator this can have the advantage of knowing his or her own learning style. The aim of the conceptual model was to provide an organised frame of reference that not only guides the learning process but also provides for systematic education. The conceptual model accommodates individual

differences within the learning process in any learning environment for higher education.

For this aim to be realised, it is important that educators should be willing to change their thinking and methods within the educational process. Through the construction of a learning style instrument for self-assessment and a conceptual model, educators have been granted the opportunity and support to contribute to learning style promotion in higher education.

The objectives for the research were to:

- analyse the concept *learning style*
- explore the literature (through theoretical analysis) regarding models that promote individual differences expressed in learning styles
- analyse the practice of higher education in order to indicate whether the acknowledgement of individual learning styles is required
- construct a learning style instrument which is used and analysed by the learner and educator
- construct a conceptual model which promotes individuality expressed in learning styles in adult learners
- present the new learning style instrument and conceptual model for evaluation by experts

The findings of the research study are presented according to the objectives of the research study.

9.3   METHOD OF THE RESEARCH STUDY

A qualitative research approach was used to determine the nature of the phenomena under study by using a multi-perspective approach that aimed at analysing, describing and making sense of the meanings of phenomena. A descriptive analytical study of the literature (theoretical analysis) was done because it was an essential exercise in order to come to a proper understanding of the phenomena being studied. Multiple referents were used to draw conclusions about what constitutes the true nature (meaning and explanation) of the phenomena of interest. The research was a non-empirical study aimed at constructing a learning style instrument and a conceptual model to assess and explain the phenomena of interest. The research was done in four phases.

Phase 1 was discussed in chapters 3, 4 and 5. To attain the objectives the researcher did a theoretical

analysis and exploration to gain insight into the concept under investigation, which served as a theoretical framework for the conceptualisation of the *Learning Style Assessment Tool* and the *model for learning style promotion in higher education*. The analysis of the concept *learning style* explored the foundation and the assumptions upon which the instrument and the model were constructed. The constructive guidelines were, thus, founded on a sound academic basis.

During phase 2 of the research study, a learning style instrument, known as the *Learning Style Assessment Tool*, was constructed through a process of adaptation and development, after a thorough analysis of the literature.

Phase 3 of the research study encompassed the construction of a conceptual model, known as the *model for learning style promotion in higher education*. The model evolved from inductive and deductive reasoning during a process of theoretical analysis. Assumptions were made from the analysis of the literature to determine relevant concepts through inductive reasoning. Then, through a deductive approach, concepts were presented in a graphical form. The process followed can be described as a process of structuring and contextualising, which brought about systematic linkages between and among concepts, resulting in a structure. The approaches to the processes included the following steps: identifying and defining the concepts to clarify the meaning of these important concepts, identifying assumptions to clarify the basic underlying truths from and within which reasoning flows, clarifying the context within which the model is placed to make it possible to apply the model, and compiling relationship statements between and among the concepts of the model.

Phase 4, the final phase of the research study, entailed the evaluation of the new learning style instrument and the conceptual model in order to refine both. The evaluation of the instrument and the model took place simultaneously as this could only be done after phase 3, because the first three phases were interrelated and did not take place separately.

The purpose of the evaluation of the learning style instrument was to determine its validity. Although this had not been part of the initial plan, the Cronbach's Alpha coefficient was measured to determine the internal consistency of the items used in the instrument. Further reliability tests are required, however. The purpose of the evaluation of the model was to determine its significance, logical structure and value.

9.4 FINDINGS

In this research study, learning styles were based on the Kolb model of experiential learning, which served as the theoretical framework for the research study.

The findings are discussed according to the objectives of the research study.

◆ **Analyse the concept** *learning style*

The notion of learning styles is a recognition of individuality. "Learning style" is a comprehensive term, referring to the internal organisation and perception of information, as well as to external factors influencing learning, such as socialisation and professional environments. Learning styles are attributes, characteristics, and qualities of individuals that interact with instructional circumstances in such a way as to produce differential learning achievements. Learners are categorised in terms of educational conditions under which they are most likely to learn and the amount of structure they require for learning to occur. The concept of learning style encompasses sensory partiality, perceptual preferences and the environmental factors that are most conducive to learning. Learning styles are conceptually independent of cognitive capacity, success, cognitive strategies, and coping behaviours (see sections 3.3 and 3.4).

Many approaches to categorising learning styles on different levels exist. A clear explanation of what a specific learning style entails depends upon the learning style model that is adopted (see section 3.5).

It was concluded that there is no relationship between learning styles and intelligence. Learning styles are related to personality and are temporally stable (see sections 3.4.1 and 3.4.2).

Learners who are aware of their learning styles and who have knowledge of their learning characteristics and preferences (strengths and weaknesses) are empowered to select the right style of learning for the particular task they are faced with (see section 3.6).

Although there is no unified conceptual description of learning styles, there is enough evidence to support a contention that such an educational entity exists at the paradigmatic level. Knowledge of learning styles provides a potentially powerful basis for educational guidance, with relevance for both the course of individual learning in various subject matter areas and for the nature of learner-educator

interactions and social behaviour in the learning environment. The direction of higher education should be towards obtaining more detailed knowledge of the individual learning styles of the learners involved.

The Kolb model of experiential learning served as the theoretical framework for describing learning styles in this research study. Kolb (1984:132) explains the experiential learning cycle as a spiral in which each episode of experience has the potential for movement from prior doing to a life of choice and purpose. The learning cycle thus brings about development. For learning to be effective the learner has to move through the cycle of experiences (see figure 3.2), which are: concrete experience, followed by observation and reflection, which lead to the formation of abstract concepts and generalisations, which in turn lead to hypotheses that will be tested in future action (Kolb 1984:68). Finally, the hypotheses lead to new experiences (Hodges 1988:341). The experiential learning cycle includes *experiencing* (when activities generate knowledge, the experiences have the potential for learning), *sharing perceptions from experience* (sharing and verbalising what one saw or felt during an activity, which broadens and deepens the experience), *making sense of the experience* (during this step one clarifies and interprets what the meaning of the experience is), *abstracting concepts, generalisations and principles* (during this stage certain experiences can be selected and applied to reality), and *applying concepts, generalisations and principles* (the learner now has to implement the selected experiences and apply them to future activities) (see section 3.5.2.1).

The Kolb learning style model that emanates from the Kolb model of experiential learning identifies four different learning styles, namely the divergent, assimilative, convergent and accommodative learning styles (Kolb 1984).

The learner with a divergent learning style grasps information through tangible experiences and transforms it through intellectualisation. The dominant learning abilities are concrete experience and reflective observation. Their imaginative abilities and awareness of meaning and values are the great strengths of this learning style. These learners view concrete situations from many perspectives and then organise the many relationships into a meaningful *gestalt*. They therefore adapt by observation rather than action. They perform better in situations where alternative ideas and implications are generated, such as group discussions and brainstorming sessions. They are people-oriented and creative learners (see section 3.5.2.1).

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The learner with an assimilative learning style processes information through symbolic representation and intellectualisation. The dominant abilities are abstract conceptualisation and reflective observation. Their abilities lie in reasoning inductively and creating theoretical models. These learners assimilate disparate observations into an integrated explanation. They are less focused on people and more concerned with ideas and abstract concepts. Their concern with ideas has more to do with their logical soundness and precision than with their practical value (see section 3.5.2.1).

The learner with a convergent learning style processes information by grasping it through symbolic representation and transforms it through behavioural extension. The dominant learning abilities are abstract conceptualisation and active experimentation. Problem-solving, decision-making and the practical application of ideas are the great strengths of this learning style. These learners do best in situations where there is a single correct answer or solution to a question or problem. They organise their knowledge in such a way that it can be focused on specific problems through hypothetical-deductive reasoning, logical and analytical thinking, with a narrow focus on practical thinking (see section 3.5.2.1).

The learner with an accommodative learning style grasps information through tangible experiences and transforms it through behavioural extension. The dominant learning abilities are concrete experience and active experimentation. Doing things, carrying out tasks and plans and getting involved in new experiences are the great strengths of this learning style. These learners do best when seeking opportunities and taking action and risks. They organise their information by adapting to changing immediate circumstances. Problem-solving is approached in an intuitive trial-and-error manner, while relying on others for information, rather than on their own analytical ability (see section 3.5.2.1).

Although learners must be supported in their preferred way of learning, they should also be supported to develop different approaches to learning to enable them to become more flexible learners who can adapt to different learning environments to maximise learning.

✦ **Explore the literature (through theoretical analysis) regarding models that promote individual differences expressed in learning styles**

An outcome of developments in education and learning has been the elaboration of educational approaches that are sensitive to individual differences. Recognition of individual differences in the

learning environment and educational setting enhances the quality of education and learning. It has an impact on individual development and growth in the educational environment, enhances knowledge of the individual as a learner, and contributes to analysis and presentation of the learning material.

Learning is an active process by which individuals construct their own knowledge based on their existing knowledge and on interaction with information and the world around them. This process entails absorbing and discovering information, constructing meaning, and interpreting newly constructed knowledge. Learning is a lifelong, cyclic experience that serves as a constant modifier of new knowledge through thinking, feeling, perceiving and behaving (see section 4.2).

The learning process in higher education demands an eclectic approach to learning and encompasses components of the behaviouristic, cognitive, humanistic, social and phenomenological views of this process. Promoting individual learning styles is thus necessary when engaging in the learning process.

Learning styles are promoted in a learning process that is *behaviouristic* because learning requires skills through repetition, and uses reinforcement to strengthen behaviour or repeat positive behaviour. The behaviour is then rewarded through feedback and by setting objectives and determining the outcomes thereof. The behaviouristic approach to the learning process contributes to the formation of new behaviour through an association between a stimulus and a response in the learning process. The learner is manipulated and governed by the external environment. The learning that occurs, as a result of experience, is relatively permanent and changes an individual's behaviour or knowledge.

Learning styles are promoted in a learning process that is *cognitive* because learning emphasises how an individual learns and how the thinking processes develop. The cognitive learning process demands active and accountable participation on the part of the learner, who has to master new knowledge and gain new skills. The cognitive approach to learning includes concepts of discovery learning, reception learning and conditions for learning. Discovery learning requires active participation on the part of the learner that stimulates and promotes thinking, displaying and using insight, and problem-solving. Reception learning is based on existing knowledge, where the learner is given the opportunity to reflect on knowledge, and then selects information on the basis of what is needed in the learning process. Conditions for learning are part of the learning process, because they set out the relationship between the events of learning and instruction. The relevance of these conditions for learning lies in the fact that the educational processes (instruction) support the learner through the learning process. The learning

process is a holistic approach in which perception, speech and action serve as instruments of mental internalisation. The learner is the central element of the learning process. The focus is on what happens to the learner and *how* the learner engages in the learning process and not on the product of education. Learners are the active constructors of learning and the educators the facilitators of the learning process.

Learning styles are promoted in a learning process that is *humanistic* because learning is based on the learner's natural need to learn. The learning process is directed by what a learner wants to learn, how he or she wants to go about learning, and when learning should take place. Intrinsic motivation is important in this approach to the learning process. Individuality in the learning process is fostered where both learners and educators are active co-participants in the learning process. Learners move through the learning process by participating actively, being motivated, independent and self-actualised.

Learning styles are promoted in a learning process that is *social* because the learner learns vicariously by being exposed to a caring role model. The more positive the experiences of the role models are, the more learning takes place. The learner is thus guided through the learning process by what is observed, through direct experiences and through observation. Minimal instruction accompanies the process that takes place. The learning process includes questioning, intuiting, seeing patterns and finding meanings, investigating, strategising and creating, learners are thus freed from prescriptive confines of learning.

Learning styles are promoted in a learning process that is *phenomenological* because learning is a continuous process. The factors that contribute to making the process successful are the fact that learners want to learn, they learn by doing, they want continuous feedback, and they digest information to make sense of the learning experience and feedback. The learning process recognises the uniqueness of the individual and the mental capacities that enable a learner to grasp meaning from experiences in a creative way; make choices and decisions based upon thoughtful deliberations; and be the source of one's own responses to events in both the internal and external environment. The learning process is an internal process deriving from behaviour change.

The emphasis regarding individual differences within the process of learning is placed on the *how* of learning rather than the abilities of the learner or the content of instruction. The assumption underlying the use of learning style information to plan the educational process is that individuals learn more and better if allowed and guided to learn the way they prefer to, and are more motivated to learn if assisted in this manner.

♦ **Analyse the practice of higher education in order to indicate whether the acknowledgement of individual learning styles is required**

Learning theories direct the educator towards becoming an expert in learning in order to assist learners in learning how to learn and become successful. The educator must adopt and use educational approaches that promote learning in higher education. Learners must be freed from prescriptive confines of training and opened to learning that includes questioning, intuiting, seeing patterns and finding meanings, investigating, strategising and creating. Within such a framework, educators and learners are re-socialised into educative processes that are liberating for both the educator and the learner. The shift from a very comfortable educational approach to a more eclectic, liberated way of thinking and interacting with learners in the learning environment is a challenging perspective (see section 4.3).

Educating the adult learner in higher education within a climate that addresses the individual needs of a learner requires knowledge of the cognitive and affective predispositions of a learner, structure of the body of knowledge, instructional modes, motivation to learn, and teaching styles (see sections 4.4, 4.7, 4.8, 4.9, 4.10, 4.11, 5.7 and 5.8).

♦ **Construct a learning style instrument which is used and analysed by the learner and educator**

The assessment of learning styles focuses on an understanding of similarities and differences in how learners approach the learning process, and contributes to reaching the goal of learning style promotion in higher education. Learning styles are measurable. Assessment of learning styles is just as important in education as understanding and making sense of the theory of individual differences in learning styles.

A theoretical analysis of existing instruments was done to determine their uses, strengths, weaknesses, applicability, validity, and reliability. Specific needs, especially linguistic needs and needs relating to the method of assessment, were identified to find an instrument that was suitable to adapt, change or use for the purpose of this research study. The linguistic specifications included the level of difficulty of the language used in items, as well as the meaning and comprehensibility of the words, phrases and sentences used. During the analysis of instruments, aspects such as applicability to higher education and length of an instrument were also important. Existing instruments are not always readily available as copyright

often prohibits one from using them without permission or paying high royalties. The instrument was also planned to be a self-assessment instrument. After the thorough theoretical analysis of existing instruments, a process of adaptation and development was followed to construct a new instrument that met all the identified requirements.

A learning style instrument, the *Learning Style Assessment Tool*, was constructed to help achieve learning style promotion in higher education. The process of construction was discussed in chapter 6. The instrument was constructed to serve as a supplementary aid for educators as well as a medium to support learners in the learning process. The acknowledgment of individual differences in the learning process is supported by the ability to assess these individual differences, which ultimately contributes to learning style promotion in higher education. The instrument is contained in annexure A.

✦ **Construct a conceptual model which promotes individuality expressed in learning styles in adult learners**

The inclusive aim of this research study was actualised by the construction of the model that promotes learning styles in higher education. The purpose of constructing the model was to provide an organised frame of reference for all aspects of the learning process and to provide for quality education by acknowledging individual differences in learning styles in the context of higher education.

The construction of the model arose from this research study after an analysis of the literature on the phenomena of interest had been undertaken. The analysis enabled the researcher to base the model on theoretical assumptions derived from the analysis of the literature. The model evolved from inductive and deductive reasoning. During the inductive reasoning stage the phenomena of interest were analysed to determine relevant concepts and explore the phenomena. During the deductive reasoning phase, the researcher, in an attempt to produce a comprehensive presentation of the phenomena of interest, synthesised the information that had been gathered. The instrument was developed to serve as a tool to implement and realise the inclusive aim of the research. The *model for learning style promotion in higher education* is the formal presentation of the researcher's representation of accommodating learning styles in the learning process.

The *model for learning style promotion in higher education* allows for the identification of the different learning styles of learners in higher education. It stresses the importance of how the learning process

is approached within a dynamic learning environment. The adult learner is supported in his or her progress from a dependent learner to an independent learner who reaches an optimal level of metacognition and academic achievement. It furthermore provides for the acknowledgment of the educator as a role player in the educational environment, who has individual differences with regard to learning styles and teaching styles.

The *model for learning style promotion in higher education* presents a challenge to all educators in higher education to approach the educational environment with new enthusiasm, and greater flexibility and impartially. For the learner the model means recognition of their individuality in the learning process, guiding them to effective and quality learning, and ultimately to a high level of academic achievement.

The construction of the model was discussed in chapter 7 and the final model was visually presented in figure 7.7.

✦ Present the new learning style instrument and conceptual model for evaluation by experts

The aim of the evaluation of the learning style instrument and the conceptual model was to identify gaps and inconsistencies and also to assess their value and potential contribution to higher education.

The *Learning Style Assessment Tool* was presented mainly for determining validity as it was not the purpose of this research study to determine the reliability of the instrument. However, the Cronbach's Alpha coefficient was also measured to determine the internal consistency of the items in the instrument. The instrument was exposed to different categories of participants for evaluation. The participants consisted of key participants (learners) and general participants (educators, a linguist, a statistician, psychologists). The participants were given an instrument to assess their own learning styles, questionnaires to complete after they have done the assessment, as well as an opportunity to discuss the instrument with the researcher. Valuable information was gathered (see section 8.3.3). Minor modifications were made to the instrument (see section 8.3.4).

Based on the evidence of this research, the instrument may prove a useful addition to the collection of learning style instruments available and suitable for higher education.

The *model for learning style promotion in higher education* was presented to participants who were regarded as experts. Their role was to evaluate the model to determine its significance and value (see section 8.4). Criteria for the analysis and evaluation of the model were provided in the form of a questionnaire with open-ended questions. Opportunity for discussion was also allowed. The criteria for evaluation included semantic integrity, logic, and practical implications and application. According to the feedback, only minor changes were suggested (see section 8.4.4). The final model is presented in chapter 7, figure 7.7.

The evidence of this research indicates that the model may prove a useful addition to the body of knowledge of educational practices in higher education that provides a framework to promote the acknowledgment of learning styles.

9.5   INFERENCES FROM THE FINDINGS

The most significant conclusions pertaining to the aim and objectives of this research are based on the inferences from the findings. The findings refer to what emerged from the theoretical analysis as explained in chapters 3, 4 and 5 as well as the construction and evaluation of the learning style instrument and the conceptual model (chapters 6, 7 and 8).

- Learning styles are neither good nor bad. They simply form the foundation of how individuals receive, process, and integrate new learning material. This foundation is established during early childhood and remains fairly stable throughout adulthood. These characteristics bring about different responses to identical learning situations.

- The findings of this research should not be utilised to categorise learners, but rather to allow them to reflect upon their own learning styles to enhance learning. This will have an impact on the learning potential of learners.

- There is a relationship between self-directness and learning styles. It can be concluded that those learners who prefer the abstract side of the concrete-abstract continuum are more self-directed in their learning than those who prefer the concrete dimension. It can further be concluded that self-directedness and intrinsic motivation are interrelated. This furthermore supports the notion that an educational environment must allow the learners to be accountable and responsible for

their own learning.

- Learners should not be categorised as regards specific study skills, as each learning style is not associated with a particular way of studying, but the same study skills should rather be approached in different ways depending on the learning style.

- There seems to be something elusive about learning styles which may cause an unpredictable fluctuation of individual preferences for a learning style. The adoption of a specific learning style and/or learning strategy is not determined merely by the inherent characteristics of the learner but also by the nature and structure of the subject content and instructional design of the educational programme.

- The presence of different learning styles in all groups of learners has implications for education. To make learning accessible to the array of learning styles represented, to evaluate fairly, and to help individuals develop the non-dominant aspects of their learning styles, educators are encouraged to draw actively upon all components of the learning process in their design of the educational process. Such an approach can develop individuals' flexibility in responding to learning tasks both during professional preparation and in professional positions in the field.

- The realisation that differences in learning styles could be significant should convince both educators and learners that there is a need to acknowledge and accommodate individual differences in the learning process.

- It is unfortunate that a review of the literature provided very few publications that investigated the learning styles of educators and the way an educator's learning style influences teaching style. This concept may be an area for further research.

- There is a need for educators to assess their own learning styles and then analyse their own design of programmes and their own implementation to see whether or to what extent what they offer is affected by their own learning styles and preferences rather than by their understanding of the preferences of the learners they are facilitating.

- Educators need to decide on the types of behaviours that they wish to see in both the learners and themselves. They need to sort out their own values with regard to learning behaviours before meaningful changes can be made to educational practices and approaches. The change to a non-traditional approach is a process that challenges the essence of an educator's teaching practices. Educators will be successful in making the change and achieving the expected outcomes only if they engage in dialogue and activities that are liberating both for themselves and the learners. It is hoped that the discussions in this thesis can assist educators in making such a transition. For higher education to be meaningful to both educators and learners, educators must reconceptualise their global approach to higher education.

- No educational programme can afford to neglect the learning needs of individuals. In meeting the demands of society, education needs to be more personalised to match the learning environment with the learners' learning styles. This is an ongoing challenge for educators who have to meet the ever-increasing demands of a diverse learner population.

- Owing to various changes (including social, economic, financial and political changes) and the influences these changes have on educational structures, learners in South Africa and other African countries are placing new and even higher demands on academic achievement.

- Higher education must educate for high academic achievement that also develops a positive self-concept in learners.

- The implication for higher education is the reality of the necessity to emphasise learning styles in the delivery of instruction, in professional methodology classes and in practical experiences. With more professions in the future demanding people who can not only function in groups but also apply knowledge and skills, educators must prepare diverse professionals to meet contextual needs, and thus satisfy the changing demands of society.

- As Kolb (1984) reported, facilitating adaptive competencies that reflect integrative development by promoting learning style flexibility is important as a component of specialised professional education if ongoing career adaptation, as required by changes in one's professional life based on advancement, is to be viable. Furthermore, if the professional field is to attract and retain a diverse group of individuals, it is imperative that educators respond to learning style differences

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as well as help individuals develop non-dominant aspects of their learning styles.

- Discipline-related association with learning styles can be confusing. It is therefore suggested that the learning styles of learners should not be categorised according to their choice of career or field of study. The rapidly changing approach to, fields such as health sciences bring about major changes in the construction of study fields and a more interdisciplinary approach is used. A learner in the field of health sciences studies health subjects but also other social sciences and related subjects. This argument could be extended to all other fields of study.

- Learners and educators need to be given knowledge of their learning styles through the process of assessment and the identification of those individual differences that will enable them to cope with new, increasingly complex educational demands, in a manner that will contribute to quality learning.

- If the instrument has concurrent validity, it should be capable of discriminating between groups which are presumed to differ in their learning styles. Individual differences in groups must be addressed without ignoring the importance of group dynamics in the learning process.

- The researcher considers the construction of the *model for learning style promotion in higher education* to have the potential to develop a learning style awareness in both learners and educators as it is based on the conceptual exploration of the phenomena underlying the concept *learning style.*

- Steps should be taken to promote effective learning through the use of learning styles. Professional development activities on the use of learning styles in improving education and learner development should go beyond traditional practices. Ongoing workshops, seminars, instructional improvement projects, and other functions can be very useful in helping educators, learners and managers understand the importance of a sensitivity to learning styles.

- Ongoing research is an important strategy in achieving a learning style-sensitive educational climate. When linked with other data about learners, information about learning styles holds great promise for innovation in higher education. A continuing dialogue among institution for higher education, administrators and learners must be stimulated, whether formally or informally,

to enable them to learn from each other about education and learning.

The conclusions clearly indicate the vast extent of learning style awareness and accommodation in the learning process within the context of higher education.

9.6   LIMITATIONS

During the course of the research certain limitations were identified. Some of these limitations offer scope for further research. The most important limitations are:

- Although the literature has shown that there is a relationship between culture and learning styles, this relationship was not explored in this research due to extent of the research. A study on culture and learning styles will in itself be a major study because of the importance of cross-cultural differences in the learning process, powerful influences on how we behave and learn, and the differences in identities, communication patterns, and beliefs about the world.

- Owing to the vast number of teaching strategies that could be used in higher education, it was not feasible to include and discuss all the different strategies that could be used in the educational environment.

- Because the purpose of this research was not to measure reliability of the new learning style instrument, reliability tests have not been done, except for a Cronbach's Alpha coefficient to determine internal consistency. Reliability tests have to take place over a period of time, in more than one research project, and be compared with results of another reliable instrument. This limitation offers opportunities for further studies.

9.7   IMPLICATIONS FOR HIGHER EDUCATION

This research is of importance to all educators in higher education.

Educators are advised to become aware of their learners' learning styles, which will enable them to adapt their approaches to the educational environment. The acknowledgment of individual differences among learners is an acknowledgment of the educator's interest in the learners as holistic beings.

Educators need an understanding of learning styles as individual differences. Research on learner development, learning theory, and ways to use the creative tension between content and process are all important prerequisites for effective education. A positive, creative educator will have the opportunity to make a contribution to improved learning in a institution for higher education.

Educators should strive towards becoming self-actualised practitioners. In order to achieve this, they will have to acknowledge their own individual characteristics and differences. They must set an example as regards the importance of accepting these differences, using the dominant characteristics to the full and developing the less dominant characteristics, to eventually reach a level of quality.

Not all educators in higher education are qualified in adult education. Health sciences educators and educators from education departments have training, but other professions use their experts from the field to become educators, often without any training in educational principles and practice. Educators in the field of higher education are therefore advised to develop themselves to become knowledgeable in the practice of higher education.

If the learning style instrument and the conceptual model are to be acknowledged for their value and use in higher education, educators utilising them need to engage in further readings on the concept of interest and the related phenomena. Although the concept is described as abstract in nature, the importance of its existence cannot be argued. Motivation to engage in continuing education on educational practices is thus necessary.

9.8 CONTRIBUTION OF THE RESEARCH

Contemporary trends in higher education justified this research. The implementation of innovative educational approaches, including the fostering of the individuality of learners, contributes to an educational environment where a learner can become a self-actualised, mature, effective and independent learner. Educators are the drivers who lead learners to effective learning through quality education.

The practical contribution of this research is that it provides a learning style instrument that is regarded as user-friendly and applicable to diverse groups of learners. The research further contributes to the existing base of knowledge on the practice of higher education and the improvement of quality in higher education.

9.9 RECOMMENDATIONS

The findings of this research are potentially useful for educators in higher education. From the above findings, conclusions, limitations and implications, the following recommendations are made for implementation in the practice of higher education and for further research.

9.9.1 Recommendation for the practice of higher education

- The *model for learning style promotion in higher education* should be implemented in the context for which it was constructed to assess its value, meaningfulness and significance. The implementation will demand a new approach to higher education as well as motivation to change.

- The implementation of the *model for learning style promotion in higher education* could be implemented in a professional environment for the purpose of improving team work. This model could then possibly be utilised in both educational and professional (service) environments. In the latter case the learner would be replaced with a client or worker, and the setting with any place where the model would be applied.

- The instrument should be translated into the remaining ten of the eleven official languages of South Africa to give individuals the choice of language in which they prefer to analyse their individual learning styles. However, this would require further tests on the validity and reliability of the translated instruments.

- It is recommended that learning experiences should be established that focus on helping learners learn how to learn. Orientation activities that serve as an introduction to an institution of higher education can be geared towards helping new learners gain a greater understanding of how learning occurs and what their responsibility in the learning process is. The instrument can be used to empower learners with knowledge of their learning characteristics and preferences.

9.9.2 Recommendation for further research

- The theoretical assumptions presented during the construction of the *model for learning style promotion in higher education* can be used to formulate hypotheses for further research studies.

- The terms "theory" and "model" are used interchangeably in the literature. The consensus is that a theory has been validated through research while a model has been conceptualised but not yet validated through research (Poggenpoel 1991:1). It is therefore recommended that the new conceptual model be validated through further research studies in higher education.

- The learning process of children, adolescents and adults shares more similarities than it exhibits differences. Children are often problem-centred in their learning; they may show a natural tendency for self-directedness, they often work best when new learning activities are evidently connected to past experiences, and they prefer immediate application of what they are learning. Similarly, the pedagogic principles which govern the education of adults are equally applicable to educating/teaching children. Additionally, during the discussions the researcher had with participants after the evaluation of the instrument, the key participants (learners) expressed the need for knowledge of their learning styles in their senior school years to prepare them better for higher education. It is thus recommended that the use of the instrument and the implementation of the model be investigated at senior school level.

- It is recommended that further research be done to measure the reliability of the new learning style instrument. Reliability tests have to take place over a period of time, in more than one research project, and be compared with results of another reliable instrument. An evaluation of the instrument thus needs to be extended and replicated. A test-retest study over an extended period of time is necessary. Confirmatory evidence of the factor structure is desirable. Stability studies should be carried out. Further experimentation with scoring formats is also a way to improve the instrument's reliability. It is further recommended that a factor analysis be done on each of the items of the instrument to determine their true reflection of what they present.

- Further research into the relationship between learning styles and teaching styles is needed. It may be important to identify whether or not learning styles influence the teaching styles of educators. A correlational study can be done to determine the relationship of an educator's teaching style to his or her preferred learning style.

- Because of the vast number of teaching strategies available and the innovative and creative approach to higher education, it is recommended that research be done on the matching of

teaching strategies with learning styles.

- No organising theory or model for understanding learning styles in relation to each other exists (Sternberg 1997:142). It is recommended that each set of learning styles, as a separate entity, be organised into another set of learning styles, within a unifying framework that relates different learning styles in one set to the different learning styles in another set. By doing this the application and implementation of knowledge of learning styles can be maximised.

- Although it was not explored in this research, literature has shown that there is a relationship between culture and learning styles (Linares 1999:411). Learning styles are influenced by both heredity and environment, they change with age and experience, and are not correlated with intelligence, with the exception of analytical intelligence. Factors that influence learning styles include socialisation, sociocultural aspects, ecological adaptation, biological effects, language, and context. Cross-cultural differences in communication patterns are also important. Culture not only influences our identities, communication patterns and beliefs about the world, but it also exerts a powerful influence on how we behave and learn. It is therefore recommended that an explorative study be done on the relationship between learning styles and culture, and specifically in the South African and African learner communities with their variety of cultures.

9.10 POST-DOCTORAL RESEARCH

As part of an ongoing process of continuing education and a high level of interest in the phenomena related to learning styles, the researcher plans to do post-doctoral research in directions suggested by this research. To meet the growing need for development of computer-based education, the instrument will be developed into a computer-presented design. A software program will be developed to enable the users of the instrument to utilise the instrument on computer.

9.11 CONCLUSION

Development of the person should be the central purpose of education. Learning styles and their use in higher education, student affairs and in the work setting become key issues in today's higher education. The link between the substantial body of literature on individual differences in learning styles provides not only a source of practical suggestions for educators but also a way of thinking about

institutional purpose and effective educational practices.

Probably the most positive general aspect of learning style awareness starts with the design of an educational programme. Major programmes should be based on an explicit approach to helping participants to learn. This means giving learning a place as one of the obvious aspects of the educational programme, so that time is devoted to it and a real attempt is made to ensure that learners realise that they are there to learn how to learn as much as they are there to learn about their field of study/interest. Individuals are therefore expected to develop their learning abilities within a structured educational programme.

Learning style awareness is seen as a prerequisite for effective self-development. This includes encouraging individuals to build on and improve all their learning style attributes, to improve their existing learning style characteristics and preferences, and to select learning activities that will maximise learning. All of this is necessary if learners are to become effective as learners.

The *Learning Style Assessment Tool* is an instrument that empowers the user with self-knowledge. The *model for learning style promotion in higher education* is the formal presentation of the researcher's representation of awareness of and the accommodation of learning styles in the learning process. This instrument and model are the realisation of long-standing involvement and research into individual differences in the learning process. It is the researcher's professional and personal endeavour to implement the results and products (learning style instrument and model) to the benefit of those individuals who are engaging in the learning process at any level.

It is trusted that this research will provide knowledge that leads to a deeper understanding of learning style individuality among both learners and educators. It is hoped that this research will support educators in becoming successful facilitators of learning and innovative educational practitioners. It is further hoped that learners will become empowered through self-knowledge and act as independent learners with the ultimate aim of becoming a competent, effective and self-actualised workforce.

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LEARNING STYLE ASSESSMENT TOOL (LSAT)
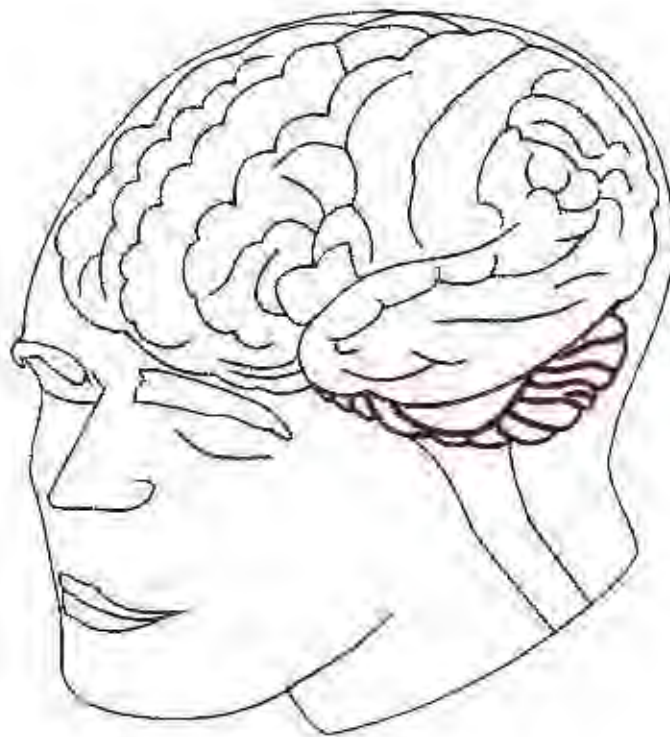
designed by

Gisela H van Rensburg

2002

LEARNING STYLE ASSESSMENT TOOL (LSAT)

designed by

Gisela H van Rensburg

in part fulfilment of the requirements for the degree of DLitt et Phil, UNISA

2002

The Learning Style Assessment Tool (LSAT), based on factor and content analysis, is a comprehensive self-assessment instrument for the identification of how individuals prefer to learn.

The Learning Style Assessment Tool comprises three (3) sections.

Section A: Response continuum

Section B: Scoring procedures

Section C: Identification of learning style

SECTION A: RESPONSE CONTINUUM

Forty items are listed in the table below. For each item, decide which one of the options is most appropriate to/descriptive of you. There is no single correct answer. All the answers are equally acceptable. The purpose of this tool is to describe how you prefer to learn, not to evaluate your learning abilities. It will reveal how you process information. Your individual learning style will thus determine the answers and you will be classified under one of the learning styles identified by the Kolb model of experiential learning. When answering the items, put yourself in the position of a learner (student) in a learning situation or environment.

Completing this exercise should not take you more than 35 minutes.

Complete the following items. Remember, there is no single correct answer. All the answers are equally acceptable.

Response key

Option	Numerical value
Most of the time/generally	5
Over half the time	4
About half the time	3
Less than half the time	2
Seldom or never	1

	ITEMS	5	4	3	2	1
1	I prefer to make a decision spontaneously rather than first questioning the situation or problem.					
2	I prefer to observe when an activity is done rather than participating in the activity.					
3	I will give careful thought to a decision rather than making a logical decision.					
4	I prefer to participate actively in a task rather than remain in the background to observe.					
5	I can apprehend in advance when I have to make a decision and do not have to think a problem over.					
6	I am cautious and formal when I am part of a group rather than expressing my feelings easily.					
7	I will consider an answer first and will not give an impulsive answer.					

	ITEMS	5	4	3	2	1
8	When I am part of a group that has to perform a procedure, I want to participate and not be the one who has to observe the procedure.					
9	When I have to solve a problem, I rather react on intuition than think it over logically.					
10	I will observe an activity closely rather than being involved in performing the action.					
11	I will choose the logical explanation to a problem instead of making my choice based on a hunch that the explanation will be correct.					
12	I want to do the experiment while somebody else has to give feedback on the experiment afterwards.					
13	I interpret information on intuition and not by using intellectual reasoning.					
14	I will rather watch how someone demonstrates an activity than doing it myself.					
15	My decisions are based on a thorough investigation of possible answers rather than letting my emotions influence my thinking.					
16	I will complete an assignment rather than examining the completed assignment.					
17	My decisions are determined by emotion rather than using logical thinking.					
18	When a procedure is demonstrated I prefer to be the bystander and not the one demonstrating it.					

3

	ITEMS	5	4	3	2	1
19	When I perform a task I am very cautious and exact, and will not let my emotions influence me.					
20	I prefer to make decisions rather than closely observing somebody else making them.					
21	My actions are spontaneous and sudden, and I do not plan them ahead.					
22	I will think something over very carefully instead of just doing it.					
23	While working on a problem I am capable of keeping a clear mind, and am not easily influenced by sentimental feelings.					
24	I will produce a plan rather than watching over someone else doing it.					
25	I prefer to feel that an answer is correct and not make a decision based on intelligent thoughts.					
26	I do not want to participate in an activity, unlike other people who always want to do the activity.					
27	When I have to make a decision I think a problem over, and do not act on instinct.					
28	When decisions are made while working on a project, I want to be part of it and not remain at a distance.					
29	I gain knowledge through instinct rather than drawing logical conclusions from facts.					
30	I prefer to watch while others complete the task.					

	ITEMS	5	4	3	2	1
31	When I select an answer I prefer to make a firm decision rather than relying on my feelings that the answer is correct.					
32	I prefer to write a report rather than overseeing it being done.					
33	I use insight to select an answer rather than thinking the answer over logically.					
34	I prefer to discuss the steps of a procedure rather than doing the procedure myself.					
35	When I write a report I think it through academically and do not let my emotions influence my thoughts.					
36	I will find the explanation for a solution, while another person deliberates it/thinks it over.					
37	I will choose an answer based on a suspicion that it is correct, and not because it is the logical choice.					
38	It is better to mediate a problem instead of producing a solution to the problem immediately.					
39	When I select an answer I first judge all the answers to ascertain the value of each one, and am not affected by external influences.					
40	When a new procedure is developed, I prefer to practise using it rather than observe and give my opinion on it.					

SECTION B: SCORING PROCEDURES

The Learning Style Assessment Tool (LSAT) contains four learning modes. There are ten items associated with each learning mode. The scores for each learning mode are obtained by adding the numerical values assigned to the items in a particular learning mode (Use scoring grid 1). For example, add the numerical values assigned to all the items on the concrete experience learning mode. Do this with all four learning modes.

SCORING GRID 1							
Item	**Value**	**Item**	**Value**	**Item**	**Value**	**Item**	**Value**
1		2		3		4	
5		6		7		8	
9		10		11		12	
13		14		15		16	
17		18		19		20	
21		22		23		24	
25		26		27		28	
29		30		31		32	
33		34		35		36	
37		38		39		40	
Total CE:		**Total RO:**		**Total AC:**		**Total AE:**	

The four scores that you have obtained are for the four learning modes. Take the four scores of the learning modes and enter them in the spaces provided in scoring grid 2. Then subtract the scores as indicated below to obtain the combined score for each of the two dimensions (ACCE and AERO). You may get a positive answer (eg: 14) or a negative answer (eg: − 12).

SCORING GRID 2	
CE − AC = ACCE	RO − AE = AERO
___ − ___ = _____	___ − ___ = _____

SECTION C: IDENTIFICATION OF LEARNING STYLE

Plot your ACCE and AERO scores on the diagram provided on page 8. Note that both the ACCE and the AERO dimensions have positive and negative scores. For example, if your score for the AERO dimension is -14, you would plot it on the left side of the AERO line. Draw a long horizontal line through the ACCE score and a long vertical line through the AERO score. The two lines will meet to form a 90 degree angle in one of the four quadrants of the diagram. Each quadrant resembles a learning style. Identify your learning style according to where your lines meet. Placing yourself in one of the four quadrants, identifies you as either a converger, a diverger, an accommodator, or an assimilator.

On page 14 of the LSAT you will find two examples of what your plotting might look like, should you be uncertain about how to do it.

ACCE

CONCRETE
EXPERIENCE

Accommo-
dator

Diverger

ACTIVE
EXPERIMENTATION

REFLECTIVE
OBSERVATION

AERO

-38 -36 -34 -32 -30 -28 -26 -24 -22 -20 -18 -16 -14 -12 -10 -8 -6 -4 -2   2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38

38
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-36
-38

Converger

Assimilator

ABSTRACT
CONCEPTUALISATION

8
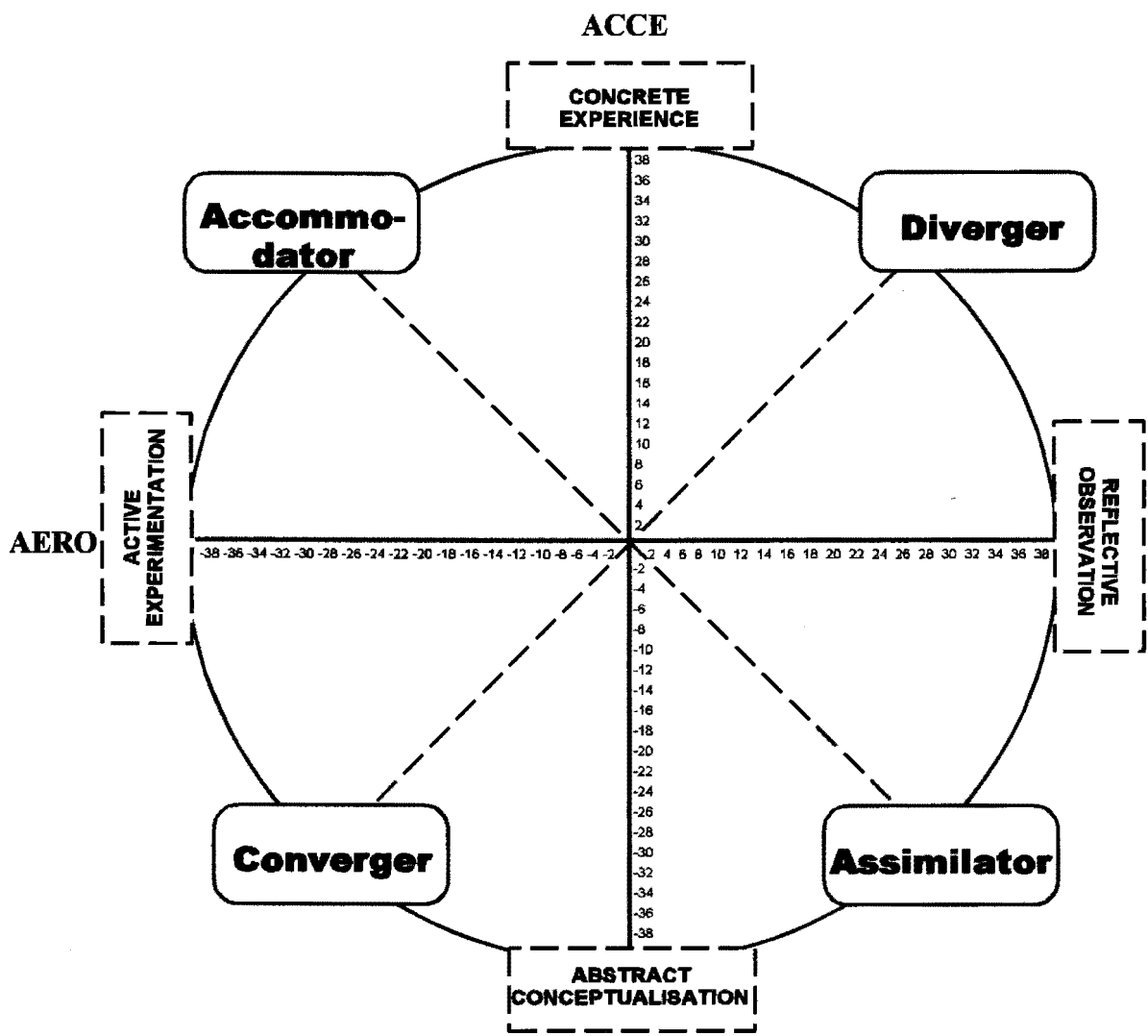
You have placed yourself in one of the four quadrants of the diagram. Each quadrant resembles a learning style. Each learning style has certain learning characteristics and preferences. You may also lie fairly close to the middle of the diagram, which means that you have a combination of the learning characteristics and preferences of two or more learning styles.

The learning characteristics and preferences of each learning style are described below.

Convergent learning style (Converger)

The converger learns through:

- problem-solving, decision-making and the practical application of ideas
- logical and analytical thinking, with a narrow focus on practical fast-paced thinking
- technical hands-on activities
- activities that stimulate application of newly acquired knowledge and skills
- creating new ways of thinking and doing
- experimenting with new ideas

The converger prefers to:

- process information by grasping it through symbolic representation and transform it through behavioural extension
- deal with technical tasks and problems, rather than social and interpersonal issues
- find a single correct answer or solution to a question or problem
- do activities as opposed to observing others doing the activities
- apply theoretical approaches to practical situations

The converger:

- has dominant learning abilities of abstract conceptualisation and active experimentation
- is controlled in expression of emotion
- focuses on specific problems through hypothetical-deductive reasoning

- wants knowledge that can be applied

- wants to see results

- actively influences others to change situations

- is pragmatic

- emphasises thinking over feeling

- sets goals

- prefers a learning environment that emphasises abstract conceptualisation

Divergent learning style (Diverger)

The diverger learns through:

- imaginative abilities and awareness of meaning and values

- viewing concrete situations from many perspectives and then organising the many relationships into a meaningful *gestalt*

- lateral thinking that is productive or imaginative

- allowing emotions and intellect the freedom to explore possibilities

- an awareness of meaning and values

- starting with the known

- educator-learner interaction

The diverger prefers to:

- grasp information through tangible experiences and transform it through intellectualisation

- adapt by observation rather than action

- emphasise understanding rather than the practical application of knowledge

- be open-minded

- get involved by expressing existing knowledge

The diverger:

- has dominant learning abilities of concrete experience and reflective observation

- performs better in situations where alternative ideas and implications are generated, such as group discussions and brainstorming sessions
- is interested in people
- is creative and emotion-oriented
- values people
- emphasises feelings rather than thinking/cognition
- is intuitive and artistic
- values patience and impartiality
- is imaginative
- personalises learning by connecting it with something familiar in own life experience
- is sensitive to people's feelings and values
- prefers a learning environment that emphasises concrete experience

Assimilative learning style (Assimilator)

The assimilator learns through:

- the watching and thinking dimensions of learning.
- reasoning inductively and creating theoretical and conceptual models
- assimilating disparate observations into an integrated explanation
- focusing on logic, ideas and concepts
- organising information
- integrating new knowledge with past experience

The assimilator prefers to:

- process information through symbolic representation and intellectualisation
- learn in a traditional lecture room environment
- focus the educator's delivery of content
- learn from factual information
- reason by induction
- plan systematically

*   design experiments
*   analise quantitative data

The assimilator:

*   has dominant abilities of abstract conceptualisation and reflective observation
*   is less focussed on people
*   is more concerned with ideas and abstract concepts
*   values facts and knowledge
*   tends to be scientific as opposed to artistic
*   values precision, rigor and analysis
*   emphasises thinking over feeling
*   puts less emphasis on interaction
*   values expert knowledge
*   emphasises reflection over action
*   tends to be understanding rather than pragmatic
*   has an awareness of abstract concepts
*   needs time to reflect on what has been learned
*   prefers a learning environment that emphasises reflective observation

Accommodative learning style (Accommodator)

The accommodator learns through:

*   the feeling and doing dimensions of learning
*   'hands-on' situations associated with emotions
*   situations where one must adapt oneself to changing immediate circumstances
*   commitment to objectives
*   taking action, experimenting and modifying situations

The accommodator prefers to:

- grasp information through tangible experiences and transform it through behavioural extension
- do things, carry out tasks and plans and get involved in new experiences
- discard theory or plans that do not fit the facts
- rely on others for information, rather than on his or her own analytical ability
- explore options and modifications

The accommodator:

- emphasises concrete experience and active experimentation
- seeks opportunities and takes action and risks
- approaches problem-solving in an intuitive trial-and-error manner
- is at ease with and values people
- is impatient
- is intuitive, involved and open-minded
- emphasises feeling over thinking
- tends to be artistic rather than scientific
- relies on others for information rather than analysing facts or situations for himself or herself
- prefers activities that connect newly acquired knowledge to own life and goals
- is good at carrying out plans but less concerned with theoretical rationale for actions
- prefers a learning environment that emphasises active experimentation

Example 1:
ACCE = 18
AERO = 18
This learner is a diverger
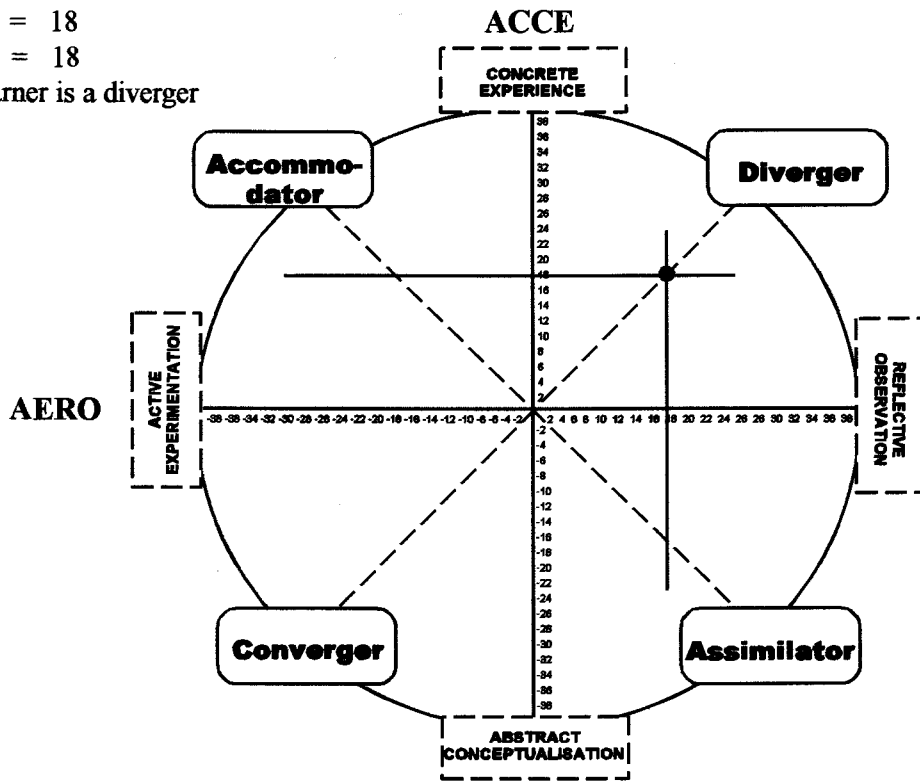
Example 2:
ACCE = –20
AERO = 10
This learner is an assimilator

14
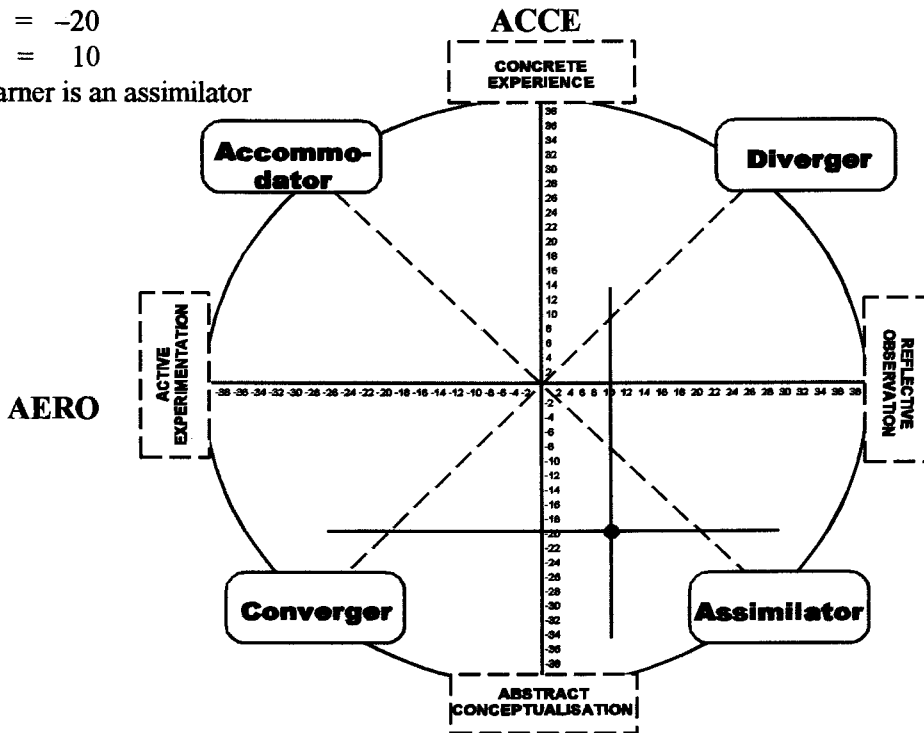
Annexure B

Evaluation of Learning Style Assessment Tool

- Letter of permission
- Covering letter to key participants
- Questionnaire 1
- Covering letter to general participants
- Questionnaire 2

9 May 2002

GH van Rensburg
436 North Side
0081

E-Mail - VRENSGH@unisa.ac.za

Dear Gisela

REQUEST FOR PERMISSION TO DO RESEARCH ON LEARNING STYLES

As per your letter dated 6th May 2002, permission is hereby given to include learners from the Netcare Academy to participate in the qualitative evaluation of the newly developed learning style instrument.

I will definitely be interested in the final report.

Kind regards

EILEEN BRANNIGAN
GROUP NURSING MANAGER

436 North Side
Lynnwood
0081
9 May 2002

Dear Participant

RESEARCH ON LEARNING STYLES

I am currently doing research towards a DLitt et Phil degree at the University of South Africa. One of the phases of the research, titled *Learning styles: implications for higher education*, is to develop an instrument to determine one's own learning style. The newly developed Learning Style Assessment Tool (LSAT) has to be evaluated in order to finalise it.

Attached is a questionnaire. It will be highly appreciated if you could complete it after you have used the LSAT. A copy of the LSAT is included, which also contains an explanation of the learning preferences associated with the different learning styles.

Your personal identity will only be known to me. Data summarised in the thesis will not reveal this information. No other person will have access to your personal identity, except with your written consent.

You are regarded as an important participant in the process of finalising the instrument. Your specific professional characteristics and expertise make you eligible to participate in this process. Participation is, however, voluntary. Your involvement should not exceed 45 minutes. By participating, you can contribute towards the aim of acknowledging and promoting individual differences expressed in learning styles in the field of higher education. The final instrument will be submitted as part of the thesis during June 2002. The thesis will be available after it has been accepted, should you be interested in the final report.

Thank you for your contribution.

Gisela van Rensburg
Tel (h) 361 3841   Cell: 082 892 0959

QUESTIONNAIRE 1

EVALUATION OF THE LEARNING STYLE ASSESSMENT TOOL (LSAT)

1 Biographic data

Complete the following items by either making a tick (✓) or writing a comment.

1.1 What is your profession?

Educator   ☐

Psychologist   ☐

Statistician   ☐

Linguist   ☐

Graphic designer   ☐

Other (specify)

_____

1.2 In which type of institution are you employed?

University   ☐

Technikon   ☐

College   ☐

Other (specify)

_____

1.3 Briefly explain your professional role in the above institution. If you are an educator, indicate the learning area in which you are teaching.

_____

_____

_____

_____

1.4 Are you familiar with the concept *learning style*?   Yes ☐   No ☐

1.5   To what extent are you familiar with the concept *learning style*?

Not applicable (only if the answer to 1.4 is *no*)   ☐

Basic knowledge   ☐

Expert knowledge   ☐

Apply the knowledge to practice   ☐

Research on the concept   ☐

Other (specify)

_____

2   Structure of the LSAT

Response key

Option	**Numerical value**

Strongly agree	5
Agree	4
Neutral	3
Disagree	2
Strongly disagree	1

Indicate the level to which you agree with the comment by making a tick (✓) in the appropriate block. You may also use the space provided below for any comments related to the item.

2.1   The instructions are clear

5	4	3	2	1

_____

_____

2.2   The items are clear

5	4	3	2	1

_____

_____

2.3   The language used in the items is easily understandable

5	4	3	2	1

_____

_____

2.4   I was able to do the analysis without difficulty

5	4	3	2	1

_____

_____

2.5   The length of the LSAT is reasonable

5	4	3	2	1

_____

_____

3   Content of the LSAT

Response key

Option	Numerical value
Strongly agree	5
Agree	4
Neutral	3
Disagree	2
Strongly disagree	1

Indicate the level to which you agree with the comment by making a tick (✓) in the appropriate block. You may also use the space provided below for any comments related to the item.

3.1   There is bias towards a specific learning style.

5	4	3	2	1

_____

_____

_____

_____

3

3.2   The choice you have to make in an item is realistic.

5	4	3	2	1

_____
_____
_____
_____

3.3   The explanation of the learning preferences and characteristics of the learning styles are clear.

5	4	3	2	1

_____
_____
_____
_____

3.4   There are items that you think should <u>not</u> be included in the LSAT.

5	4	3	2	1

_____
_____
_____
_____

3.5   There are additional items that you think should be included in the LSAT. Please write the item/s in the space below.

5	4	3	2	1

_____
_____
_____
_____

4 Practical implementation of the LSAT

Response key

Option	Numerical value
Strongly agree	5
Agree	4
Neutral	3
Disagree	2
Strongly disagree	1

Indicate the level to which you agree with the comment by making a tick (✓) in the appropriate block. You may also use the space provided below for any comments related to the item.

4.1　It is important that you know your learning style.

5	4	3	2	1

_____
_____
_____
_____

4.2　Knowledge of your learning style will influence the way you approach the learning process.

5	4	3	2	1

_____
_____
_____
_____

4.3　The LSAT has the potential to be used in higher education.

5	4	3	2	1

_____
_____
_____
_____

4.4   The LSAT is too difficult to use for someone who does not have knowledge of the concept *learning style*.

5	4	3	2	1

_____

_____

_____

_____

4.5   Knowledge of a group's learning styles will be of value when you work in a group.

5	4	3	2	1

_____

_____

_____

_____

4.6   Knowledge of your and your team members' learning styles will be of value when you have to manage a project in future.

5	4	3	2	1

_____

_____

_____

_____

5   Validity of the LSAT

Response key

Option	Numerical value
Strongly agree	5
Agree	4
Neutral	3
Disagree	2
Strongly disagree	1

Indicate the level to which you agree with the comment by making a tick ($\checkmark$) in the appropriate block. You may also use the space provided below for any comments related to the item.

5.1   The LSAT measures learning styles.

5	4	3	2	1

_____

_____

_____

5.2   There are a sufficient number of items to clearly explain your learning style.

5	4	3	2	1

_____

_____

_____

5.3   The LSAT appears to be relevant to measuring learning style.

5	4	3	2	1

_____

_____

_____

5.4   The description of your learning style given in Section C of the LSAT corresponds with your typical learning preferences and characteristics.

5	4	3	2	1

_____
_____
_____

5.5   I agree that the descriptions of the <u>other</u> learning styles, as given in Section C of the LSAT, are less dominant of my learning style.

5	4	3	2	1

_____
_____
_____

5.6   I understand what a learning style is.

5	4	3	2	1

_____
_____
_____

6   Comments

Use the space below, should you wish to make any other comments that can contribute to the finalisation of the LSAT.

_____
_____
_____

Thank you for your valuable contribution and time.

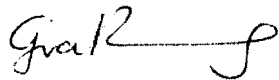436 North Side
Lynnwood
0081
9 May 2002

Dear Participant

RESEARCH ON LEARNING STYLES

I am currently doing research towards a DLitt et Phil degree at the University of South Africa. One of the phases of the research, titled *Learning styles: implications for higher education*, is to develop an instrument to determine one's own learning style. The newly developed Learning Style Assessment Tool (LSAT) has to be evaluated in order to finalise it.

Attached is a questionnaire. It will be highly appreciated if you could complete it after you have used the LSAT. A copy of the LSAT is included, which also contains an explanation of the learning preferences and characteristics associated with the different learning styles.

You are regarded as an important participant in the process of finalising the instrument. Your specific characteristics and experiences as learner make you eligible to participate in this process. Participation is voluntary and anonymous. Your involvement should not exceed 45 minutes. By participating, you can contribute towards the aim of acknowledging and promoting individual differences expressed in learning styles in the field of higher education. The final instrument will be submitted as part of the thesis during June 2002. The thesis will be available after it has been accepted, should you be interested in the final report.

Thank you for your contribution.

Gisela van Rensburg
Tel (h) 361 3841   Cell: 082 892 0959

EVALUATION OF THE LEARNING STYLE ASSESSMENT TOOL (LSAT)

1   Biographic data

Complete the following items by either making a tick (✓) or writing a comment.

1.1   In which type of institution are you a learner?

University   ☐

Technikon   ☐

College   ☐

Other (specify)

_____

1.2   Briefly explain your field of study.

_____

_____

_____

_____

_____

1.3   Indicate your level of study (for example first year).

_____

_____

2   Structure of the LSAT

Response key

Option	Numerical value
Strongly agree	5
Agree	4
Neutral	3
Disagree	2
Strongly disagree	1

Indicate the level to which you agree with the comment by making a tick (✓) in the appropriate block. You may also use the space provided below for any comments related to the item.

2.1   The instructions are clear

5	4	3	2	1

_____

_____

2.2   The items are clear

5	4	3	2	1

_____

_____

2.3   The language used in the items is easily understandable

5	4	3	2	1

_____

_____

2.4   I was able to do the analysis without difficulty

5	4	3	2	1

_____

_____

2.5   The length of the LSAT is reasonable

5	4	3	2	1

_____

_____

3   Content of the LSAT

Response key

Option	Numerical value
Strongly agree	5
Agree	4
Neutral	3
Disagree	2
Strongly disagree	1

Indicate the level to which you agree with the comment by making a tick (✓) in the appropriate block. You may also use the space provided below for any comments related to the item.

3.1   There is bias towards a specific learning style.

5	4	3	2	1

_____

_____

_____

_____

3.2   The choice you have to make in an item is realistic.

5	4	3	2	1

_____

_____

_____

_____

3.3   The explanation of the learning preferences and characteristics of the learning styles are clear.

5	4	3	2	1

_____

_____

_____

_____

3.4   There are items that you think should <u>not</u> be included in the LSAT.

5	4	3	2	1

_____

_____

_____

_____

3.5   There are additional items that you think should be included in the LSAT. Please write the item/s in the space below.

5	4	3	2	1

_____

_____

_____

_____

4   Practical implementation of the LSAT

Response key

Option	Numerical value
Strongly agree	5
Agree	4
Neutral	3
Disagree	2
Strongly disagree	1

Indicate the level to which you agree with the comment by making a tick (✓) in the appropriate block. You may also use the space provided below for any comments related to the item.

4.1   It is important that you know your learning style.

5	4	3	2	1

_____

_____

_____

_____

4.2   Knowledge of your learning style will influence the way you approach the learning process.

5	4	3	2	1

_____

_____

_____

4.3   The LSAT has the potential to be used in higher education.

5	4	3	2	1

_____

_____

_____

_____

4.4 The LSAT is too difficult to use for someone who does not have knowledge of the concept *learning style.*

5	4	3	2	1

_____

_____

_____

_____

4.5 Knowledge of a group's learning styles will be of value when you work in a group.

5	4	3	2	1

_____

_____

_____

_____

4.6 Knowledge of your and your team members' learning styles will be of value when you have to manage a project in future.

5	4	3	2	1

_____

_____

_____

_____

## 5	Validity of the LSAT

Response key

Option	Numerical value
Strongly agree	5
Agree	4
Neutral	3
Disagree	2
Strongly disagree	1

Indicate the level to which you agree with the comment by making a tick (✓) in the appropriate block. You may also use the space provided below for any comments related to the item.

5.1	The LSAT measures learning styles.

5	4	3	2	1

_____
_____
_____

5.2	There are a sufficient number of items to clearly explain your learning style.

5	4	3	2	1

_____
_____
_____

5.3	The LSAT appears to be relevant to measuring learning style.

5	4	3	2	1

_____
_____
_____

5.4   The description of your learning style given in Section C of the LSAT corresponds with your typical learning preferences and characteristics.

5	4	3	2	1

_____

_____

_____

5.5   I agree that the descriptions of the <u>other</u> learning styles, as given in Section C of the LSAT, are less dominant of my learning style.

5	4	3	2	1

_____

_____

_____

5.6   I understand what a learning style is.

5	4	3	2	1

_____

_____

_____

6   Comments

Use the space below, should you wish to make any other comments that can contribute to the finalisation of the LSAT.

_____

_____

_____

Thank you for your valuable contribution and time.

Annexure C

Evaluation of the model for learning style promotion in higher education

- Covering letter to participants
- Questionnaire 3

436 North Side
Lynnwood
0081
7 June 2002

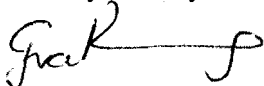Dear Participant

RESEARCH ON LEARNING STYLES

I am currently doing research towards a DLitt et Phil degree at the University of South Africa. One of the phases of the research, titled *Learning styles: implications for higher education*, is to develop a conceptual model for learning style promotion in higher education. The newly developed model has to be evaluated in order to finalise it.

Attached is a questionnaire, with an accompanying discussion of the model as well as the model itself. It will be highly appreciated if you could complete the questionnaire after you have evaluated the model.

Your personal identity will only be known to me. Data summarised in the thesis will not reveal this information. No other person will have access to your personal identity, except with your written consent.

You are regarded as an important participant in the process of finalising the model. Your specific professional characteristics and expertise make you eligible to participate in this process. Participation is, however, voluntary. By participating, you can contribute towards the aim of acknowledging and promoting individual differences expressed in learning styles in the field of higher education. The final model will be submitted as part of the thesis. The thesis will be available after it has been accepted, should you be interested in the final report.

Thank you for your contribution.

Gisela van Rensburg
Tel (h) 361 3841   Cell: 082 892 0959

QUESTIONNAIRE 3

EVALUATION OF THE MODEL FOR LEARNING STYLE PROMOTION IN HIGHER EDUCATION

1 Biographic data

Complete the following items by either making a tick (✓) or writing a comment.

1.1 What is your involvement in higher education?

_____

_____

_____

_____

1.2 In which type of institution are you employed?

University ☐

Technikon ☐

College ☐

Other (specify)

_____

1.3 You are regarded as being eligible to evaluate a conceptual model. Briefly explain your professional experiences with model development or evaluation.

_____

_____

_____

_____

1

2   Evaluation of the model

2.1   In the explanation of the model, the major concepts, related concepts and interrelationships between concepts are described. Please give your view with regards to the clarity, congruency and consistency of the explanations of the concepts, and the explanation of the relationships between the concepts.

_____

_____

_____

_____

_____

_____

2.2   The five parts of the model are individually presented before the model is presented as a whole. Please comment on the explanation of each part and the compatibility and coherence of the structures presented by the parts in comparison to the explanations given on the parts.

_____

_____

_____

_____

_____

_____

2.3   The five parts form a whole when the complete model is depicted. Please comment on the whole structure of the model with regards to the representation of the concepts, the flow of the model, and the sequence of the presentation of the parts.

_____

_____

_____

_____

_____

_____

2.4   An important requirement for the model is that it must be simple enough to use. What is your view with regards to the number of concepts and relationships in the model, and the understanding of the processes that are depicted by the model.

_____

_____

_____

_____

_____

_____

2.5   The model was designed for the educational environment of higher education. In your opinion, is this model applicable to higher education? Please give your reasons.

_____

_____

_____

_____

_____

_____

2.6   Does the model have potential to influence educators in higher education to be more flexible and creative in their education? Please give your reasons.

_____

_____

_____

_____

_____

_____

2.7   What would you say is the most important contribution that this model can make to the educational environment of higher education?

_____

_____

_____

_____

_____

_____

2.8   Can the model be used in the practical field of your programme, or be adapted to suit your field of education? Please explain your answer.

_____
_____
_____
_____
_____
_____

2.9   Can the model be implemented in a team approach? Please explain your answer.

_____
_____
_____
_____
_____
_____

2.10   Can the model be implemented without any additional costs in material and human resources? Please explain your answer.

_____
_____
_____
_____
_____
_____

2.11   Can the model be implemented without additional training of the educators using it? Please explain your answer.

_____
_____
_____
_____
_____
_____

2.12   Does the model correspond with the needs of the adult learner? Please explain your answer.

_____

_____

_____

_____

_____

_____

2.13   The method used to develop this model was an analytical research study. Please comment on the validity of the model with regards to the methods used to develop the model. its defensibleness as a qualitatively different approach to education, and the theoretical assumptions accompanying the model.

_____

_____

_____

_____

_____

2.14   What is your personal view of the model. Your comments may be based purely on feelings.

_____

_____

_____

_____

_____

_____

Thank you for your valuable contribution and time.

DECLARATION

I hereby declare that I am employed as an editor and translator in the Editorial Department at Unisa and I have edited the thesis entitled "Learning styles: implications for higher education", submitted by Gisela H van Rensburg in fulfilment of the requirements for the degree of DLit et Phil.

AA Mills

AA Mills
BA Hons