THE USE OF INFORMATION TECHNOLOGY IN IMPROVING DECISION MAKING AND PLANNING IN THE MANAGEMENT OF SENIOR SECONDARY SCHOOLS IN BOTSWANA

by

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AUTHOR DECLARATION

(a) The material included in this dissertation has not been submitted wholly or in part for any other academic award.

(b) The programme of study for which this dissertation is part has included completion of the following eight courses:

1. Public and municipal personnel administration and management (HPERSA-K)
2. Management of public and municipal finance (HRFINS-E)
3. Planning and policy analysis in the public sector (HBEBEP-3)
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ABSTRACT

The study was undertaken with a view to establishing the extent to which information technology was used in improving decision making and planning in the senior secondary schools in Botswana. The study included an extensive review of published literature on planning and decision making as some of the management functions. The review also included information technology and related technologies as well as the potential role thereof on planning and decision making in senior secondary schools.

The study also included the use of a questionnaire to collect relevant data from heads of senior secondary schools in Botswana. The analysis of the collected data has revealed that the information technology facilities are available in senior secondary schools in Botswana. However, heads of these schools do not have the necessary skills to optimally use the facilities in improving planning and decision making in their schools. The study culminated in a number of proposals.

Key terms

Public administration
Management
Information technology
Decision making
Planning
Administrative innovation
Data banks
Knowledge
Efficiency
Effectiveness

CHAPTER 1

INTRODUCTION

1.1 Introduction

In this chapter the intent is to set out the nature and scope of the dissertation as well as to outline its structure. The general overview of the dissertation is presented in this chapter as well as the problem statement and the hypothesis. In addition, the research method and research questions are presented in the chapter and so is the significance of the study. Key concepts in the dissertation are briefly clarified in the chapter.

1.2 General overview

The modern world is characterized by, amongst others, technological advancement resulting from research and development. This has given rise to the proliferation of information technology. Public and, to a large extent, private institutions use information technology to enhance the provision of goods and services to the world community. The use of information technology (IT) in the management of public institutions has the potential of IT improving the quality of management performance. In particular, the use of IT can improve planning and decision making practices in the public sector. Public institutions such as schools handle and use a lot of data so much so that the need for the use of IT to promote efficiency and effectiveness can never be over-emphasized. Technological advancement brought about progress but also challenges to those in positions of authority. Values and expectations of the society continue to change and the need to meet these challenges is ever pressing. The advent of

new technology necessitates deliberate effort on the part of public managers to be familiar and conversant with such technology. Heads of secondary schools are no exception particularly because of the large volume of data they handle.

1.3 Problem statement and hypothesis

The availability of IT as well as the fluency in its use is a *sine qua non* (essential) for improved management practices in the public sector. IT can effectively guide decision making and planning practices in public institutions such as secondary schools where volumes of data are handled on regular basis. The Government of Botswana has provided senior secondary schools in the country with computers and associated facilities for use by students, staff and those in management positions. It does seem however, that there has not been any deliberate effort to put in place a proper programme to enable particularly those in school management to effectively use information technology in their schools. In view of the aforementioned problem, the following hypothesis will be investigated in this dissertation:

> " Senior secondary school heads in Botswana are competent users of information technology in guiding their decision making and planning practices"

The study is therefore going to confirm or refute the hypothesis and determine the extent to which school heads have access to the benefits of information technology. The ability to optimally use IT is associated with the ability to efficiently and effectively manage information in schools as public institutions. It may further be stated that the quality of information management has a bearing on the quality of decisions that are based on such information. Testing the hypothesis will also enable the author to confirm or refute the statement that:

> "there has not been any deliberate effort to put in place a proper programme to enable particularly those in school management to effectively use IT in their schools".

The aforementioned hypothesis will be tested by way of providing answers to some research questions. The questions will also facilitate or suggest possible solutions to the stated problem.

1.4 Research questions

There are many questions that can be deduced from the aforementioned problem statement. The following are but some of such questions:

- What is decision making?
- What is planning and its relevance in public administration?
- Can the use of IT impact on decision making?
- To what extent does IT impact on decision making?
- What is the relevance of IT to planning in the public administration?
- How does the use of IT impact upon the decision making and planning activities of school heads?
- Has there been any programme designed to train senior secondary school heads in the use of information technology?
- Is it expected of school heads to use IT?
- Are computers available in senior secondary schools?
- What benefits can be derived from the competent use of IT by school heads?
- To what extent has the advent of a computer affected the management practices of the school heads in general?
- To what extent do human resource development programmes accommodate the use of IT?
- How could the use of IT improve the efficiency of the school head?
- To what extent could effective management of information by the school head improve the effectiveness and efficiency of a school?

- What is the relationship between globalization and the school heads' proficiency in the use of IT?
- What is the relationship between the use of IT and personal development of school heads?

1.5 Purpose and significance of the study

The study is of relevance particularly to Botswana and other developing countries which are aspiring for technological advancement. It does appear that there is a tendency to acquire new technology without a commensurate effort to develop the competency to use the same technology. Public funds expended on the acquisition of such technology can not be rationally justified if its use is below optimality. The study will therefore highlight this problem. This could also be a source of inspiration to develop technological fluency of the human capital within the confines of the available technology.

The research will enable the subjects of the study to evaluate their skills insofar as the use of IT is concerned. Once their shortcomings have been brought to working memories then it is hoped that they will find ways and means of developing the necessary competencies. To a novice in IT the study will integrate what seems to be unrelated, namely IT on the one hand and planning and decision making on the other hand. The significance of this integration is valid across the entire public sector and its relevance should transcend the frontiers of national states. A study on the use of IT in improving planning and decision making in the management of senior secondary schools in Botswana can add value to the practice of public administration and its academic counterpart.

It is envisaged that the study will be of significance to public managers (and, by association, school heads) and motivate them to seek ways and means to

professionalize the use of IT to enhance their personal development and managerial effectiveness.

1.6 Focus and frame of reference of the study

The hypothesis stated above delimits the focus of the study as it is closely linked to the topic of this dissertation. The primary focus of this study is to test the extent to which the stated hypothesis is true or not. In this context, the extent to which senior secondary school heads use IT will be examined together with the nature and scope of the availability of these technologies. It must be stated that over and above the primary focus there are various ancillary foci which will also be addressed with a view to achieving a vivid description of the main objective of the study.

One of the ancillary foci is to establish the scope of the lag between technological innovation and administrative innovation. In this context, the study examines the extent to which management practices in senior secondary schools have been adapted to the contemporary knowledge based technologies. In particular, the study examines the planning and decision making practices and the extent to which IT is used to enhance these activities.

In the process, the study elucidates the benefits that are most likely to be derived from a rigorous adoption of information technology in the management of public institutions like schools. For this reason, various facets of management are examined with a specific focus on decision making and planning. In other words these latter concepts are also explored through literature review. The competency in the use of information technology and the stress level of public managers is also examined. Furthermore, the study highlights the need for public institutions to occasionally embrace new ways of doing things with a view to professionalising their management practice. The need for professional

management of change by public managers is also examined with a view to providing evidence that the deficiency of this competence has the propensity to exacerbate the organisational lag from a sociotechnical perspective.

Another ancillary focus of the study is to explore the significance of accurate information in the quest for quality decision making. In this context the concept of information and the attendant concept of data and the collection thereof are examined insofar as they guide planning and decision making processes. All this is addressed from the perspective of increasing productivity and efficiency in the public sector.

Botswana is a relatively small country in terms of population if not in area. The population of the country is less than two million people according to projections from the 2001 population census. There are only twenty-seven senior secondary schools in the country (2001), which will constitute the focus of the study.

1.7 Design and research method of the study

The central concepts of the study are explored through the review and analysis of published literature and this constitutes a significant part of the study. Literature review also addresses some of the ancillary foci of the study.

The bulk of the study was conducted through a survey of the public managers in question, namely senior secondary school heads in Botswana. A questionnaire (see appendix A) was used to collect primary data from the subjects of the study. As mentioned in paragraph 1.6 there are only twenty-seven senior secondary schools in Botswana and this is the scope of the study. Over and above the use of a questionnaire, personal interviews have also been used. The objective of the study and the attendant foci are therefore addressed through a

combination of these methods with the use of a questionnaire being the key method of the study.

1.8 Terminological clarification

In this section, the focus is on clarification of key concepts in the dissertation albeit in brief because the same concepts are elaborated upon under conceptual overview in chapter two. Management is one of the key concepts in this dissertation and is viewed as an undertaking by people in leading positions to work with and through others and other resources to achieve the goals of the institution they inhabit (Hersey & Blanchard, 1993:5). Planning is one of the management functions and is concerned with determining future actions aimed at achieving the goals of the institution. Decision making is another management function and is regarded as a conscious choice between various alternative courses of action (Andrews, 1988:14). The other key concept is information technology (IT), which is basically the application of computers and communication technologies in storage, processing and transfer of information (Chisenga, 1995:20). The intent is to establish the impact that IT can have on planning and decision making in senior secondary schools. Technological innovation refers to the implementation of a new idea or kind of equipment for a product, process, or service. On the other hand administrative innovation refers to the implementation of a new idea to change and improve the social system of an institution to enhance the capacity to meet its obligations (Evan, 1993:122).

1.9 Exposition of chapters

Chapter one, as an introductory chapter, outlines the structure of the dissertation and how it progresses. **Chapters two and three** are devoted exclusively to literature review with the focus on the exploration of some published literature in order to glean what some authors have written about the

central concepts of the dissertation topic as well as international benchmarks in this field. Amongst other things, the following concepts are covered:

- Public administration and management
- Decision making
- Planning
- Information technology
- The role IT can play in decision making and planning in secondary schools
- Information and communication technology (ICT)

Chapter three is more focused on the potential role IT can play in decision making and planning in secondary schools. The chapter provides a global overview of what is being done within this context in other countries both developed and developing. All this is then used as a benchmark with which one compares practices in Botswana senior secondary schools.

Chapter four concentrates on the research method used in collecting data. A questionnaire was used to collect primary data and the choice for this instrument is justified in this chapter. In addition, the research process is outlined. The development of the data collecting instrument, piloting and data collection are discussed in the chapter.

The fifth chapter**, chapter five**, concentrates on research data analysis. In this chapter research data are collated, analyzed and presented in a digestible form. Interpretation of data is also done in this chapter.

Chapter six of the dissertation is the concluding chapter and therefore consolidates the preceding chapters. It provides conclusions that relate specifically to the hypothesis stated in paragraph 1.3 above. In particular, a summary, conclusions and some proposals are presented in this chapter.

1.10 Conclusion

The use of information technology in public institutions like secondary schools can effectively guide decision making and planning practices. The intent of the study is to determine the extent to which senior secondary school heads in Botswana use IT to guide decision making and planning in their schools. The study could inspire the said school heads to enhance their technological fluency within the confines of the available technology. The problem statement and the hypothesis have been presented in this chapter together with the research questions and the concomitant research method. Various key concepts have been briefly clarified in this chapter and are elaborated upon in the next chapter, that is chapter two.

CHAPTER 2

CONCEPTUAL OVERVIEW

2.1 Introduction

The aim of this chapter is to elucidate the key concepts of the dissertation, namely public administration and management, decision making, planning, information technology (IT) and, to some extent, information and communication technologies (ICTs) will be analysed. The purpose of all this is to give a theoretical background to the study that is being undertaken and, more importantly, to enable the author (and the reader) to have a broader understanding of these concepts. In addition, these concepts are being elaborated upon in order to establish how IT can be used in improving decision making and planning in senior secondary schools in Botswana. IT and related technologies are topical concepts and have recently gained popularity in terms of their application in the private sector. Although the public sector is lagging behind in terms of the application of IT, public institutions stand to gain from the use of IT in their management functions.

2.2 Public Administration

Various authors have written about the concept of Public Administration as a discipline and public administration as a field of activity in the public sector. The latter is the primary focus here. Perhaps one should first briefly discuss the general concept of administration before going into the specific area of public administration.

2.2.1 Administration

Administration is mostly associated with the public sector. For example, Baxter (1991:99) argued that "more often the term is used as an informal reference to the machinery of executive government as a whole, or as a reference to the executive branch of government..." On the other hand Mullins (1989:200) has observed that administration is associated more popularly with the public sector institutions and refers to the "highest level of management (top management) and to the functions of establishing the overall aims and formulating policy for the organisation as a whole." These two views on administration do not suggest what administration is except for its association with the public sector. The second view has attempted to suggest what administration entails but it is deficient in that administration entails more than establishing the overall aims and formulating policy for the institution as a whole. It is suggested that administration is a feature of both public and private institutions. In this dissertation, the generic view of administration is espoused. Ströh and Van der Westhuizen (1994:10) contended that "in terms of such view, it is recognised that administration comprises specific generic administrative functions/activities, namely policy determination and execution, organising, financing, personnel provision and utilisation, work procedures and methods, and control, and that all members of the institution are responsible for these." This suggests that administration is not just the province of top officials of an institution but, instead, all members are involved though not to the same degree. The most junior officials are the least involved whilst those at the pinacle of the institution are the most involved. Administration is directed at the achievement of objectives by enabling the functional work of an institution (private and public) to be performed. To this end, Adlem, Brynard and Mynhardt (1993:168) have

argued that "administration does not refer to all the activities of all the members, nor to all the activities of a particular group of members, but only to specific activities of all the members whose work is directed towards the functional work of other members." It may be added that functions which constitute administration are regarded as generic because they are omnipresent in any goal-oriented institutionalised group activity. In this regard administration can be viewed as a means towards an end since it facilitates the performance of the functional work.

2.2.2 Public administration

The definition of the concept of public administration as a field of activity can very well be influenced by ones interests. These could be in the form of ideological, moral or political views. However, Pauw and Wessels (1999:22) have defined public administration as "the organised, non-political, executive functions of the state." The functions are viewed broadly to encompass services, activities as well as public institutions as machinery of governance. The apolitical aspect of the definition derives from the conviction that impartial public service can not be rendered when officials are at the same time struggling for power which is characteristic of politics. However, Pauw does not refute the obvious fact that public officials have a significant role to play in policy determination and implementation and that they translate political goals into action. The definition is a normative rather than an empirical perception of the concept influenced by the desire to have an impartial public service (Pauw & Wessels, 1999:23). The definition however does not reveal what the services and activities are which constitute functions.

From the analysis of administration it can be inferred that public administration is the totality of the generic administrative functions

performed in the public sector. In this regard, Hanekom and Thornhill (1990:7) have viewed public administration as a concept that "consists of the functions of policy making, organisation, financing, staffing and the development of work procedures and control measures, which are performed in public institutions."

It might be instructive at this stage to highlight the distinction between Public Administration and public administration. The former, i.e. starting with capital letters, is an academic subject which belongs to the family of sciences concerned with human activities. It is therefore a social science but with a particular focus and locus which manifests itself in the activities of public institutions and other activities which have a bearing on the general welfare of the populace. As an academic subject it focuses on approaches, concepts and practices in the teaching of the subject and training of public officials. To this end, Kruger and Bernhardt (1993:184) view the focus of the subject as " the way in which people organize their activities in a government context to satisfy their needs for clothing, food and housing, and also their intellectual needs such as the search for knowledge and spiritual welfare." On the other hand public administration, i.e. beginning with small letters, is a field of activity which is directed towards the promotion of the general welfare of the society by accomplishing specific functional objectives (Ströh & Van der Westhuizen, 1994:9). As a field of activity it manifests itself in public institutions but in a political and socio-economic context. It must be emphasized that although administration is a phenomenon of both public and private institutions, public administration is unique to the public sector because the functionaries are invariably constrained by specific and indispensable normative factors which are peculiar to the public sector. These factors are briefly discussed below.

2.2.3 Normative factors

These are the principles or guidelines that those who practice public administration are required to observe. These principles apply in the public sector although traces of some of them may be found in the private sector. Brynard and Hanekom (1993:170) have identified at least five such factors. In addition to these, there are other such factors that have been brought about by the advent of IT in public institutions and a brief discussion thereof is included.

2.2.3.1 Acknowledgement of constitutional supremacy

The functions performed under the auspices of public administration by the executive are defined and authorized by the constitution. This means that officials must perform their functions within the limits set by the constitution as supreme law in Botswana.

2.2.3.2 Public accountability and responsibility

When carrying out public functions the need for public accountability and responsibility should never be overlooked. Collection and expenditure of public funds should be beyond reproach and it should be expected that the legislative institution in a democracy will demand that those acting on its behalf do so in a responsible and accountable manner. In this regard, Normanton in Gildenhuys (1997:58) perceives accountability as "the obligation to expose activities and the results of such activities and to explain and justify them." This suggests that political office bearers and

public officials should not act from base motives but rather in the public interest and without ulterior motives.

2.2.3.3 Criterion of efficiency

The public sector's primary focus is the provision of service to the community whilst that of the private sector is to maximize profit. This suggests clearly that efficiency in the two sectors cannot be measured by the same criteria. The criteria for success for public institutions are not as easy to define as those for private ones because those for public institutions include social and market measures as well as political ones (Horton & Farnham, 1999:27). They are also replete with values which are vulnerable to subjective judgement. Such values could include diligence, honesty, fairness and justness to everyone irrespective of their race, language, religious or political views (Hanekom & Thornhill, 1990:20).

It should however, be argued that those involved in the public administrative process should take cognisance of the need for efficiency (and effectiveness) and endeavour to pursue optimal utilisation of resources and the achievement of optimal utility for the society.

2.2.3.4 Requirements of administrative law

The administrative law is, from a general point of view, meant to regulate the relations of public institutions with private individuals and institutions as well as other public institutions. In particular, "it stipulates a set of common principles which are designed to promote the effective use of administrative power, to protect

individuals and organisations from its misuse, to preserve a balance of fairness between public authorities and those with whom they interact, and to ensure the maintenance of the public interest" (Baxter, 1991:3). This is necessary to ensure that political office bearers and public officials perform their functions without ulterior motives and in accordance with public expectations. In other words morality should be applied to the activities of these officials.

2.2.3.5 Maintenance of democratic principles

Political office bearers and public officials operate within a particular political system. It is therefore incumbent upon these officials to function in accordance with the demands of such a system. For example, in a democratic system both political office bearers and public officials must take cognizance of democratic principles such as involving others in delivering their public functions because this is what is expected of them particularly by the electorate.

These normative factors account, in the main, for the difference between public administration and private administration. Public administration is viewed broadly enough to encompass the totality of administrative actions performed in the public sector with a view to promote the general welfare of the populace. The activities do not occur in vacuum but rather within a framework of a political process and manifest in the spheres of government authority such as legislative, executive and the judiciary. It may be added that public administration is undertaken within the parameters of specific government structures at various levels of government i.e.

local, regional, national and international. (Ströh & Van der Westhuizen, 1994:9).

It can be realised from the foregoing that public administration is a complex undertaking characterised by a myriad of work processes which make the role of the public manager very prominent in the dispensation of the public service.

2.2.3.6 Respect for personal information

The use of information technology in public institutions may involve keeping personnel records in information technology facilities and the use of such facilities must be beyond reproach. In particular, privacy of personal information must be respected and such information should be held and used only for the purposes for which it is legally intended. Personal information should always be treated as confidential and should therefore remain secure and to be disclosed only to those who are meant to have access to it. Besides, changes to personal details without the consent of the owner must be avoided at all costs (Crawford, 1997:216; Kearsley, 1990:181).

2.3 Public management

In order to elucidate the concept of public management it may be necessary to focus first on management in general and this is done below.

2.3.1 Management

Management is a contested concept and therefore has been defined in many different ways by different authors. Here, two definitions are given. Marx in Kroon (1990:6) defined management as "a process whereby people in leading positions use human and other resources as efficiently as possible in order to provide certain products and/or services, with the aim of fulfilling particular needs and achieving the enterprises set goals." This definition regards management as a process of performing various tasks by people in leadership positions. However, the definition does not attempt to suggest what these tasks are.

The second definition is the one crafted by Hanekom, Rowland and Bain (1990:4), namely "management is regarded as an integrated process whereby certain authorized individuals establish, maintain and operate institutions by ensuring the setting of institutional objectives and their optimum achievement." Certainly there are similarities and differences between these definitions. Both recognize management as an integrated process because those in management positions focus on a great variety of tasks and roles almost at the same time. These tasks and roles are essential for the successful operation of an institution. It is also recognised that the process focuses on goals or objectives and the optimum achievement thereof as a responsibility of those in management positions. The first definition is concerned with achieving the enterprises goals whilst the second is concerned with the optimum achievement of institutional objectives. It can therefore be deduced that management is manifested in an institutional context and that it is goal/objective oriented.

2.3.2 Management functions

Various authors on management have come up with different groupings of tasks which are referred to as management functions. For example Uys (1994:19) has identified planning, organisation, leadership and control; Kroon (1990:6) has planning, organisation, activating and controlling; Hersey and Blanchard (1993:6) have planning, organising, motivating and controlling; Hanekom *et al* (1990:26) have planning, decision making, leadership and control. These four examples of different classifications of management functions have certain functions which are common, namely planning and control. However the classification given by Hanekom *et al* is preferred to others for basically two reasons. Firstly the classification has to some extent avoided the inclusion of administrative functions. Secondly, it has recognised the significance of decision making as a function of management, which is also implied in the title of this dissertation. Decision making is not only important in all these other functions but it takes place at all levels of an institution. Of the four management functions, namely planning, decision making, leadership and control, the first two will be discussed later in the chapter because they are some of the key concepts of the dissertation. It must be stated that in order for the management functions to be carried out effectively and efficiently, the public manager must be in possession of some specific skills. Some of these are considered below.

2.3.3 Management skills

It must be accepted that managers need various skills in order to cope with the demands of their multifarious tasks. Hersey and Blanchard (1993:8) have grouped these skills into three broad categories, namely technical skills, human skills, and conceptual skills.

2.3.3.1 Technical skills

This is a category of skills which enables the manager to use resources and scientific knowledge and to apply techniques in order to accomplish the objectives of the institution.

2.3.3.2 Human skills

This refers to the ability to work well with other people and achieve results through them. Like other categories, human skills can be broken down into specific skills. For example, communication, delegation and motivation are specific human skills.

2.3.3.3 Conceptual skills

This is the cognitive capacity to perceive the institution in its totality and the relationship between parts thereof. It includes the ability to understand how change in one unit will affect the other units. It also includes being able to understand the situation one wants to influence and the possible consequences thereof.

2.3.4 Management context

It has been stated in one of the previous paragraphs that management manifests itself in an institutional context. This facet of the concept is looked at more closely in this paragraph. Management can be viewed from at least two contexts, namely the private and/or the public sector. It should be stated that although there are some private institutions which are non-profit oriented the focus here is on profit making private

institutions because they make up the bulk of such institutions. On the other hand public institutions are not concerned with profit but rather with service provision except quasi-governmental ones which are not the focus of this discussion. The public sector comprises many diverse institutions which are created by government to promote the general welfare of the society. These institutions are managed by public managers but are accountable to the legislative institutions which, in turn, are accountable to the electorate. This is the context in which public management manifests itself. Management in the private sector is predominantly market driven. To this end, Horton and Farnham (1999:29) observed that "Private businesses, in short, must be both profitable and economically efficient to survive in the market place. The managerial function within them derives from these basic facts of economic life." All this suggests that the objectives and functions of public institutions differ from those of the private ones. This is also true of the environment in which these institutions operate. It could be argued that although institutions in the private sector are not specifically established for the purpose of implementing public policy, they contribute towards the implementation of public policy by complying with certain statutory requirements.

2.3.5 Public management

From the foregoing, it can be inferred that public management is an integrated process which manifests itself in public institutions with a view to achieving specific functional objectives to improve the general welfare of the society. It can further be inferred that the demands on public institutions differ markedly from those on the private sector. For these reasons management must be contextualised in terms of objectives, functions and the environment of institution under discussion. Management is viewed as an integrated process because "To meaningful

public administration, is important that the Public Management integrates management functions, administrative functions, auxiliary functions and functional work" (Ströh & Van der Westhuizen, 1994:13). Only when these functions are integrated in the management process can public institutions be expected to render efficient and effective services.

The management of secondary schools falls under public administration and therefore the broad understanding of the latter should facilitate a better understanding of the management of secondary schools as public institutions. In particular, the management of secondary schools should be undertaken within the broad parameters of public administration i.e. within the overarching policy framework of the government.

2.4 Planning

In this part of the chapter, the focus is on analysing planning as a management function in public administration. A few definitions are given and thereafter analysed in order to identify common themes and various facets of planning in the public sector.

2.4.1 Definitions of planning

Like many other contested concepts, planning has been defined differently by many authors. Chadwick (1981:25) has contended that "planning is future-oriented, and thus optimistic, for it assumes man's ability to control his own destiny, at least within certain limits. Planning thus involves man closely with nature and with life."

On the same concept, Brynard in Bekker (1996:132) has also observed that there were many definitions of planning but argued that "planning

consists of those activities which are aimed at the formulation of a future course of action directed at the achievement of a certain goal or a set of goals by optimal means."

Green in Hanekom and Thornhill (1990:34) has also expressed views about planning and argued that "I understand planning to be a process of human activity – of human thought and action – which is essentially purposeful ... to plan, is to arrange beforehand. To plan thus implies that alternative courses of action are open to us, and that we can and do in fact, choose between them."

Brynard *et al* captured it succinctly when they perceived planning as "an intellectual activity (changing in character and scope in accordance with its context and the substance to which it applies) aimed at determining a future state of affairs and also at the steps to be taken to realise this future state of affairs" (Brynard & Hanekom, 1993:13).

2.4.2 Analysis of definitions

The list of definitions is not exhaustive. However, from the above exposition it can be realised that in the context of public administration, planning has a number of features. In the first instance, planning involves human intellectual activity and the ability to see into the future, though without absolute certainty. In the second instance, planning is not an event but rather, a purposive process aimed specifically at promoting the multifaceted general welfare of the populace or part thereof. In this regard, planning involves setting goals and objectives for a public institution as well as developing strategies for the achievement of these goals and objectives. Planning is therefore a means towards an end.

It can be deduced from the definitions that planning is future-oriented. It is concerned with future behaviours of the people and, by implication, this suggests that planning is, to some extent, concerned with the change of human behaviour in the short or long term. Another feature of planning which is implied in the definitions is that it proceeds through a number of steps which are both interrelated and interdependent. Since government planning is rational, "the process begins with the determination and establishment of a need" (Bekker, 1996:133). Such a need must exist in the society and the public manager must have the capacity to collect sufficient data to illuminate the nature and scope of the need. The process of planning must culminate in a solution, chosen from a list of alternative solutions, to address the need. For this to be achieved goals and objectives must be formulated and decisions must be made on activities to be carried out in pursuit of these goals and objectives.

2.4.3 Significance of planning

Planning enables public institutions to focus on essential activities and therefore exclude that which is undesirable. This ensures that public funds are expended only on activities that will benefit the public. Planning, therefore, enhances the efficient utilisation of scarce resources in an attempt to meet ever increasing public needs. Since activities are pre-determined little time, if any, is wasted during the performance of such activities because people know in advance what to do. This has an added advantage of facilitating the control function which could lead to enhanced productivity of public institutions (Kroon, 1990:127). Planning has the advantage of enabling public managers to be proactive and to manage change more effectively. A public institution like a secondary school is most likely to remain focused if proper planning is followed. It follows therefore that senior secondary schools in general should

undertake proper planning if they are to satisfy the needs of the society and justify their existence on public funds.

2.4.4 Planning process

In the public sector, the planning process takes place within the framework of policy which determines limits within which decisions can be made. Moreover, a policy is developed to address a specific need which forms the basis of the planning process. In order to be meaningful the process needs to be both logical and systematic. Many authors are agreed that the planning process unfolds through several steps but not equally agreed on the steps to be followed. For example, Kling in Hanekom *et al* (1990:46) has identified seven steps in the planning process, namely:

- Identification of needs
- Identification of clients
- Value formulation
- Development of goals
- Means identification i.e. identifying objectives, weighing alternatives, and making a recommendation
- Implementation – effectuation
- Monitoring

Hanekom, Rowland and Bain (1992:31) have viewed the planning process in terms of the following steps:

- Determining policy for particular planned issues
- Determining the needs within the environment
- Setting an objective

- Making predictions and evaluating existing resources for the execution of plans
- Determining alternative plans of action
- Deciding on a plan
- Implementing a plan
- Evaluating a plan

For the purposes of this dissertation the planning process as articulated by Brynard and Hanekom (1993:37) is preferred because of its clarity and reasonableness. It seems to be more logical and straight forward than the above two. For these reasons the process is elaborated below.

2.4.4.1 Establishing needs

As stated above, there must be a need to be addressed before actual planning can begin. So the first steps is to establish the need of the society. This entails gathering relevant information and intensive analysis thereof with a view to establishing the nature and scope of specific needs.

2.4.4.2 Setting objectives

Once a need has been established and delimited, then planning objectives can be determined to address the need. One should underscore the need for objectives that match the established need and this requires thorough analysis of information at hand.

2.4.4.3 Courses of action

When an objective has been clearly articulated then alternative courses of action to achieve the objective should be established. The more of these alternatives the better the planning process. It should be stated that intensive study of the relevant facts can guide the establishment of alternative courses of action. Public officials responsible for planning have to evaluate these alternatives and eliminate the most undesirable ones.

2.4.4.4 Selection of a suitable plan of action

In the public sector, a decision at this stage on a course of action can have serious political implications. As a result, political office bearers have to make a decision on the plan of action. This also gives the political office bearers (cabinet ministers) an opportunity to ensure that the plan of action is in concurrence with the ruling political party's philosophy and/or objectives.

2.4.4.5 Trial run

Before a plan can be translated into action on a large scale, it needs to be tested on a small scale to ensure that the necessary improvements are made before a full-scale plan is implemented. This is also an opportunity to test the reaction of the people who will ultimately be affected by the implementation of the plan.

2.4.4.6 Operationalising the plan

The fundamental purpose of a plan is to facilitate the efficient and effective achievement of an objective. A plan is not an end, namely achievement of an objective. Therefore a plan must be translated into action and serve its purpose. To put a plan into action entails ensuring that activities are inline with the plan and therefore the objectives to be achieved and that, if there are any deviations from the planned course of action, they should be timeously corrected.

2.4.4.7 Evaluation

A plan is meant to achieve some objective and therefore it stands to reason that once a plan has been fully executed the extent to which the objective has been achieved must be determined. That is some form of summative evaluation which must be undertaken over and above the formative evaluation implied in the previous paragraph. To this end, Brynard and Hanekom (1993:40) argued that: "The end results of an executed planned objective must be measured against the initial expectations. It must also be measured against the initial allocation of funds and resources." If this is not done then it may not be known how far the established need has been addressed.

2.4.5 Comments on the planning process

The range of steps to be followed in the planning process may differ slightly from one situation to the other. However the process which is outlined above is mostly appropriate for high level planning in government

where political office bearers have to make an input in the planning process. For lower authority institutions, like schools, the input of politicians in management practices, like planning, is not normally sought depending on objectives to be pursued. However, most if not all of the steps can still be maintained for most of the objectives in high and low authority public institutions. In this context, high authority refers to an institution, or part thereof, vested with the power to perform a specific function of which part is delegated to other legally established public institutions - lower authorities - so that the latter reports to the former. For example, the Ministry of Education could be viewed as a high authority institution and a senior secondary school as a lower authority institution.

2.5 Decision making

In an institutional context, making things happen the way they should depends to a large extent on the ability to make and implement the right decisions. However, making decisions is not always a smooth and comfortable thing because often it involves change, conflict, or even the risk of making a wrong decision. However, activities of public institutions are based largely on decision making by various authorities. Policies on which activities are based are invariably the result of decision making. In fact decision making is a kernel of the generic administrative functions so much so that without it they can not be determined. All this emphasizes the significance of decision making in public institutions in general and in the quality of life of the community in particular. A case in point is the situation in Zimbabwe where the quality of life of the people has drastically deteriorated as a result of decisions and the concomitant policies of the government. So decision making in public institutions can have far reaching implications in the lives of the affected people. To further elucidate the concept of decision making, various definitions are given below.

2.5.1 Definitions of decision making

Decision making, as a concept, has been defined in different ways by various authors. However, most authors perceive decision making as the act of choosing amongst the alternative solutions to a situation for which the need for a solution is perceived. The chosen alternative needs to be the most suitable solution with the highest possibility of optimally addressing the situation in question.

Andrews (1988:14) has argued that "decision making implies a conscious choice between various alternative actions for a specific action to take place." On the other hand Betts (1993:108) has contended that "making decision involves the consideration of a number of conflicting factors such as the objective, degree of ruthlessness necessary, humane treatment of people, cost and effectiveness." It seems, according to the latter view, that decision making entails the consideration, or perhaps a balance, between the objectives of the institution and the welfare of the personnel. For his part Graft (1993:344) has maintained that the "decision making process represents the brain and nervous system of the organization." This view acknowledges the centrality of decision making in the functioning of any institution. Ströh and Van der Westhuizen (1994:61) are of the opinion that "decision making may be defined as a conscious choice of the most suitable alternative from among the identified alternative solutions, but that such choice is dependent on and is the result of a process of activities which has, as its aim, the making of a choice."

Writers on decision making can generally be divided into two camps, namely those who regard decision making as a process and those who

regard it as just making a choice among alternative solutions. The last definition seems to have been crafted with full recognition of these two camps and most importantly their significance and complementarity as both are explicit in the definition. It is for these reasons that the latter definition is preferred for the purposes of this dissertation.

2.5.2 Levels of decision making

Although decision making takes place at all levels of an institution it can, for the purpose of analysis, be divided into at least three levels, namely strategic, tactical and operational decisions. Strategic decisions are broad or long term decisions which are the prerogative of top management of the institution. These are general guidelines and policies which constitute the framework within which the functional activities of the institution are carried out. Tactical decisions are carried out by middle management and are geared towards controlling the activities of the institution. Tactical decisions are for the implementation of strategic decisions. Operational decisions are made at the 'shopfloor' level in the course of performing the actual activities (Graft 1993:346). Tactical and operational decisions are made within the parameters set at a strategic level of decision making.

2.5.3 Models of decision making

There are various decision making models in the published literature. However, in this section the intent is to concentrate on three models which emphasize procedure and the actual activities involved in making decisions. The first is the rational decision making process. In decision making, rationality suggests that decisions are based on logical reasoning derived, in part, from in-depth analysis of relevant factors as opposed to reliance on intuition or the ideas of the decision maker. It further

suggests that in the process of making decisions, objectives are clearly conceived and that all conduct is orientated towards the achievement of the objectives (Robbins, 1987:181). The second model is the incremental one which is more on the descriptive side of the decisions that are actually made in public institutions. Decisions that fall into this category are those which are actually marginal modifications of existing policies and/or practices. Just like the rational process, incrementalism does entail the identification of alternative solutions but only a limited number of the crucial consequences are considered (Anderson,1990:113). This theory seems to be biased towards the existing order as opposed to innovative decisions and as such it can be said to be rather conservative. Its notable advantage however, is that it enhances agreement in the decision making process that involves numerous participants. The third model is the mixed scanning theory which takes cognizance of the necessity of both rationalism and incrementalism. In particular, mixed scanning is premised on the grounds that each of the first two models has shortcomings but that both complement each other. This is particularly so if one considers the obvious fact that the nature and scope of decisions to be made in public institutions vary enormously according to the situation (Anderson, 1990:118). There is certainly a need for a more versatile model of decision making to guide in dealing with a myriad of issues in public institutions.

Moreover, of the first two models, namely rationalism and incrementalism, the former is preferred because of its comprehensiveness and the effectiveness of resulting decisions. As a result of this preference the rational decision making process is being articulated below.

2.5.4 Rational decision making process

Various authors have articulated the steps in the rational decision making process differently. For example Betts (1993:108) has identified the following steps:

- Aim to reach the objective
- Consider various courses of action
- Weigh the factors involved, for example individuals, cost, undesirable after-effects, and morale
- Choose a course of action
- Set standards to check after-effects
- Follow up and revise if necessary

For his part Anderson (1990:113) has maintained that the rational decision is arrived at through the following steps:

- The decision maker is confronted with a given problem that can be separated from other problems or at least considered meaningfully in comparison with them
- The goals, values, or objectives that guide the decision maker are clarified and ranked according to their importance
- The various alternatives for dealing with the problem are examined
- The consequences (costs and benefits, advantages and disadvantages) that would follow from the selection of each alternative are investigated
- Each alternative, and its attendant consequences, can be compared with the other alternatives

- The decision maker will choose that alternative, and its consequences, that maximizes the attainment of his or her goals, values, or objectives

On the other hand Kroon (1990:195) has crafted a more concise model of the rational decision making process which is presented below, albeit augmented with the views of other authors.

2.5.4.1 Understand the problem or situation

The first step of the process is to clearly understand the problem or situation to be dealt with. The quality of the final decision depends to a large extent on the accuracy with which the problem has been defined and/or delineated. To achieve this clarity of the situation, relevant, accurate and reliable information must be gathered and collated. Such information according to Kroon (1990:195) "can be obtained by systematic observation and even elementary experimentation, and can minimise uncertainty and lead to precise problem definition." This, furthermore, can be achieved more easily with the aid of information technology.

2.5.4.2 Alternative solutions

The development of alternative solutions to a problem/situation is basically the second step in the process. It is important to develop suitable alternative solutions to the problem because the first solution that comes to mind may not necessarily be the best. There are a number of factors which influence the number and quality of alternative solutions. Kroon (1990:197) for example, has argued that "The number of alternative solutions to problems is

naturally influenced by a few factors, e.g. the time available, quality, quantity, accuracy, reliability and relevance of the information, as well as the importance of the decision and analytical abilities of decision makers." At this stage of the process, the decision maker needs to be creative and imaginative in trying to match the alternative solutions with the defined problem or situation. It should be noted that each alternative solution needs to be accompanied by cost and benefit implications to facilitate cost/benefit analysis of each solution. The best alternative therefore is the most effective one taking into account how much it will cost to implement; in other words, the best alternative will be the one that offers the most benefits to society for the amount of money that the institution can afford. The effectiveness of an alternative is a measure of the extent to which a problem or situation is adequately addressed.

2.5.4.3 Evaluation of alternatives

Once the alternative solutions have been concluded then a choice between these has to be made. Each possible solution is considered with a view to establishing a solution with the greatest possible benefits at the least possible cost. In this context, benefits refer to the extent to which the solutions are likely to address the problem which has been defined.

2.5.4.4 Implement the solution and follow up

The whole process becomes meaningful when the solution is ultimately being implemented in an attempt to address the problem. Normally the implementation is undertaken by

subordinates and therefore it is of utmost importance that they are taken on board throughout the process. This stands a chance of engaging their commitment and support for the chosen solution. It is important that during the implementation of the solution activities are monitored to ensure that any deviations from addressing the problem are timeously detected and addressed (Ströh & Van der Westhuizen, 1994:77).

2.5.5 Comments on the rational decision making process

The rational decision making process appears to be both theoretical and practical in that some decisions do not follow the sequence of the steps in this process. Other decisions can follow the sequence but the time constraints may not allow the process to proceed through these steps. The other constraint may be limited information that the public manager may have access to. Most public managers, especially in situations where information technology is rather wanting, are not quite capable of generating sufficient information for the rational decision making process. In addition, the ability to realistically undertake cost/benefit analysis is limited. However, if these problems can be overcome, the rational decision making remains the best way forward in the quest to develop humankind. Educating public managers to, amongst other things, enable them to competently follow this process is a *sine qua non* for high quality decisions in public institutions. This is the ideal which must be pursued by every government especially in developing countries. It must be acknowledged that cost accountants are trained to, amongst others, calculate costs. If they are engaged to calculate costs for public managers, the latter must be in a position to comprehend the outcome of such calculations, in other words, the value such calculations can have for the improvement of decision making should be understood.

2.6 Information technology (IT)

In this part of the chapter, the main focus is to explore the concept of information technology with a view to establishing the extent to which it can enhance the quality of planning and decision making in public institutions. The understanding of the concept is necessary and therefore the definitions from a few authors are presented in order to establish the common themes in such definitions. The discussion will be extended to encompass information communication technologies (ICTs) and the implications thereof in the management of public institutions.

Different authors have written about information technology and defined it in different ways. To begin with, Langley and Shain in Chisenga (1995:20) have perceived information technology as the acquisition, processing, storage and dissemination of vocal, pictorial, textual and numerical information by a micro-electronic based combination of computing and telecommunication. This suggests that information technology is all about enhancing the flow of information.

For their part, Attewell and Rule (1984:1189) have viewed information technology in terms of the application of computers and communication technologies in acquisition, storage, analysis and distribution as well as representation of information.

Nader (1992:222) views information technology as "A general term used to refer to all aspects of technology that encompass the creation, storage, display, exchange, and management of information for business, artistic, scientific, recreational, or personal use."

These definitions have been chosen because they seem to adequately elucidate the concept clearly and are in consonant with each other. They certainly point out what information technology is all about and it will be redundant to repeat all this. It can also be deduced from the definitions that information technology encompasses, by and large, the use of computers and other communication technologies which is the view upheld in this dissertation. However, these definitions seem to be deficient in that they fail to distinguish data from information. Such a distinction will be made in the following section.

2.6.1 Data, information, knowledge and intelligence

It should be acknowledged that human beings are limited in their capacity to acquire and interpret information and knowledge within their environment. This is due to the limited capacity of their senses. As a result, it stands to reason that without the aid of information technology it can, at times, be difficult to make reasoned and defensible decisions. This is based on the premise that such decisions need to be based on sufficient information and/or knowledge. Since information and knowledge are crucial to decision making and planning, they are elucidated in this context below. Other related concepts, namely 'data' and 'intelligence' are also substantiated.

It seems appropriate to observe that occasionally the concepts 'data' and 'information' are regarded as synonymous and therefore interchangeable. In this study it is argued that they are not synonymous. Data are particulars or facts about a specific entity. Mandell in Ströh and Van der Westhuizen (1994:93) has argued that "data refers to raw facts that have been collected form different sources and, as such cannot be the basis for meaningful decisions." When these raw facts, namely data, are processed, presented and interpreted in a meaningful and useful way they

lead to information. The relationship between data and information has been crystallized by Theunissen (1999:2) when he contented that "the building blocks of information are data which are raw, unsummarised and unanalyzed facts such as statistics which, when viewed on their own, are meaningless, yet they become information when placed together in an ordered and understandable fashion." It can be deduced that information is more associated with meaning and utility. When the recipient of information has the capacity to put it to some productive use then such information becomes knowledge. Lorimer (1996:146) has viewed knowledge in two fundamental ways, namely as "the possession of a fact or state of knowing with clarity or certainty ... and as the possession of a skill or expertise, or an understanding gained through study, training and experience."

It should further be noted that both information and knowledge have a bearing on the intelligence of an individual or even that of an institution. In fact intelligence is not only viewed as the power of reasoning but also, and more importantly, as "a user-specific information and knowledge that is tailor-made for the needs of a specific customer or information-user recipient. It presents the recipient or consumer with context, problem identification of opportunity, therefore acting as an instrument in the making of defensible decisions and policy" (Theunissen, 1999:3). It follows therefore that intelligence, as viewed in this context, constitutes the kernel of reasoned and defensible decisions in both public and private institutions. It should be clear that intelligence is viewed and/or considered beyond the frontiers of military institutions and therefore regarded as indispensable to effective and efficient institutions in general.

In view of the foregoing, it stands to reason that management of information is very crucial in enhancing the intelligence of public

institutions individually and/or collectively. All this could have the ultimate effect of promoting the intelligence of the state to the benefit of the general populace. The prevalence of high-level intelligence in public institutions is an ideal that any serious government should pursue. The assumption is that the final beneficiary of such state intelligence is the man in the street.

2.6.2 Information and communication technologies (ICTs) in public institutions

Information and communication technologies may be viewed as a means to expeditiously distribute large volumes of information to a number of recipients. Besides, information distributed/received through these technologies is often in hypermedia form and therefore it is of high quality. This is particularly so with the internet which has become a powerful communication tool which can also be viewed as a reliable, accessible, large-scale communication medium. The strength of the internet derives from the inherent search and 'surfing' tools provided by world wide web the (www) and electronic mail services (Fung; Visscher; Barbara & Teather, 1997:7). The web can facilitate the gathering of updated information a lot easier and expeditiously. As a result, information that is required, say, for strategic management purposes can be accessed with relative ease particularly in the required format and thereby expediting the decision making process.

It can further be stated that information and communication technologies have the capacity to enhance collaborative effort for individuals or groups working on a common task and being far apart but without the need for them to traverse long distances to meet each other. A case in point is the use of video conferencing where people in different localities, even

thousands of kilometres apart, can participate in the conference. The author recently visited the University of Natal where a demonstration of video conferencing was made at Pietermaritzburg campus with other participants at the Durban campus being involved. It became clear that optimal use of information and communication technologies can greatly enhance communication and at the same time greatly reduce costs such as transportation costs.

To some extent information and communications technologies have made significant contributions to the emergence of the so-called 'global society', in which society traditional barriers to communication, time, and distance have been scaled down immeasurably. So, metaphorically speaking, the world is shrinking in space and time as information and communication technologies advance (http://www.idrc.ca/acacia/studies/ir-usesl.htm).

Notwithstanding the positive attribute of information and communication technologies referred to above, it is worth noting that although such technologies greatly enhance access to information, they can also facilitate the isolation of individuals in the workplace as they increasingly become dependent on such technologies instead of other human beings to facilitate communication. Besides, the technology has the potential of replacing the human labour and that becomes a threat to the labour force. However, the net effect of optimally using these technologies is efficiency which is highly desirable in the competitive global society.

In view of the foregoing, it seems apparent that information and communication technologies have a significant role to play in the management of public institutions. In particular, with the aid of these technologies the critical issues in the public service such as effectiveness, efficiency, quality and democracy can be harmonized and enhanced to

bring greater satisfaction to the people. The view is shared by, amongst others, Horton and Farnham (1999:128) who have argued that "information and communications technologies can be harnessed in a variety of ways to speed up administrative processes, 'join-up' fragmented services, and provide new, more effective means for government and public to transact and interact." Public institutions should not hesitate to embrace revolutionary methods which are driven by information and/or knowledge-based technologies. After all this is the global trend in an attempt to use the abundant information and/or knowledge in order to make intelligible and defensible decisions.

2.7 CONCLUSION

In this dissertation, the generic view of administration is espoused and therefore public administration is viewed as a totality of the generic administrative functions performed in the public sector. Public administration is an overarching activity whilst public management is concerned more with certain functional activities of specific public officials. Planning and decision making are but some of the management functions and they have been dealt with in this chapter. Planning has been viewed as an instrument to facilitate the achievement of objectives whilst decision making represents the brain and nervous system of an institution. Information is dispensable to both administration and management whilst IT is all about the application of computers and communication technologies in the acquisition, storage, analysis, distribution and representation of information. The benefit of using IT in improving decision making and planning in public institutions can be understood by exploring these issues in respect of a specific public institution. The next chapter focuses on the potential benefits of IT in the management of secondary schools with specific reference to planning and decision making.

CHAPTER 3

THE POTENTIAL ROLE INFORMATION TECHNOLOGY (IT) CAN PLAY IN DECISION MAKING AND PLANNING IN SENIOR SECONDARY SCHOOLS

3.1 Introduction

The relentless forces of globalisation demand, amongst other things, that the gap between developed and developing countries be narrowed. Exploiting the power of IT by developing countries' public and private institutions has the potential of contributing towards the narrowing of the aforementioned gap. The effective use of IT and related technologies by schools has the potential of improving the quality of management of schools and (by association) education. The main aim of this chapter is to look more closely at the potential impact of the use of IT in Botswana senior secondary schools with specific reference to decision making and planning in these institutions. The relationship between planning and decision making is briefly analysed. The quality of these management functions has a potential impact on the quality of the delivery of education in schools.

3.2 Decision making and planning

Decision making and planning have already been identified as some of the management functions. However, these functions are inextricably intertwined. In fact the management process is basically concerned with decision making. In line with this view, Selwood and Drenoyianmi in Fung *et al* (1997: 100) have argued that "whenever for example, headteachers and governing bodies in a school form a vision of where the school is going, to establish aims and objectives, prioritise them and develop a plan for the accomplishment of these objectives, they are involved in strategic decision making. Whenever, they are

making decisions concerned with the implementation of the school's development plan, their decisions may be considered as tactical. Finally, wherever they have to carry out clear and specific tasks they are making operational decisions." For their part Koontz, O'Donnell and Weinrich in Hanekom *et al* (1990:45) contend that "planning is deciding in advance what to do, how to do it, and who is to do it." The dividing line between these management functions is blurred and it is considered for analytical purposes.

3.3 Impact of IT on decision making in senior secondary schools

It has already been mentioned in the previous chapter that decision making is a process that entails, amongst other things, the understanding of a problem/situation, determining suitable alternative solutions and a comparison thereof with a view to selecting the most appropriate alternative solution. All this needs a lot of time and skill. However, school heads (principals) are seldom blessed with the necessary analytical skills and they don't have sufficient time to do all this. School heads are, on a daily basis, faced with a myriad of problems for which solutions must be found. The University of Columbia conducted a study on decision making by two hundred school principals and this study attests to the complexity as well as the daunting task of decision (Hoy & Miskel, 1991:325).

In this regard, "the study revealed that principals who are effective decision makers engage in a large amount of preliminary work: they seek more information, they differentiate between fact and opinion, and they frequently obtain the views of others" (Hoy & Miskel, 1991:326). In the light of all this, it is worth noting that school heads deal, on a daily basis, with a lot of people (students, teachers, auxiliary staff, parents, and education officers) and a large volume of information. In addition, Riehal in Fung *et al* (1997:58) has argued that "the nature and the conditions under which principals work (many brief

episodes of unpredictable interactions) affects their information use. Since school managers have to pay attention to so many different topics, they do not spend much time to each topic. They must react rapidly and therefore need information quickly." Consequently, it can be argued that a rational problem solving school head who takes smart decisions on the basis of all relevant information is a rarity primarily due to inadequate time and skills. Visscher of the Netherlands has observed that "school managers take many decisions, are burdened with information and have little time to process all information and to reflect on it. Full rational behaviour in terms of choosing the best action to achieve a goal, after processing all relevant information, is exceptional" (Fung *et al,* 1997:59). That being said, it can also be argued that due to human limitations not all relevant information reaches the school head, there is invariably some crucial information surrounding school heads/managers yet it does not reach them. This is part of the justification for the need to exploit the power of IT in school management in order to have access to as much information as possible. The education systems, particularly of developing countries, must make every effort to exploit the power of IT and related technologies.

The New Zealand Education Review Office (ERO) has revealed the national information and communication technologies (ICT) strategy whose objectives are, amongst others, "to increase the efficiency and effectiveness of teachers and schools by helping them to use ICT to (i) enhance the delivery of the curriculum, and (ii) reduce time spent on administration ... improve the quality of teaching in and leadership of schools by helping teachers and principals to identify their ICT needs and to develop the skills necessary to meet these needs" (ERO, 2000:5). The strategy was in response to the need for the education system of New Zealand to respond to the challenges and opportunities offered by IT and related technologies.

In view of the foregoing, it does seem inevitable that school heads need to harness the power of IT to bolster their decision making capacity. In particular, the effective use of IT is imperative if a good job is to be done and sustained in the management of senior secondary schools. IT can enable a myriad of information available in schools to be systematically collected, stored and, when needed, to be easily retrieved thus saving a lot of time. Writing with a background of the European experience, Everard and Morris (1990:207) noted that, "Database programs enable the user to enter records (e.g. the names, addresses and other details of all pupils) and then update them, to sort them (e.g. into alphabetical order or by form), and to extract at will any which meet given criteria (e.g. all girls age 14+ on 1 January 1985), or, indeed the names and addresses of a set of children's parents for automatic envelope labeling." Whether these tasks are done by the school head or delegated to someone else is irrelevant. The most important thing from the quotation is that the use of IT can enable a lot of time to be available to school management and a lot of quality can be added to the services provided by schools. Most important is the ability 'to extract at will' any relevant information to expedite the decision making process.

Most decisions made by the school head depend, to a large extent, on the information that is handled by other people in the school. The availability of a local IT network can enable the school head to access the relevant information within seconds and thus enabling him/her to make relevant decisions on time. This may be enhanced by the establishment of a data bank designed to be part of an integrated information system of a school which has the capacity to improve the overall flow of information. Complete information about individual students can be retrieved within a split of a second and this can enhance the formulation of reasoned and defensible decisions based on relevant and sufficient information about individual students or even staff members. For these reasons, it should be argued that management of schools should be

guided by the use of IT. As a school head one used to take disciplinary action against students for infringement of a school regulation but only to realize later that a particular student had earlier broken more regulations. Had this information been known by the time a disciplinary action was taken the punishment could have been commensurate with the totality of the infringements. Teachers do not have easy access to students' files and therefore they rarely document information about individual students. It can therefore be inferred that inadequate information invariably leads to inappropriate decisions.

Selwood and Drenoyianni in Fung *et al* (1997:99) observed that "in the UK, the Education Reform Act (ERA) required that head teachers and governing bodies in every school should embrace a role similar to that of managers in commercial companies ... As experience in commercial and industrial organisations has shown, effective decisions must be based on a steady flow of quality, up-to date information. Education Managers need also to consider the value and the nature of information needed for decision making and strategic planning activities, and decide upon the form and extent of their management information system." It is therefore apparent that school heads need to understand and/or appreciate the extent to which IT can support management functions such as decision making and planning. The private enterprises, because of their profit motive have enhanced their technical innovation and embraced the use of information technology to augment their capacity to be productive. The public sector in general and the senior secondary schools in particular should emulate the private sector at the use of IT to improve on their management practices and procedures. In the absence of IT, decisions are most likely to be based on inadequate and/or incorrect information which has the propensity to lead to incorrect decisions. It needs to be noted that in this era inadequate information, as well as inadequate knowledge, is tantamount to having inadequate resources for running an institution and therefore a recipe for failure.

3.3.1 Students records

In the management of a senior secondary school, maintaining student records is most important and therefore the discussion will concentrate on student records in order to demonstrate the potential benefits that could be realized in using IT in this aspect of school management. It should be noted that schools are highly populated institutions and currently in Botswana each student has a hard file in which information about him/her is kept. These files can be a menace to keep because as time goes on both files and contents become too many. So much so that retrieval of information can be a slow and daunting task which invariably delays decision making which is to be based on such information. In some cases files cannot be retrieved and thereby making decision making almost impossible even when an urgent one is imperative.

The use of IT can, to a certain extent, alleviate this state of affairs. In line with this, Herring (1999:11) has argued that "IT tools provide us with a wealth of support for information handling and decision making." In fact, IT can help in integrating all the information about students into a single database instead of separate files for attendance, marks, conduct and so on (Kearsley, 1990:20) which seems to be the case in most if not all senior secondary schools in Botswana. Examination entries are done manually in Botswana senior secondary schools and this takes a long time especially where there are as many as more than six hundred candidates in each school. Once the entries are done students are called from classes to check if their entries are correct and this also takes a lot of time. It does seem possible to develop IT programme for this purpose. Students' entries for the core subjects can be done in seconds for all the candidates in a school and the same programme can simplify the entries of optional subjects as well as the checking thereof by individual

candidates. In a closely related context Crawford (1997:127) argued in support of the use of IT and suggested that "examination entries to GCSE and other examination boards can be compiled and submitted, and results analysed and printed in suitable formats for reporting to Governors, parents, the press, subject departments within the school, class teachers, or individual pupils." Analysis of school results is important and can facilitate both planning and decision making. The scope of communicating results suggests the need for accuracy of information.

In Botswana, it is a statutory requirement, designed in 1978, that schools keep records of attendance in the form of class registers. There is no doubt that keeping students' records of attendance is important. Such records provide information that is often required to guide decision making by school heads, guidance counselors and teachers in general (Kearsley, 1996:20). It therefore stands to reason that such records should be accurate and provide the necessary information. The class registers used in Botswana are outdated and certainly need to be replaced by some form of IT application which is more efficient and effective.

3.3.2 Analysis of alternatives

In planning and decision making analysis of alternatives is, to a large extent, indispensable. The use of IT in understanding these tasks seems equally indispensable in this era in which information is in abundance. In particular, it is very critical that the alternatives be realistic and appropriate to the needs to be addressed and that the analysis should also be realistic and appropriate if the final choice is to address the predetermined goals and/or objectives. As a result, the need for relevant, accurate and timeous information cannot be overemphasized (Hanekom, Rowland & Bain, 1990:49).

The use of IT can facilitate the provision of information which meets these requirements and enhance a reliable analysis of various alternatives. It has the capacity to perform a variety of complicated analysis of various tasks, can analyse large volumes of data accurately and expeditiously leading to more reliable information. It has already been stated that the effective use of IT can enable school heads to have more time available to themselves which can be used to develop larger number of alternative solutions and thorough analysis thereof. The ability to extract at will relevant information from databases as well as the versatility of IT makes it possible to develop alternative solutions. School heads who use IT for, amongst other things, analyzing alternative courses of action in this way are most likely to instill confidence in their staff for the decisions they make and therefore reducing uncertainty about issues in question.

3.3.3 Students reports

In Botswana, senior secondary schools issue up to three reports for every student in a year. Each report contains, amongst other things, the average of term marks and either end of term or year examination marks. These are currently done manually and errors are a common feature as evidenced by a lot of cancellation and correction fluid. Incorrect percentage are occasionally detected not because of the teachers' weakness but rather because of, amongst other things, large class sizes and a lot of data handled manually. This state of affairs does not promote a good image of a senior secondary school in the country. Having said this, it must be stated that issuing students reports to parents is a very important obligation of schools and it must be done within the framework of the normative factors. In particular, public accountability, efficiency and effectiveness must always be borne in mind by school management.

The use of IT in the preparation of students' report can expedite the process and enhance the quality of such reports and thereby help the schools to provide a satisfactory service to the public. In line with this argument, Herring (1999:12) has contended that "the use of IT in school administration and management allows senior management and school staff to manage a range of information more effectively and to produce professional reports (e.g. for parents or pupils) that include added value information." The performance of individual students can be analysed per subject and it is also possible to determine grades and rank students on the basis of overall performance. All this can be done accurately and expeditiously using IT. On the basis of the subjects for which students are registered, it could be possible to check missing marks or subjects in the student's reports. Reports prepared in this manner provide accurate information on individual students. In addition, with the aid of IT, envelopes in which reports are sent to parents can be labeled more efficiently and where possible such reports can be e-mailed to parents. Special software for the performance of these tasks can be designed by specialists who need not to be school heads. General mistakes can be brought to a bare minimum if the software has a self-checking feature. It needs to be stated that information in the students reports can be used for decision making purposes by school management, staff and parents. If a decision has to be correct about a particular student then information about him/her must also be correct. The decision could be on remedial teaching or grouping of students and therefore wrong decisions could have a lasting effect on the academic life of such a student. For example some parents decide to engage, or not to engage, private tutors for their children on the basis of their performance as reflected in their school reports.

3.4 Planning in senior secondary schools

In a school situation, there are numerous plans that are made on a regular basis. However, the aim here is to highlight the potential impact of IT on planning in senior secondary schools generally. This is illuminated by brief descriptions of some of the problems one used to face as a school head of a senior secondary school.

3.4.1 Planning the delivery of the curriculum

Drawing a school timetable necessitates planning the delivery of the curriculum and this was done manually at Naledi Secondary School where the author was the head (1996 to 2000). At the beginning of 1999 the timetable team was made up of seven teachers and by the time the timetable was operational the team had been reduced to three teachers. The rest had left the team due to frustration as a result of the complexity of the exercise. The timetable was like a puzzle which defied solution. The timetable, like in many other years, took a long time to operationalise and it was characterized by numerous clashes. At times trying to solve one clash created more clashes. Consequently a lot of teaching time was lost and hence productivity was compromised. Some clashes resulted in conflict between teachers. Ng of the Chinese University of Hong Kong made an observation of timetabling in schools and noted that "the toil of the timetabling process is however a grave problem. The team suffer heavy cognitive load during those few days, and consequently they are often ready, probably too ready, to compromise when facing time clashes. The quality of the constructed timetable suffers as a result" (Fung *et al* 1997:133). Certainly this observation is in line with the experience of Naledi Senior Secondary School (1996-2000) and this forms an

incontrovertible evidence to suggest that manual methods of timetabling are stressful and time wasting.

Timetabling is one of the critical tasks of school management and it defines "the educational activities of students and teachers as well as dictate the use of school facilities and equipment" (Kearsly, 1990:16). The use of school facilities in pursuit of educational activities of students is the core function of a school. It is therefore necessary for schools to draw timetables which optimally support these educational activities and/or aspirations. School timetable is one other area which creates the opportunity for the use of IT to improve the quality of the delivery of the curriculum.

Studies have shown that IT-based timetabling takes much shorter time and has very few clashes compared to the manual ones (Fung, *et al* 1997:133). It may be added that once data are online, teachers' free periods can easily be detected and used for substitution purposes in the event some teachers are not available. Furthermore with IT, patterns of students' subject preferences can also be easily determined and analysed to establish trends which could facilitate decisions and planning for future staffing of the school as well as the provision of other relevant resources.

3.4.2 School budget

A budget is a form of a plan articulated in monetary terms. It is an authoritative plan for the expenditure of resources to accomplish the objectives of a school within a specific period of time. A budget is a source of information on the objectives which have been given priority (Gildenhuys, 1997:396). In a school, such information is very crucial for heads of department particularly for the purposes of departmental

planning within the same time horizon. To a large extent a budget estimates the nature and scope of the activities of an institution. For example a school trip to a foreign country will normally not be undertaken if it had not been envisaged and therefore not incorporated into the budget estimates and approved. By the same token a school budget can facilitate the control of financial expenditure in that the school head can determine whether a request for financial expenditure, at any particular point in time, is commensurate with the budgetary provisions before taking a decision. An approved budget constitutes authorization to expend funds on specific matters. In a large senior secondary school the budgeting process can be a daunting task especially when it is done manually. The budget could be another opportunity for the use of IT. In particular the application of a spreadsheet is most appropriate for budgeting purposes. In this regard, Kearsly (1990:35) argues that "spreadsheets make financial analysis much easier than manual methods. Furthermore, they give administrators a real sense of power over the budgets they are responsible for." The use of IT in budgeting can facilitate a better understanding of trends in financial expenditure and therefore provide a sound basis for forecasting, decision making and planning. It is easy to make amendments in the budget document when using IT and such a budget is most likely to be accurate in terms of calculations.

3.4.3 School development planning

School development planning is a way to effectively manage change whilst development is a perceptible change for the better. School management should occasionally strive for purposeful changes in order to effectively and efficiently serve the interests of its clientele. For school development planning to serve this purpose it must be based on enough,

current and accurate information (Moursund, Bielefeldt & Underwood, 1995:89).

The planning process entails defining the future state of affairs and translating it into aims and objectives which should be achieved by staff members individually and/or collectively. To enlist the commitment of staff, in this regard, there necessarily has to be a shared vision of the future state of affairs of a school. Tjosvold and Tjosvold (1995:73) have argued that "a shared vision is the critical first step to high commitment, high performance organization ... The vision inspires and directs people so that they work together successfully and feel fulfilled and purposed." The shared vision further enhances team work where individuals are committed to the same vision and perceive their roles as complementary. In this way the institution remains well focused on its activities and probably productive in its functioning. All this is very important but can be a daunting task in a large senior school especially when the entire process is a handicraft.

The use of IT can promote communication and coordination. School development planning requires gathering information from various stakeholders. It has the capacity to facilitate the sending and reception of electronic mail quite expeditiously. In addition, data can be faxed to communicate ideas or views on specific issues. Information is very important in planning; one must know what is desirable or undesirable particularly by stakeholders and all this needs to be communicated to the relevant authorities for planning purposes. IT can be used to collate data from different sources, analyse it and present it in a more coherent discernible manner and thus enhancing the quality of planning and decision making. IT facilities can also enhance collaboration in that stakeholders or participants in the planning process can be assigned tasks;

be checked and asked to give feedback from wherever they work without the need to meet regularly. Easy flow of information and the ability to process large volumes of data can enhance the school development planning process.

It must be emphasized that the involvement of staff in the school development planning process is, to some extent, a prerequisite to commitment in implementing the plan. However, for the purposes of accountability, the views of parents, students and education officers should also be sought. This could also be extended to the employers' federation, a body which is likely to employ school heads. Such an effort could induce a sense of ownership of the plan and enhance its support by the aforementioned stakeholders. As already stated, IT has the capacity to collate data from different sources, analyse it and present it in an informative way. It does appear therefore, that the use of IT can play an important role in school development planning. School heads who optimally use IT are likely to be better off compared to those who do not use IT.

3.5 Information technology and school heads

It has already been implied that the use of IT in schools by the school heads can enable them to do things in less time but with better results. This could make the work life of a school head both invigorating and fulfilling with the potential of reduced stress levels. Being able to achieve more in less time, the school head can have a reasonable amount of time to actually supervise and guide the subordinates. This has the potential of improving labour relations but more importantly the school head can have time to develop his/her staff. The availability of time to the school heads can enable them to concentrate on the most critical issues such as strategic management. The use of IT by school

heads can enhance their productive capacity by enabling them to perform better and do tasks which probably may be impossible for them without the aid of IT. By improving the productivity of the school heads, the schools are also likely to be productive as most things will be done properly which is likely to spur staff and students to greater efforts. In this way the head can be proactive and be in a position to deal with change creatively.

Once the school head is conversant with IT and has acquired the necessary skills for him/her to appreciate the benefits of using IT, he/she can play a leading role in enabling staff and students to acquire the same skills. In particular, the integration of IT into the school curriculum can be facilitated by the school heads' positive attitude towards IT, the attitude derived from the benefit and appreciation of having and using IT skills in running the school.

IT promotes communication and collaboration with the potential of enhancing the quality of a decision making process. However, it needs to be mentioned that IT should not be viewed as the panacea of the ills of educational management. The school head will occasionally be faced with some complex problems which require imagination, resourcefulness, intuition and inductive reasoning which can not be left to IT since such attributes are characteristics of a human expert (Lorimer, 1996:179). It should also be noted that over-obsession with IT can reduce interaction between the school head and the staff and this could compromise human relations in the school. Where IT is widely used in a school or any public institution, the head of the institution may have a daunting task of ensuring that personnel information in the IT network is not abused.

3.6 Conclusion

Chapter three dealt with the potential role IT can play in decision making and planning in senior secondary schools. The need for reasoned and defensible decisions in public institutions cannot be overemphasized. Such decisions can be achieved if based on information that is accurate, adequate, timely and when the user of the information has the necessary skills to handle such information. The use of IT in this regard can lead to such reasoned decisions. It has been established that the use of IT can lead to less time needed to process data, easier accessibility of information and better results. This can enable school heads and governing bodies to base their decision making and planning activities on relevant information. Personal health of school heads and positive relations between school heads and their staff can be enhanced if the heads have some time available to them for these purposes. Such time can be made available by exploiting the power of IT and related technologies. In view of the significance of IT in school management it might be illuminating to establish the extent to which IT is used in the management of senior secondary schools in Botswana and this is the focus of the next two chapters.

CHAPTER 4

RESEARCH METHOD

4.1 Introduction

As stated in chapter one, the study is aimed at, amongst other things, to determine the extent to which information technology is used in senior secondary schools in Botswana to improve decision making and planning processes. This chapter deals with the research method to facilitate the study. Data to be collected and the instrument to be used for this purpose are explained. The study followed a descriptive survey research method which is also discussed. The research process is also described in this chapter.

4.2 Data to be collected

It is important to first make a distinction between two kinds of data, namely primary and secondary data. The latter refers to data that are available in published literature, like those used in chapter two and three of the dissertation, whilst the former refers to those obtained from the original source being investigated. In this study, primary data were also collected because the author does not believe that there is sufficient secondary data available on the subject of study.

Data to be collected should have a bearing on the objectives of the study. Such data should lead to information on the extent to which information technology is used in improving decision making and planning in the management of senior secondary schools in Botswana. Consequently data were collected on, amongst

others, the following areas:

- Availability of IT facilities – to establish the extent to which such facilities are available to school heads
- Policy on IT – to establish whether there is a national policy on IT and the nature and scope of the training arrangement which are in place for school heads
- Use of IT – to determine the extent to which IT facilities are used, if they are available, for planning and decision making in the management of senior secondary schools
- Opinions – to establish the opinions of school heads with regards to the benefits that could be realized from the use of IT in decision making and planning in senior secondary schools

4.3 Research method

In view of the nature of data that were to be collected, the study followed a descriptive survey research method. According to Ary, Jacobs and Rozavieh (1996:427) a survey is "a research technique in which data are gathered by asking questions to a group of individuals called respondents." However, data in this method can also be gathered through observation. A descriptive research method is regarded as a type of quantitative research which incorporates careful descriptions of a phenomenon in question (Gall, Borg and Gall, 1996:89). Its main purpose is to systematically describe facts and characteristics of a particular research population as factually and accurately as possible (Isaac and Michael, 1997:123). This method is relevant for the study in question because in the end one would like to describe the extent to which heads of senior secondary schools in Botswana use information technology to aid decisions making and planning.

The method has been chosen because it seemed capable of addressing the research questions posed in chapter one. A descriptive research method can facilitate the collection of detailed factual information that actually describes the situation in senior secondary schools.

4.4 Primary data collecting instruments

Primary data can be collected in various ways and Nel *et al* (1994:140) have argued that "primary data can be collected in three ways: by communication, observation and experiment." However, not all these methods of data collection are suitable in all situations. To a large extent the situation dictates which method is suitable for a particular study.

Communication, as a method of data collection, enables the researcher to obtain data directly from the respondents verbally or in writing. On the other hand, observation entails watching people in action in the appropriate environment. In the case of this study, observation would mean that the researcher or his assistants actually go to the senior secondary schools in Botswana to watch school heads in action and record the relevant data. Normally there is no need for communication between those being observed and the observers. It is also possible for electronic devices such as the people meter, oculometer and psycho-galvanometer to be used for observation purposes (Gall *et al,* 1996:145). Experiments are normally effective in determining cause–and–effect relations. This is usually done by "exposing one or more experimental groups to one or more treatment condition and comparing the results to one or more control group not receiving the treatment" (Isaac and Michael, 1997:56). The idea is to control the variables, that are most likely to influence the dependent variable in order to establish the cause and effect relations.

From the exposition made above and taking into consideration the nature of the study, it would appear logical to prefer communication to the other two methods. Facts about the use of IT and policies on IT can easily be established through communication.

Communication as a method of data collection is very broad in that it includes personal interviews, telephone interviews and written communication like the use of a questionnaire. Although all these styles of communication can be used in the same study to facilitate triangulation, the use of a questionnaire is, nevertheless, preferred as the main instrument for data collection in this study. However, interviewing was used to triangulate the questionnaire. Since the questionnaire and interviewing were used in this study, they are analysed below in more detail.

4.4.1 Questionnaire

A questionnaire is a set of written questions and/or statements to which the research subjects are to respond in order to provide data which are relevant to a research topic. The main objective was to undertake a worthwhile and instructive study by using a data collection instrument which had been critically examined with a view to collecting valid and reliable data. Reliability as viewed by Bell *et al* (1984:64) is "the extent to which a test or procedure produces similar results under constant conditions on all occasions." On the other hand, the questionnaire should have a high degree of validity which is a measure of the extent to which an instrument describes or measures what it is supposed to describe or measure (Ary, Jacobs and Razavieh, 1996:53).

It should however, be noted that designing a questionnaire is not an easy thing despite the abundance of the guidelines on its design. In fact,

designing an effective questionnaire is more in the nature of art than a scientific exercise (Nel *et al*, 1994:98). However, a well designed questionnaire is rather easy to use and can gather valid and reliable data. Data to be collected are summarized in paragraph 4.2 above and therefore statements or questions in the questionnaire had to cover the delimited area to comply with the requirements of construct validity (Sedisa, 1998:49).

In order to address different constructs three scales, namely Thurstone, Likert, and Semantic differential were used. The Thurstone scale requires the subjects to express agreement or disagreement with a specific statement about the object of study. The Likert scale, on the other hand, establishes the extent of agreement or disagreement with statements (e.g. strongly agree, agree, no opinion, disagree, strongly disagree). Semantic differential is a scale that rates opinion or attitude using bipolar adjectives e.g. available – not available; fair – unfair (Gall, Borg and Gall, 1996:175). The scales were used because the study was intended to be scientific and must therefore comply with research principles and practices with the hope that the final outcome of the study will gain a wider acceptability.

4.4.2 Interviewing

The interview may be used for various reasons. However, for the purpose of this dissertation the focus was on the interview as a research technique which facilitated basically two things, namely the process of seeking information and that of providing it. Cannell and Kaln, as quoted by Cohen and Manion (1995:271), have defined the research interview as "a two-person conversation initiated by the interviewer for the specific purpose of obtaining research relevant information, and focused by him

on content specified by research objectives of systematic description, and prediction or explanation." However, the research interviews are not limited to a conversation between two people, they can be conducted by more than one person as is the case with an interview panel.

Interviews can either be fact-to-face or in the form of a telephone communication between an interviewer and a respondent. Whatever form it takes, interviewing has a number of advantages. For example, if a response suggests that a respondent has more valuable information, a follow-up can be made to elicit that information. The advantages of interviewing have been summarised by Bell *et al* (1984:177) as follows: "A skillful interviewer can follow up leads, probe responses, investigate motives and feelings, which a questionnaire can never do." It can be added that the rate of return of responses, as compared to a questionnaire, can be good in the case of an interview.

Interviewing has its own problems. It takes a lot of time to conduct interviews which could result in very few people being interviewed due to lack of time. Another problem with this method of data collection is that it is subjective and therefore the danger of bias can be very difficult, if not impossible, to eliminate. It must be stated however, that the disadvantages of interviewing do not always surpass its advantages especially with skillful interviewers.

The main purpose of interviewing in this study is to triangulate the questionnaire with a view to improving the reliability and validity of the research data. Triangulation is described in the British Open University course (E8II) and is quoted by Bell (1984:64) as "cross-checking the existence of certain phenomena and the veracity of individual accounts by gathering data from a number of informants and a number of sources and

subsequently comparing and contrasting one account with another in order to produce as full and balanced a study as possible." This also implies that triangulation strengthens the research design by using various methods to identify loopholes in the design with a view to closing them and adapting the same design to the realities of the research environment.

4.4.3 Preference for a questionnaire

In addition to issues raised earlier in this chapter a questionnaire was preferred to other instruments for a number of reasons. In the first place the author is a full-time administrator, director of student affairs at a university and therefore does not have enough time to conduct experiments, make observations or interview the research population. This is so because the research population is spread over a wide geographical expanse, so much so that one would have had to undertake extensive traveling to observe the subjects in action. The use of telephone interviews can be extremely expensive for the researcher. In addition, school heads' days are unpredictable, so much so that appointments may not be honoured by most of them. Youngman in Goulding in Bell *et al* (1984:40) made observations and arguments which guided the choice of a questionnaire as he contended that "questionnaires are probably the most common method of collecting information. They are cheap to administer, can be sent to a large number of subjects and provided they are well designed, are relatively easy to analyse." However Youngman, like Nel *et al* (1994:98), acknowledged the complexity of designing an effective questionnaire.

4.5 Research process

This section focuses on how the research proceeded from the point the questionnaire was prepared up to the point when it was received from the respondents. It must be pointed out that research has a significant role to play in the realm of knowledge and therefore it must be undertaken in a purposive manner. Mouly, quoted by Cohen and Manion (1995:40) has viewed research as follows: "Research is best conceived as the process of arriving at dependable solutions to problems through the planned and systematic collection, analysis, and interpretation of data. It is a most important tool for advancing knowledge, for promoting progress, and for enabling man to relate more effectively to his environment, to accomplish his purposes, and to resolve his conflicts." It follows then that any research which is meant to achieve the aforementioned objectives must be specifically designed for the purpose. In particular, the whole process must follow universally accepted research practices for the findings to be generalisable and also to add to the existing knowledge.

4.5.1 Scope

As mentioned in chapter one, there were only twenty seven senior secondary schools in Botswana at the time of the study. So the research population was made up of twenty seven school heads from all over the country, some from schools in towns/cities and others from villages. The subjects included three school heads who were recently promoted from junior secondary schools to senior secondary schools in the country.

4.5.2 Selection criteria

The number of senior secondary schools in Botswana is not overwhelming to the extent that it is possible to check responses from all of them

without great cost (psychological and financial). So one consideration was the availability of the subjects and access to them which were perceived adequate for the author. Besides, the author had been a senior secondary school head and therefore was familiar with other senior secondary school heads and management practices in these schools. Such familiarity was perceived to have the potential of facilitating the study. The other consideration for selecting senior secondary schools was that their financial management was similar to those of other government departments as compared to community junior secondary and primary schools in the country. This similarity has the potential to facilitate the generalization of the research findings to encompass practices in public administration in Botswana in general.

4.5.3 Piloting the questionnaire

The piloting of a data-collecting instrument is another important stage in a scientific study. Piloting a data-collecting instrument, in this case a questionnaire, ensures that the instrument stands a good chance of achieving the objective of collecting data which have a reasonable degree of validity. The process of piloting a questionnaire also ensures that it is adapted to the realities of the research population by trying it several times and improving it where necessary. To this end, Oppenheim (1992:47) expressed the same sentiments as follows: "Questionnaires have to be composed and tried out, improved and then tried out again, often several times over, until we are certain that they can do the job for which they are needed." These views were echoed by Bell *et al* (1984:96) when she argued that "all data-gathering instruments should be piloted to test how long it takes the recipients to complete them, to check that all questions and instructions are clear and to enable you to remove any items that do not yield usable data."

It can therefore be inferred that however well designed a questionnaire may seem to be, it should always be piloted to ensure relevance, objectivity and effectiveness. In addition, piloting a data-collecting instrument seems to be a common practice in scientific studies.

Before piloting the questionnaire, it was given to one of my colleagues to critique it. He recommended some modifications to some statements and these were done. After that the questionnaire was sent to one of my supervisors to further critique it. He also recommended some refinement of the questionnaire and that was done.

The questionnaire was then given to three school heads to complete and all responded. In addition, one of them was interviewed using the statements in the questionnaire as the interview schedule. The results of the pilot study were analysed and the analysis thereof is presented in the next chapter. The purpose of the analysis of the pilot work was to check the reasonableness of the whole exercise.

4.5.4 Distribution of the questionnaire

The author knew, at some point, of a meeting of senior secondary school heads to be convened in Gaborone, the capital city of Botswana. Instead of posting the questionnaire it was distributed at that meeting. In view of the fact that senior secondary schools in Botswana are spread over a large geographical expanse, this mode of distribution of the questionnaire was deemed to be the quickest, cheapest, and most reliable.

4.5.5 Rate of return

As stated in paragraph 16, there were twenty seven government senior secondary schools in Botswana when this study was undertaken. Certainly the mode of the distribution of the questionnaire was the best in the prevailing circumstances. However, the rate of return was not equally the best. Although the heads were asked to complete the questionnaire and leave it with the organizers of the meeting, some heads nevertheless felt they were busy and decided to take the questionnaire with them back to their stations and then send it to me later. In the end twenty four, out of twenty seven, questionnaires were received and this constitutes a return rate of 88.9% which is not bad by any means. The analysis of data collected is now the focus of the next chapter.

4.6 Conclusion

The research followed a descriptive survey method in which a questionnaire was used as the main data collection instrument. The instrument was used to collect primary data from heads of senior secondary schools in Botswana. In an attempt to address various constructs, the questionnaire was made up of three different scales, namely Thurstone, Likert, and semantic differential. The preference of a questionnaire over other research instruments was due to the fact that the research population was spread over a wide geographical expanse. However, the researcher happened to know of the impending meeting of all the heads of senior secondary schools in Gaborone, at which meeting the questionnaire was distributed and the return rate was 88.9%. The questionnaire was piloted using five school heads from the research population. This was done in order to ensure that the questionnaire was adapted to the realities of the research population. Interviewing was used

simply to triangulate the questionnaire with a view to ensuring that the research generated valid and reliable data. Data were collected mainly on the availability and extent of the use of IT facilities, policy on IT and opinions of the research population on the benefits that can be realised from the use of IT in improving decision making and planning. The analysis of the research data follows in the next chapter, that is chapter five.

CHAPTER 5

RESEARCH DATA ANALYSIS

5.1 Introduction

The primary focus of chapter five is to present and analyse the research data with a view to establishing the extent to which information technology facilities are being used in improving decision making and planning in senior secondary schools in Botswana. Data are presented in tables for ease of reference and interpretation. The tables show the numbers and percentages of the subjects who responded to the questionnaire. The analysis of data is based on the aggregation of individuals' responses to statements which focus on specific constructs.

5.2 Research data and analysis

As indicated in the previous chapter, out of twenty seven senior secondary school heads in the country, twenty four returned the questionnaire. So the analysis is based on the responses of twenty four school heads. In addition, the analysis of the responses of a pilot group of three is presented, albeit in the form of a summary below.

5.2.1 Pilot study

The first construct in the questionnaire dealt with the availability of information technology facilities. The three school heads had the facilities listed in table 5.1 either in their offices or elsewhere within their schools. One head used a computer daily but only for word processing whilst the

other two used a computer once in a while. However, the three heads did not seem to know of the availability of the software applications 'spreadsheet', 'database' and 'publisher'. One head had an e-mail facility but under the custody of the information technology teacher and the head used it once in a while. The other two heads did not have such a facility.

The level of computer literacy was very low for the pilot group. One head's competence was only limited to word processing otherwise they were all poor in the rest of the software applications listed in table 5.2. The three heads believed that there was neither a national policy on information technology nor a training policy on the use thereof and that the Botswana Government should develop such policies. Besides, they all strongly believed that school heads should be trained in the use of information technology as they also believed that the use of information technology can improve the quality of decision making and planning in schools. The rest of the chapter focuses on the analysis of the results of the research group.

5.2.2 Availability of information technology facilities

Table 5.1 shows the extent of the availability of information technology facilities to school heads in senior secondary schools in Botswana. According to the table, 79.2% of school heads had computers in their offices but only 37.5% of them used such facilities daily according to table 5.2. Although 20.8% of heads reported that they did not have computers in their offices, 91.7% of them indicated the availability of computers in other offices within the school (table 5.1). This suggests that although schools had computers, some heads of these schools did not have computers in their offices. In general, table 5.1 shows that information technology facilities were available in almost all the senior secondary

schools in Botswana and that if such facilities were not in the school heads' office then they were somewhere else in the school. If any one school did not have information technology facilities that could possibly be attributed to lack of initiative on the part of the school head in question. Most heads (70.8%) relied on teachers for doing some information technology related work and this clearly indicated that most senior secondary school heads in Botswana were not that much independent in using information technology facilities that were available to them (table 5.1). Besides, this reliance on teachers suggested that the competency of heads in question regarding the effective use of information technology facilities can be questioned.

Table 5.1: Extent of the availability of information technology facilities

	Information technology facilities	A		NA	
		No	%	No	%
1	Computer in own office	19	79.2	5	20.8
2	Printer in own office	9	37.5	15	62.5
3	Internet connection	8	33.3	16	66.7
4	Computer in other offices	22	91.7	2	8.3
5	Scanner	15	62.5	9	37.5
6	E-mail facilities	8	33.3	16	66.7
7	A teacher who does the IT work for you	17	70.8	7	29.2

The role e-mail facilities can play in decision making and planning has been emphasized in chapter three. However, table 5.1 shows that only 33.3% of the respondents were connected to the internet and had the e-mail facility at their disposal. It is also shown in table 5.2 that only 8.3% of the respondents used e-mail daily; 4.2% used it at least once a month whilst 16.7% used it once in a while. This suggests that 91.7% of heads of senior secondary schools in Botswana did not use the e-mail optimally to the extent of improving decision making and planning in their schools.

Besides, availability of facilities was not commensurate with their use as reflected in table 5.2 which is elaborated upon in paragraph 5.2.3.

Although 79.2 % of respondents had computers in their offices only 37.5% of them had printers in the offices according to table 5.1. Printers are very crucial output devices and if they are largely not available especially in a situation where e-mail facilities are barely used it does seem plausible to infer that most of the school heads in question did not harness the power of these facilities to bear upon their decision making and planning practices.

Table 5.2 suggests that several software packages were not available to many school heads. Even the Word Processing software was not available to some school heads. Such software application is fundamental so much so that its lack of availability raises serious questions like why was a computer bought in the first place? The e-mail and internet facilities were not available to the majority of the school heads (70.8% in each case). However, the data on availability of software do not lend themselves to a definitive evaluation especially when considered in tandem with the rest of the data in the same table. This matter is taken further in the last paragraph of 5.2.3. In general however, the majority of the school heads did not have most of the application software listed in table 5.2.

5.2.3 Frequency of use of information technology facilities

Table 5.2 shows the frequency of the use of information technology facilities by the school heads. The table indicates that 37.5% of the respondents used computers daily, 16.7% did not have computers and therefore did not use them; 12.5% of them used computers at least once

a week, 8.3% at least once a fortnight whilst 25.0% once a while. These figures suggest that the rate of general computer usage was low even before going into specific software application programmes.

Table 5.2: Frequency of the use of information technology facilities

		Not available		Daily		At least once a week		At least once a fortnight		At least once a month		At least once a while	
		No	%	No	%	No	%	No	%	No	%	No	%
1	General computer usage	4	16.7	9	37.5	3	12.5	2	8.3	0	0.0	6	25.0
2	Microsoft Word	5	20.8	8	33.3	4	16.7	1	4.2	1	4.2	5	20.8
3	Word Perfect	12	50.0	2	8.3	1	4.2	1	4.2	0	0.0	8	33.3
4	Microsoft Power Point	12	50.0	2	8.3	2	8.3	0	0.0	0	0.0	8	33.3
5	Microsoft Excel	8	33.3	0	0.0	3	12.5	1	4.2	1	4.2	11	45.8
6	Microsoft Access	10	41.7	1	4.2	3	12.5	0	0.0	2	8.3	8	33.3
7	Microsoft Publisher	13	54.2	0	0.0	3	12.5	0	0.0	0	0.0	8	33.3
8	Microsoft Frontpage	16	66.7	0	0.0	4	16.7	0	0.0	0	0.0	4	16.7
9	E-mail	17	70.8	2	8.3	0	0.0	0	0.0	1	4.2	4	16.7
10	Internet	17	70.8	2	8.3	0	0.0	0	0.0	1	4.2	4	16.7

Wordprocessing, especially Microsoft Word, was relatively popular since 33.3% of the respondents used it daily whilst for the rest of the programmes in table 5.2 only 8.3% or less of the respondents used each of them daily. For example nobody used Excel daily according to table 5.2 whilst table 5.3 on computer literacy shows that 87.5% of the school heads' level of literacy with respect to the same software application programme was either average (12.5%) or poor (25.0%) or nil (50.0%). Although Microsoft word seemed relatively popular, it still remained low in terms of the rate at which it was used daily i.e. 33.3%.

Apart from Microsoft Word it is clear from table 5.2 that the rest of the programmes were barely used. For example Microsoft Power Point: 50% said not available and 33.3% used it once in a while; Microsoft Access: 41.7% said not available and 33.3% used it once in a while; Microsoft Publisher: 54.2% said not available and 33.3% used it once a while; e-mail: 70.8% said not available whilst 16.7% used it once in a while; internet was rated the same as e-mail.

The conclusion that can be drawn from table 5.2 is that the frequency of the use of information technology facilities by senior secondary school heads in Botswana was very low and demonstrated that such facilities were not used that much to improve decision making and planning in schools. This is derived particularly from the nature and scope of the use of such facilities. The figures also show that a high percentage of the school heads indicated that most of the programmes were not available. It may very well be that such programmes were available but the respondents probably did not know that and/or they probably were not aware of the purposes for which they may be used. It is inconceivable that the Government of Botswana would be prepared to allow school heads to purchase computers and not the appropriate software. It does appear that the incentive to acquire the necessary software did not exist in a majority of cases.

5.2.4 Level of computer literacy

Table 5.3 shows the level of computer literacy in general by focusing on various software application programmes and the self assessment of the research population. Table 5.1 shows that 79.2% of the respondents had computers in their offices and, according to table 5.2, 37.5% of them used computers daily. However, table 5.3 shows that only 16.7% of the

respondents were either very good (4.2%) or good (12.5%) whilst 83.4% were either average (41.7%) or poor (41.7%) at general computer usage. Some school heads had some level of competency in microsoft word. As shown in table 5.3, 8.3% of the respondents were very good at microsoft word, 12.5% were good, 37.5% average, 37.5% were poor whilst 4.2% were completely illiterate. The other area in which there was an element of competency was in the use of internet and e-mail. In this area, 25.0% of the respondents were either very good (8.3%) or good (16.7%). However, the majority (75.0%) varied from average and poor (29.2%) to nil (45.8%). The level of literacy was even lower with other programmes. For example Microsoft Publisher 100% of the respondents were either poor (29.2%) or nil (70.8%).

Table 5.3: Level of computer literacy

		Very Good		**Good**		**Average**		**Poor**		**Nil**	
		No	%	No	%	No	%	No	%	No	%
1	General computer usage	1	4.2	3	12.5	10	41.7	10	41.7	0	0.0
2	Microsoft Word	2	8.3	3	12.5	9	37.5	9	37.5	1	4.2
3	Word Perfect	0	0.0	2	8.3	5	20.8	12	50.0	5	20.8
4	Microsoft Power Point	0	0.0	1	4.2	2	8.3	5	20.8	16	66.7
5	Microsoft Excel	0	0.0	3	12.5	3	12.5	6	25.0	12	50.0
6	Microsoft Access	0	0.0	1	4.2	3	12.5	8	33.3	12	50.0
7	Microsoft Publisher	0	0.0	0	0.0	0	0.0	7	29.2	17	70.8
8	Microsoft Frontpage	0	0.0	0	0.0	3	12.5	4	16.7	17	70.8
9	E-mail	2	8.3	4	16.7	3	12.5	4	16.7	11	45.8
10	Internet	2	8.3	4	16.7	4	16.7	3	12.5	11	45.8

The results in tables 5.2 and 5.3 are consistent and the message from them is clear, namely that by and large, senior secondary school heads in Botswana did not optimally use computers at their disposal due, in part, to high level of computer illiteracy.

5.2.5 Views on information technology

The study included views that the subjects had about information technology and the results of which are included in table 5.4.

The analysis is based on the following abbreviations of the likert scale: Strongly Agree (SA); Agree (A); Undecided (U); Disagree (D); and Strongly Disagree (SD). According to the table, 20.8% of the school heads agreed (SA=12.5%, A=8.3%) that there was a national policy on information technology whilst 50.0% of them disagreed (D=25%; SD=25.0%) that there was such a policy and 29.2% were undecided.

The national policy on information technology as it applies to education would best be known by school heads like those in senior secondary schools because they are the agents of change. If indeed the policy existed then one wonders why so many school heads either did not have views (29.2%) or did not know (D=25.0%; SD=25.0%) about its existence. If the policy existed then probably it is one of those policies which are developed but never implemented.

As for the training policy on the use of information technology and the strategy on information technology one would expect all this to be part of the broader national policy and indeed this is confirmed by the similarity

of results for items 1, 2, and 3 in table 5.4. This could also be a measure of consistency on the views of the respondents.

Table 5.4: Views on information technology

		SA		A		U		D		SD	
		No	%	No	%	No	%	No	%	No	%
1	There is a national policy on IT	3	12.5	2	8.3	7	29.2	6	25.0	6	25.0
2	There is a training policy for the use of IT	2	8.3	2	8.3	9	37.5	5	20.8	6	25.0
3	You understand the national strategy on IT	2	8.3	2	8.3	6	25.0	9	37.5	5	20.8
4	There is enough support from the Ministry of Education in the use of IT in your school	2	8.3	8	33.3	1	4.2	5	20.8	8	33.3
5	The Government should develop a policy on IT	18	75.0	6	25.0	0	0.0	0	0.0	0	0.0
6	There is a need for school head to be trained in the use of IT	24	100.0	0	0.0	0	0.0	0	0.0	0	0.0
7	IT is integrated into the school curriculum	6	25.0	8	33.3	0	0.0	6	25.0	4	16.7
8	You use IT in decision making	3	12.5	3	12.5	4	16.7	11	45.8	3	12.5
9	The effective use of IT in secondary school can be an advantage in managing a school	19	79.2	5	20.8	0	0.0	0	0.0	0	0.0
10	You use IT in planning	3	12.5	8	33.3	1	4.2	6	25.0	6	25.0
11	Communication between yourself and the education office is mainly through e-mail	1	4.2	0	0.00	0	0.00	3	12.5	20	83.3
12	The use of IT can improve the quality of decision making in a school	16	66.7	8	33.3	0	0.0	0	0.0	0	0.0
13	The use of IT can improve the quality of planning in a school	18	75.0	6	25.0	0	0.0	0	0.0	0	0.0
14	Communication by means of traditional postal services delays information transfer	22	91.7	2	8.3	0	0.0	0	0.0	0	0.0

Although more heads (54.1%) disagree (D = 20.8%; SD = 33.3%) with the statement that "there is enough support from the Ministry of Education in the use of information technology in your school", a reasonable proportion (41.6%) agreed (A = 33.3%; SA = 8.3%) with the statement. So these school heads were generally divided in their views of the support they got from the Ministry of Education. However, this division may be attributed to the different interpretation and/or perception of the support. It is possible that some considered support in terms of the provision of facilities whilst others considered support in terms of training in the use of IT facilities.

However, 100% of the subjects agreed (SA=75.0%; A=25.0%) that there was a need for the government of Botswana to develop a policy on information technology. In addition, all respondents agreed (SA=100%) that there was a need for school heads to be trained in the use of IT. This response may be indicative of the felt deficiency in the use of IT facilities by the research population and may confirm that the support from the Ministry of Education in the use of IT was, if anything, minimal.

Table 5.4 also shows that 25.0% of the respondents agreed (SA=12.5%; A=12.5%) that they used IT in decision making and 58.3% disagreed (D=45.8%; SD=12.5%) that they used IT in decision making in their schools. On the hand, 45.8% of the respondents agreed (SA = 12.5%, A = 33.3%) that they used IT in planning whilst 50.0% disagreed (D = 25.0%; SD = 25.0%) that they used IT in planning in their schools. Those who were undecided, 16.7% for decision making and 4.2% for planning, probably did not quite understand what could be involved in using IT in decision making and planning. However, all respondents agreed (SA=66.7%); A=33.3%) that the use of IT can, in fact, improve

the quality of decision making in a school. They also all agreed (SA=75.0%; A=25.0%) that the use of IT can improve the quality of planning in a school.

All respondents agreed (SA=91.7%; A=8.3%) that communication by means of traditional postal services delayed the transfer of information. On the other hand, that communication between themselves and the Ministry of Education was mainly through e-mail, 4.2% strongly agreed whilst the rest (95.8%) disagreed (D=12.5%; SD=83.3%). Suffice it at this stage to observe that the paucity of the research population needs to be occasionally borne in mind when interpreting some of these results. For example 4.2% that strongly agreed that e-mail was used for communication with the Ministry of Education is actually one person and his/her view is diametrically opposed to those of the rest of the research population (23). However, this state of affairs suggests that the Ministry of Education had not fully embraced the use of IT and it can therefore be inferred that the Ministry of Education did not expect senior secondary schools heads to communicate with it using e-mail because such a facility did not seem to exist. Further more, this suggests that information that schools required from the Ministry of Education for decision making and planning purposes was communicated through the traditional postal services if it could not be faxed.

5.3 Conclusion

In chapter five the research data have been presented in a tabular form and expressed in percentages for ease of analysis. The analysis has shown that 79.2% of the senior secondary school heads in Botswana had computers in their offices. Other IT facilities have also been made available to these schools. However, since a computer being a key IT

facility, the research focused more on it and various software application programmes. Microsoft Word was used more often than other programmes even though only 33.3% of the respondents indicated that they used it daily. The other programmes were rarely used so much so that it is inconceivable that they could have been used to improve decision making and planning in their schools. The analysis also showed that the subjects were generally agreed in that the government of Botswana needed to develop a policy on IT and that there was a need for them to be trained in the use of IT in their schools. It is evident from the analysis that there had not been any proper training programme to enable these school heads to effectively use IT facilities. It has also come up clearly in the analysis that the respondents were convinced that the use of IT could improve the quality of decision making and planning in their functional sphere. From the analysis of the level of computer literacy it can be inferred that although the heads of senior secondary schools in Botswana operated in a computer environment they were, by and large, computer illiterate. The analysis has also shown that most school heads depended on skilled teachers for doing IT related work. This suggests that most of the research subjects were not competent in using IT facilities. All this does not augur well with the idea of using IT to improve decision making and planning in schools.

CHAPTER 6

SUMMARY, CONCLUSIONS AND PROPOSALS

6.1 Introduction

The intent in chapter six is to conclude the dissertation by presenting a summary of the study with due regard to the literature review. In addition, the conclusions about the extent to which senior secondary school heads in Botswana use information technology in improving decision making and planning are presented. There is a gap between what has been written in published literature and what prevails in senior secondary schools in Botswana with respect to the use of information technology in schools. In view of the aforementioned gap, several proposals are made with a view to assisting the policy makers, through school heads, in improving decision making and planning in public administration in general and in senior secondary schools in particular.

6.2 Summary

Contemporary public institutions are increasingly facing dwindling resources partly because of economic factors such as inflation and recession. At the same time these institutions are facing ever increasing demands for additional and/or better services to the general populace. These two broad forces, amongst others, on public institutions necessitate the need to increase productivity in these institutions. Effective decision making and planning can improve the quality of management of the institutions in question. The focus, however, is not on public institutions in general but on a specific group of public institutions, namely senior secondary schools in Botswana.

6.2.1 The study

The modern world is characterized by, amongst others, technological advancement which include the proliferation of information technology (IT). Public institutions use information technology to enhance the provision of goods and services to the society. The intent of the study was to determine the nature and scope of the use of information technology in public administration in Botswana and senior secondary schools were chosen as an example of a category of public institutions. In particular the study focused on the extent to which information technology is used in improving decision making and planning in senior secondary schools in Botswana.

6.2.2 Management

Management has been defined differently by various authors but generally the concept is viewed as an integrated process in which particular individuals use human and other resources as efficiently and effectively as possible with a view to optimally achieving institutional goals and objectives. There are specific functions which constitute management though various authors have classified them differently. However, in this dissertation the classification by Hanekom *et al* (1990:26) has been adopted, namely planning, decision making, leadership and control. Those in positions of management need various skills in order to cope with their multifarious tasks. Such skills have been categorized as technical, human and conceptual skills. In the context of public administration it can be expected that management or, better still, public management is viewed from a specific angle, namely the public sector.

6.2.3 Planning

Planning as one of the management functions is basically viewed as a human intellectual activity aimed at determining a future state of affairs as well as the steps to be followed in order to achieve this future state of affairs. The planning function enables institutions to focus on essential activities and ensures that public funds are expended on activities that optimally benefit the society. In the planning process, essential activities are determined and therefore during the execution of the plan little time is wasted in trying to establish what needs to be done. Besides, managers are empowered by the process of planning to be proactive and therefore to manage change more effectively. In order to be meaningful, the planning process needs to be both logical and systematic. Although there are several views on how the planning process unfolds, it has been adopted in this dissertation that the process should, by and large, progress through the following steps: establishing needs; setting objectives; determining the course of action; trial run; operationalising the plan; and evaluation. These steps are differentiated for the purposes of analysis. In practice some of them can be intertwined.

6.2.4 Decision making

The decision making process is another management function dealt with in this dissertation and it is regarded as the brain and nervous system of an institution. It is basically a process of determining a rational way of dealing with a problem or a situation for which the need for a solution has been perceived. Decision making takes place at all levels of an institution. However, decisions in an institution can be classified as either strategic or tactical or operational depending on whether they are taken at top, middle or 'shopfloor' level. There are several models of decision making in the

published literature of which the rational decision making process has been adopted in this dissertation. The process is logical and systematic and it is based on certain steps which can, at least in theory, be identified.

6.2.5 Information technology (IT)

Information technology has been defined in general as the application of computers and communication technologies in the acquisition, processing, storage and dissemination of vocal, pictorial, textual and numerical data and/or information. On the other hand, information and communication technology (ICT) is a concept that focuses on the distribution of information through telecommunications equipment such as faxes, telephones, computers and modems.

Various information technology related concepts have been elucidated, namely data, information, knowledge and intelligence. It has been explained that data and information do not mean the same thing. Data are raw, unsummarised and unanalysed facts which become information when they have been analysed and put in an understandable manner.

6.2.6 Impact of information technology on decision making and planning in senior secondary schools

The work of a school head of a senior secondary school is multifaceted and requires a lot of planning and frequent decision making. In addition, school heads have to attend to many different issues in which case they can not spend much time on each one of them. This state of affairs can compromise rationality and quality in decision making and planning due to human limitations in dealing with information. People, from time immemorial, used tools to simplify their daily tasks. Information

technology offers a variety of tools which can immeasurably reduce the complexity of a variety of tasks in the process of planning and decision making in senior secondary schools.

6.2.7 Research

The research focused on government senior secondary school heads in Botswana. Unfortunately there are only twenty seven of such schools in the whole country in which case the number appears to be small. However, this is all what the Government of Botswana has at this level of education. A questionnaire was used because although there are only twenty seven government senior secondary schools in the country (2001) they are scattered over a wide geographical expanse. Any other form of data collection would have been rather expensive. The research process went on fairly well resulting in conclusive evidence on the provision of information technology facilities and the extent to which such facilities are used in improving decision making and planning in these schools.

6.3 Conclusions

Information technology is a *sine qua non* for improved management practices and can effectively guide decision making and planning in public institutions like senior secondary schools in Botswana. Although the majority are appropriately equipped with computers (hardware), there are quite a number of respondents who have indicated that some of the software facilities were not available to them (see table 5.2 in this regard).

The research findings however, suggest that almost all heads of senior secondary schools in Botswana are computer illiterate in a computer environment. A few of them are only able to use the word processor perhaps as

a legacy bequeathed to them by the era of a typewriter. The computer skills that a few of them possess are limited to those of a typewriter. It can therefore be concluded that senior secondary school heads in Botswana are not competent users of key information technology facilities. It would appear that the need to provide information technology facilities was not commensurate with the need to develop information technology skills. Consequently the majority of school heads in question had the hardware but did not have the necessary software and the requisite skills for them to be able to competently use IT to improve decision making and planning in their schools. Besides, the same school heads are invariably inundated with tasks which can be better performed on a computer and related technologies.

The research process has not been able to reveal the scope of the availability of various software packages because the subjects seemed ignorant about this aspect of technology. Apart from Microsoft Word, many respondents indicated lack of availability of various software programmes. It does seem that lack of skills in using these programmes was a disincentive to acquire the necessary software. It may very well be that the software was available but the respondents did not know that.

In view of the foregoing, it is abundantly clear that the hypothesis as presented on page two, namely "senior secondary school heads in Botswana are competent users of information technology in guiding their decision making and planning practices" has been refuted. The converse has therefore been established, namely that the majority of the heads of senior secondary schools in Botswana are computer illiterate in a computer environment. Besides, all respondents strongly agreed (100%) that there was a need for school heads to be trained in the use of IT. The fact that they all strongly agreed that there was a need for such training implies that either they did not know about the existence of the training programme or it was non-existent. Therefore the statement presented

on page two that " there has not been a deliberate effort to put in place a proper programme to enable particularly those in school management to effectively use IT in their schools" has indeed been confirmed by the research process. In addition, the rate of computer illiteracy further confirms that either there was no such a training programme or, if it is available, it has not been implemented.

Heads of senior secondary schools often take many decisions and are invariably inundated with information but have little time to process and reflect on it. Consequently, rationality in decision making is highly compromised especially with regard to choosing the best alternative to address an identified need. This suggests that the school heads in question frequently take decisions that are not based on solid information and knowledge. The quality of such decisions can hardly be perceived to be good and defensible because the process of reaching them lacks the features that are necessary for good quality decisions.

School heads do not inform their decision making processes by optimally using data that are available in schools. Such data could be analysed with a view to establishing trends in and relations between critical variables in order to make informed decisions.

Contemporary management practices require a high level of analysis and evaluation in order to effectively deal with a myriad of complex human, social and technical problems in both private and public institutions. Such a level of analysis could be reached with the aid of information technology facilities. Information technology is a powerful tool, a valuable resource and can significantly extend what individuals can do. As a tool, it should be optimally used because technology is developed in order to be used as a tool.

The culture of an institution, namely a system of beliefs and values upheld by the physical, psychological and social milieu of the institution, has a decisive

influence on the way the institution is structured and uses its information technology. Such beliefs and values determine habits in the workplace. The current senior secondary school heads went through the education system as students and later worked as teachers and then school heads. Throughout their transition/progression the education system was predominantly a handicraft and it is, by and large, the only system that they have experienced. As a result they have developed ossified handicraft work habits which have enabled them to progress up to the helm of senior secondary schools. So for most of them, it would appear, there isn't much incentive to change old habits. This includes the way they manage their schools in general and, in particular, the way they undertake planning and decision making in the schools. The majority of them, one may argue, have not seen information technology and related facilities being used in the management of senior secondary schools. So for them to use such technologies to improve decision making and planning in their schools will be breaking new ground or being pathfinders, an approach which is not easy for many people. It can therefore be inferred that senior secondary school heads need to be assisted to find their way into the information technology domain and particularly the use thereof for planning and decision making purposes.

6.4 Proposals

In view of the research findings and the conclusions made above, suffice it to say that it is very important to make some proposals regarding the use of information technology in improving decision making and planning. Some of the possible proposals are given below:

6.4.1 Policy on information technology

The Government of Botswana should develop a national policy on information technology and determine how such a policy will manifest

itself in the education sector. The call for the information technology policy was also made in a panel discussion commemorating the World Telecommunication Day on 17 May 2001. In one of the local news papers, Gaetsaloe of Mmegi (15-21 June 2001;iv) noted that "during the panel discussion debate AME and UUNET called on the government to come up with an information technology (IT) policy. Panelist said that with an information technology policy, they could move faster in accordance with the national policy since infrastructure development was based on policy. The said information technology policy was a fundamental way in which government could make decisions including pricing." The policy must be explicit in terms of how information technology will be integrated into the school curriculum and the role information technology will play in an effort to improve the efficiency and effectiveness of public institutions in general and schools in particular. There must also be some guidelines on how school heads will acquire the necessary information technology skills to enable them to optimally use the computers ("white elephants") in their offices. The acquisition of such skills should not be left to the whims and fancies of individual heads because this has failed in the past. Instead, the Government must have a commitment to develop school heads in the use of information technology.

The emphasis on providing information technology facilities and establishing high-tech offices without a commensurate commitment to providing the requisite skills to the school heads is most unfortunate. Such expenditure can not be justified and therefore constitutes a serious waste of public funds in an era where scarcity of resources to meet public needs is most pronounced. The cost of purchasing information technology facilities like computers for schools is colossal. However, the justification for such an expenditure must include optimal utilization of the facilities and, in this regard, training could play a critical role.

6.4.2 Training

Table 5.4 has shown that all the respondents strongly agreed that there was a need for them to be trained in the use of IT. Indeed training is very important in order to address most of the shortcomings revealed by the study. Once people know the extent to which IT as a tool can help them in their jobs, they can have an incentive to purchase the relevant software. In addition, once people have acquired the requisite skills to use certain tools in their workplace, they can have the incentive to use such tools. The Government of Botswana should develop a training programme for school heads. Senior secondary school heads in Botswana should therefore be trained to the extent of being able to optimally use information technology facilities in their decision making and planning processes.

6.4.3 Policy implementation

Once there is an information technology policy, then the Botswana Government should set up a team whose duty will be to ensure that the policy is effectively being translated into action. This should be treated as a matter of urgency. The team and its functions might be expensive to undertake but who will refute the fact that meaningful development in public administration is in most cases, if not all, expensive or at least involves costs. The fruits to be reaped from such an undertaking will be worth it because this has the potential of improving the general welfare of the populace. Education is after all a critical determinant of prospects for economic and human development. As a result, it is important for the Botswana Government not to spare any effort in the provision of education which will meet the economic demands of the 21st century and

beyond. This is an obligation that ambitious developing countries, like Botswana, cannot shirk regardless of cost implications.

6.4.4 Development of data banks

A data bank is a means of collecting, classifying and storing relevant information for decision making purposes. This is particularly important where the same information can be required by many different authorised people in the same institution for decision making and planning purposes. In schools many teachers deal with the same students and therefore a lot of information about the students is often needed by teachers and other staff members. Students' assessment records can be stored comprehensively and cost effectively in a central data bank. This is also true of their biographical details which are very often required by teachers and administrators. Various departments as well as teachers could be linked to the central data bank in order to facilitate and enhance the flow of information for expeditious decision making. This arrangement constitutes an integrated information system which can enhance coordination and reduce duplication of information. Each school should therefore develop a comprehensive data bank and be assisted in this regard by experts in the field of information technology and be encouraged to experience the power of information technology and what it can do for them.

6.4.5 Integration of information technology into the school curriculum

If the school heads could appreciate the power of information technology then, as curriculum leaders, they could see the need to infuse information technology skills into the curriculum. This could go a long way towards

producing school leavers who are, amongst others, computer literate. It does seem that the information age demands skills in information technology. A concerted effort should therefore be made to educate teachers and enable them to assist their students in acquiring information technology skills. All this could turn senior secondary schools into information technological/information communication technological environments which could enhance the acquisition of the necessary management information technology skills by the school heads.

6.4.6 Communication technology

Communication technology should be optimally used. Instead of sending letters in a traditional way which take many days to reach their destination, communication through e-mail takes seconds for the information to reach its destination. The use of ICT, such as the internet, can enhance personal development on the part of school heads, members of staff and students since a lot of information can be accessed through this facility. As mentioned earlier, this can contribute towards reducing the gap between the developed and developing countries especially in terms of access to knowledge. A deliberate and concerted effort must therefore be made to train school heads along these lines. The schools should be connected to an internet and school heads be trained to communicate through, amongst other, the e-mail. The Ministry of Education should also be connected to the internet and should communicate with school heads through an e-mail. After all, this is easy and more effective than the traditional ways of communicating.

6.4.7 New technology

Technology improvement will continue *ad infinitum* (forever) and it is therefore important for public institutions to adopt the habit of assimilating such improvements into the fabric of their institutional structures. Public managers should be on the lookout for new technology on the markets with a view to establishing the extent to which such technology can benefit their institutions. However, once new technology has been acquired it must be used optimally and if needed, policy and structural adjustments should be made so that the new technology could find a niche in the institution. Senior secondary schools in Botswana should also adopt the same habit with the intent to improve their management practices and procedures.

6.4.8 Management of change

Senior secondary schools, like many other public institutions, need to develop a culture that readily allows change to take place and that encourages and supports innovative ideas. People who inhabit the institution must be well disposed to embrace new and better ways of doing things. Such a culture could be developed in an attempt to stave off ossification of work habits which could ultimately become obsolete. Institutions must develop a culture which is based on participation, dialogue and collaborative relationships all of which are vital in developing the commitment that is necessary to realize the innovative aspirations of institutions. It does seem that senior secondary school heads in Botswana are experiencing a serious paradigm paralysis at a time when a paradigm shift is very necessary to change the basic ways that things have been done in the past. These heads should value learning and continuously aim at transforming themselves. They should adopt some form of self-directed

learning and self-development and, amongst other things, acquire the basic IT skills at the school level. Then they could request the Ministry of Education to offer them a more professional course to sharpen their basic IT skills and improve on such basic skills.

6.5 Conclusion

The modern world is experiencing technological advancement which includes the proliferation of information technology. The study focused on the extent to which information technology was used in improving managerial practice with a specific focus on decision making and planning in senior secondary schools in Botswana. Management has been viewed as an integrated process in which particular individuals use human and other resources as efficiently and effectively as possible with a view to optimally achieve institutional goals. Planning and decision making are some of the management functions and have been elucidated. For senior secondary schools, these management functions are complex and multifaceted. However, information technology offers a variety of tools which can immeasurably enhance the complexity of these functions. Data from the research population were collected through a questionnaire. The analysis of the results has revealed that although the majority of senior secondary schools in Botswana are appropriately equipped with computers, the use of such facilities was far below optimality as quite a number of the school heads did not have most of the necessary software. The research has also shown that the school heads in question do not use IT to improve the quality of planning and decision making in their schools simply because they just don't have the skills. In view of these observations, various proposals have been made with a view to solving the identified problems.

Appendix A

QUESTIONNAIRE

The questionnaire is based on information technology (IT) as the application of computers and communication technologies in acquisition, storage, analysis; distribution and representation of information.

A. PERSONAL DETAILS

For each of the three categories of details place one tick (√) to indicate the closest information about yourself or your school.

A1. NUMBER OF YEARS EXPERIENCE AS SCHOOL HEAD

1-5 _____
6-10 _____
11-15 _____
Over 15 _____

A2. LOCALITY OF SCHOOL

TOWN _____
VILLAGE _____
CITY _____
SEMI-URBAN _____

A3. HIGHEST QUALIFICATION ATTAINED

BA + CERT. or DIP. _____
B.Ed _____
MA _____
M.Ed _____
PhD _____
Other (specify) _____

B. AVAILABILITY OF IT FACILITIES. PLEASE TICK (√) THE APPROPRIATE BOX

A = Available and NA = Not Available

		A	NA
1	Computer		
2	Printer in own office		
3	Internet connection		
4	Computer in other offices		
5	Scanner		
6	E-mail facilities		
7	A teacher who does the IT work for you		

C. Frequency of use of IT facilities. For each facility place a tick (√) in the cell (box) that indicates the closest frequency of your use of each of the facilities listed below.

		Not Available	Daily	At least once a week	At least once a fortnight	At least once a month	Once in a while
1	General Computer Usage						
2	Microsoft Word						
3	Word Perfect						
4	Microsoft Power Point						
5	Microsoft Excel						
6	Microsoft Access						
7	Microsoft Publisher						
8	Microsoft FrontPage						
9	E-mail						
10	Internet						

D. Level of computer literacy. Please tick (√) the cell (box) that indicates the level of computer literacy closest to yours.

		Very Good	Good	Average	Poor	Nil
1	General computer Usage					
2	Microsoft Word					
3	Word Perfect					
4	Microsoft Power Point					
5	Microsoft Excel					
6	Microsoft Access					
7	Microsoft Publisher					
8	Microsoft FrontPage					
9	E-mail					
10	Internet					

E. Kindly (√) in the box that represents your views on each of the statements below about information technology (IT).

Key: SA = Strongly Agree
A = Agree
U = Undecided
SD = Strongly Disagree
D = Disagree

		SA	A	U	D	SD
1	There is a national policy on IT					
2	There is a training policy on IT					
3	You understand the national strategy on IT					
4	There is enough support from the Ministry of Education in the use of IT in your school					
5	The government should develop a policy on IT					
6	There is need for school heads to be trained in the use of IT					
7	IT is integrated into the school curriculum					
8	You use IT in decision making					
9	The effective use of IT in secondary schools can be an advantage in managing a school					
10	You use IT in planning					
11	Communication between yourself and the education office is mainly through E-mail					
12	The use of IT can improve the quality of decision-making in a school					
13	The use of IT can improve the quality of planning in a school					
14	Communication via traditional means of postal services delays information transfer					

F. ADDITIONAL VIEWS ON PLANNING AND DECISION-MAKING

F1. Kindly name at least three ways in which IT can enhance planning in a school

1. _____
2. _____
3. _____
4. _____
5. _____

F2. Kindly name at least three ways in which IT can improve the quality of decision-making in schools

1. _____
2. _____
3. _____
4. _____
5. _____

F3. Additional information (if any)

_____

_____

_____

_____

THANK YOU VERY MUCH FOR YOUR COOPERATION

Appendix B

Date:.....

To:.....

.....

.....

.....

Dear:.....

Enclosed herewith please find a questionnaire on the use of information technology (IT) in improving decision making and planning in the management of senior secondary schools in Botswana. The study is part of the effort to understand the extent to which information technology is used in public administration and management. I am particularly desirous of obtaining your responses because senior secondary schools, as a group, have been chosen, for study purposes, as an example of a public.

I will appreciate it if you will complete the questionnaire and return it to me as soon as possible but preferably within the next two days or so. I have enclosed a stamped and self-addressed envelope for this purpose. Your response will be held in strict confidence. However, if you do want to know the outcome of the study I will be most prepared to share it with you.

Yours sincerely

Mr. K. N. Sedisa

BIBILIOGRAPHY

Adlem, W. L. J. Brynard, D. J. & Mynhardt, H. P. 1993. Public Administration: Study Guide fir PBL 312-L & PBA 311-3. Pretoria: University of South Africa.

Anderson, J. E. 1990. Public policy making. Massachusetts: Houghton Mifflin Company.

Andrews, S. Y. 1988. The personnel function. Pretoria: Educational Publishers.

Ary, D., Jacobs, L. C. & Razavieh, A. 1996. Introduction to research in education. Fortworth: Harcout, Brace and World.

Attewell, R. & Rule, J. 1984. Computing and organizations. What we know and what we don't know. Communication of the ACM, Vol. 12 (3):1184-1192.

Baxter, L. 1991. Administrative law. Cape Town: Juta & Co. Ltd.

Bekker, K. 1996. Citizen participation in local government. Pretoria: Van Schaik Publishers.

Bell, J. Bush, T., Fox, A., Goodey, J. & Gouldings, S. 1984. Conducting small-scale investigations in educational management. London: Paul Chapman Publishing Ltd.

Bernhardt, Y., Brynard, D. J. & Marais, D. 1992. Public administration: Study Guide for PBL202-F & PBA202-V. Pretoria: University of South Africa.

Betts, P. W. 1993. Supervisory management. London: Pitman Publishing.

Brynard, D. J. & Hanekom, S. X. 1993. Public administration. Study Guide for HBEBEP-3. Pretoria: University of South Africa.

Chadwick, G. 1981. A system view of planning. Oxford: Pergamon Press.

Chisenga, J. 1995. The status of information in Zambia libraries. Africa journal of library, archives and information science, Vol. 59(2):19-21.

Cohen, L. & Manion, L. 1995. Research methods in education. London: Routledge.

Crawford, R. 1997. Managing information technology in secondary schools. New York: Routledge.

Evan, W. M. 1993. Organisation theory: Research and design. New York: Macmillan Publishing Company.

Everard, B. & Morris, G. 1990. Effective school management. London: Paul Chapman Publishing Ltd.

Fung, A. C. W., Visscher, A. J., Barbara, B. & Teather, D. S. B. 1997. Information technology in educational management for the schools of the future. London: Chapman & Hall.

Gaetsaloe, B. 2001. Information Technology in Botswana. Mmegi, 15-21 June:IV.

Gall, J. P., Borg, W. R. & Gall, M. D. 1996. Education research. New York: Longman.

Gildenhuys, J. S. H. 1997. Public financial management. Pretoria:Van Schaik Publishers.

Graft, R. L. 1993. Organisation theory and design. St. Paul: West Publishing Company.

Hanekom, S. X., Rowland, R. W. & Bain, E. G. 1990. Key aspects of public administration. Johannesburg: Southern Book Publishers (Pty) Ltd.

Hanekom, S. X. & Thornhill, C. 1990. The functions of the public administrator. Durban: Butterwoths.

Herring, J. E. 1999. Exploiting the internet as an information resource. London: Library Association Publishing.

Hersey, P. & Blanchard, K. 1993. Management of organizational behaviour.
New Jersey: Printice-Hall International.

Horton, S. & Farnham, D. 1999. Public management in Britain.
Hampshire: Macmillan Press Ltd.

Hoy, W. K. & Miskel, C. G. 1991. Educational administration.
New York: McGraw-Hill, Inc.

http://www.idrc.ca/acacia/studies/ir-usesl.htm

Isaac, S. & Michael, W. B. 1997. Handbook in Research and Evaluation.
San Diego, California: Edits Publishers.

Kearsley, G. 1991. Computers for educational administrators.
Norwood: Ablex Publishing Corporation.

Kroon, J. [ed] 1990. General management.
Pretoria: Haum.

Kruger, H. B. & Bernhardt, Y. 1993. Public administration.
Pretoria: University of South Africa.

Lorimer, K. V. 1996. Education, knowledge and the computer.
San Diego: Link-Frame Publishing International.

Moursund, D., Bielefedt, T. Ricketts, D. & Underwood, S. 1995. Effective practice computer technology in education.
Eugene or International Society for Technology in Education.

Mullins, L. 1989. Management and organizational behaviour. London:
Pitman Publishing.

Nader, C. J. 1992. Prentice Halls illustrations dictating of computing.
New Jersey: Prentice Hall International.

Nel, P. A., Radel, F. E. & Laubser, M. 1994. Research in South African market. Pretoria: UNISA
New Zealand. 2000. Education Review Office.
Wellington: Government Printer.

Oppenheim, A. A. 1992. Questionnaire design, interviewing and attitude measurement.
London: Ponter Publishing.

Pauw, J. C. & Wessels, J. S. 1999. Reflective public administration.
Cape Town: Oxford University Press.

Robbins, P. S. 1987. Organisation theory.
New Jersey: Prentice Hall International.

Sedisa, K. N. 1998. An investigation of teachers' perceptions of the effective management of change in secondary school in Botswana.
Unpublished MA (Educational Management) dissertation.
Bath: University of Bath.

Ströh, E. C. & Van der Westhuizen, E. J. 1994. Public Administration: Study Guide for HOPBES-V.
Pretoria: University of South Africa.

Theunissen, C. 1999. African Security Review. Managing intelligence in an age of knowledge, Vol 8(3): 1-8

Tjosvold, E. & Tjosvold, M. 1995. Psychology for leaders.
New York: John Wiley and Sons, Inc.

Uys, F. 1994. Public Administration: Study Guide for HPERSA-K.
Pretoria: University of South Africa.