

**TOWARDS INTERDISCIPLINARITY IN TEACHER EDUCATION: DEMYSTIFYING
HEGEMONIC SOCIAL FACTORS INFLUENCING FRAGMENTED USE OF
KNOWLEDGE BY STUDENT TEACHERS IN ZIMBABWE**

by

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TOWARDS INTERDISCIPLINARITY IN TEACHER EDUCATION: DEMYSTIFYING
HEGEMONIC SOCIAL FACTORS INFLUENCING KNOWLEDGE
FRAGMENTATION

I declare that the above thesis is my own work and that all the sources that I have used or quoted have been acknowledge and referenced.

I declare that the thesis has been subjected to originality checking software and that it falls within the acceptable requirements.

I further declare that neither this work nor any of its parts have been previously submitted for examination at UNISA or other institution.



December 2022

SIGNATURE DATE

DEDICATION

To my late parents for bequeathing education to the family and community.

To all the educators in their efforts to humanise knowledge

To all Zimbabweans in their search for solutions to problems in the modern global world.

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ABSTRACT

This study was conducted to explore the social causes of the use of knowledge in fragmented form by student-teachers in Zimbabwe's Midlands Province so as to find ways to promote interdisciplinarity in the use of course disciplines' knowledge. Literature related to the theoretical framework, disciplinarily, interdisciplinarity and theory-practice in Zimbabwe and globally was reviewed. The study was guided by Antonio Gramsci's cultural hegemony theory that posits that domination is maintained through cultural means transmitted as the norm through social institutions such as education. The transmission enables the powerful to strongly influence the values, norms, ideas, expectations, worldviews, and behaviours of the rest of society, including knowledge fragmentation. The study was conducted at three teacher training colleges, and was informed by the critical theory paradigm, adopting the qualitative approach and case study design involving 90 participants purposively sampled as the critical case. Interview, document analysis and observation methods and their attendant instruments were employed to generate data. The data generated was manually and thematically analysed and findings confirmed the benefits of interdisciplinarity to students though disciplinarity reigned, driven by dominant powerful subjects that thrived on knowledge categorisation which led to animosity between disciplines and members as disciplinary tribes and territories. Solutions proposed as ways to help students to embrace interdisciplinarity included team-teaching, advocacy and engaging resource persons among others. For these ways to succeed, putting in place policies to promote interdisciplinarity and harmonisation of disciplines was recommended together with institutional effort to capacitate lecturers and transform curricula towards interdisciplinarity.

Key words: compartmentalisation, academic discipline, interdisciplinarity, pre-service teacher.

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ACRONYMS AND ABBREVIATIONS

AS	Academic Study
CALA	Continuous Assessment Learning Areas
CCS	Critical case sampling
CDS	Curriculum depth study
CEDU	College of Education
CK	Content knowledge
CP	Correspondence principle
CTEMD	Centre for Teacher Education and Materials Development
DS	Development studies
DTE	Department of Teacher Education
ECD	Early Childhood Development
EMT	Educational Media and Technology
ERIC	Educational Resources Information Centre
EWP	Education with Production
FAREME	Family Religion and Moral Education
FGD	Focus group discussions
FRS	Family and Religious Studies
GK	General knowledge
GPCK	General Pedagogical Content Knowledge
GPK	General pedagogic knowledge
HEI	Higher and tertiary education institutions
HLSE	Health and Life Skills Education
HOD	Head of Department/Division
HOS	Heads of Subject
IAFOR	International Academic Forum
ICT	Information and Communication Technology
IKI	Interdisciplinary knowledge integration
ISA	Ideological state apparatus
LIC	Lecturer-in-Charge
LLS	Lifelong learning skills
MERLOT	A journal name
MHTEISTD	Ministry of Higher and Tertiary Education, Innovation, Science and Technology Development
MOOC	Massive Open Online Courses

MOPSE	Ministry of Primary and Secondary Education
MS	Main Subject
ND	National Diploma
NSS	National strategic studies
ORIM	Online Readings in Research Methods
PSA	Professional Studies Syllabus A
PE	Physical Education
PECS	Philosophy of Education and Curriculum Studies
PEI	Psychology of Education and Inclusivity
PEIE	Psychology of Education and Inclusive Education
PS	Professional Studies
PSA	Professional Studies Syllabus A
PSB	Professional Studies Syllabus B
PSC	Professional Studies Syllabus C
PsySSA	Psychological Society of South Africa
QDA	Qualitative Data Analysis
RJC	Rhodesia Junior Certificate
RSA	Repressive State Apparatus
SADC	Southern Africa Development Community
SEEA	Sociology of Education and Educational Administration
SNE	Special Needs Education
SoLD	Science of learning and development
SPED	Special Needs Education
SSI	Semi-structured interview
STEM	Science, Technology, Engineering and Mathematics
STS	Science, Technology and Society
TCS	Typical case sampling
TEIP	Teacher Education Interdisciplinarity Pentagon
TESOL	Teaching English to Speakers of Other Languages
TOE	Theory of Education
TP	Teaching Practice
TTI	Teacher training institutions
TTL	Tribal Trust Lands
TVET	Technical and Vocational Education and Training
UNISA	University of South Africa

UZ	University of Zimbabwe
WHO	World Health Organisation
ZIMDEF	Zimbabwe Manpower Development Fund
ZINTEC	Zimbabwe Integrated Teacher Education Course
ZNCSAR	Zimbabwe's National Critical Skills Audit Report

CHAPTER 1

INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

Zimbabwean teacher education programmes are designed to prepare prospective teachers to be critical thinkers and well-rounded educators who can deal with a diverse range of learner needs. The programmes are intended to develop pedagogical skills, rigorous content knowledge and the use of theory to guide practice through an array of disciplines that must all merge through interdisciplinarity. However, many teacher training institutions (TTIs) in Zimbabwe seem to face the problem of knowledge fragmentation by student-teachers. Prospective teachers tend to use course knowledge in fragmented form along disciplinary lines, seemingly incognisant of the utility of interdisciplinary knowledge integration (IKI) in assignments, examinations and teaching discourse. This study sought to promote IKI by exploring the social factors that influence student teachers in Zimbabwe's Midlands Province to use course knowledge in compartments.

Strict disciplinarity is best explained in the ideological parlance of the struggle towards hegemony sustained by knowledge compartmentalisation which facilitates role allocation, division and social stratification characterised by inequalities. On the contrary, the interdisciplinary approach promotes the use of knowledge across course subject borders, for example, Theory of Education (TOE), Main Study/Subject (MS) and Professional Studies (PS) at three TTIs in Zimbabwe. The areas are designed to holistically prepare student-teachers to effectively facilitate in the classroom (Mavundutse, Luthuli, Duve & Chivore, 2014:3-4) by providing them with general pedagogical knowledge.

The teacher-training programme is passed by satisfying examiners in broad areas of teacher education competence (Chivore, Mavundutse, Kuyayama-Tumbare, Gwaunza & Kangai, 2015:15) as shown in Table 1.1.

Table 1.1: College course areas and disciplines

Sections	Subjects
Theory of Education (TOE)	Psychology of Education, Sociology of Education and Philosophy of Education
Main Subject/Study (MS)	English, ChiShona, IsiNdebele, Social Studies, Home Economics, Art Education, Music, Physical Education, Mathematics, Religious Studies. Computer Studies, Science
Professional Studies (PS) A, B, C, & D	All MSs, Educational Media and Technology, Curriculum Depth Study (CDS)/Research, National Strategic Studies and Health and Life Skills
Teaching Practice (TP)	Micro-teaching, peer teaching, practicum/attachment

These areas are designed to merge into one body of course programme knowledge to mould pre-service teachers into competent, effective facilitators. They empower recipients with general pedagogic knowledge (GPK) combined with content knowledge (CK) for teacher knowledge that positively impacts practice. This could be achieved if the relatedness of the course subjects is exploited through interdisciplinarity.

Knowledge is effectively compartmentalised when different people have access to certain types of knowledge but are formally denied through social norms or personal preferences to go beyond their potential (Ines, 2011:34). Possibly knowledge compartmentalisation by student-teachers is due to such social factors that denies pre-service teachers a holistic view of educational issues. Holistic education challenges the mainstream assumptions of fragmented, reductionist culture and education (Mahmoud, Jafari, Nasrabadi & Liaghatdar, 2012:178-180). It focuses on the interconnected nature of experience and reality. To address some of the fragmentation, holistic and integrated curricula have been proposed and adopted by schools (Contardi, Fall, Flora, Gandee & Treadway, 2000) which is an anomalous order that needs to be corrected, a gap this study set out to fill.

A Zimbabwean primary school teacher is assigned to a class and teaches all 11 subjects while a secondary teacher has two, but student teachers are attached to mentors. This arrangement could be managed effectively with interdisciplinarity,

especially in light of the revised competence-based curriculum of 2017. Marozva (2015) reports that the Competence-Based Curriculum (CBC) was launched in 2017 in Kadoma by the then Minister of Primary and Secondary Education, Dr Lararus Dokora, and implemented the same year. The curriculum offers eight subjects at Early Childhood Development (ECD) level up to Grade 2 and nine areas for junior classes (Grade 3 to 7) (Marozva, 2015).

As far as policy is concerned, the Education Act of 1987 amended in 2007 is silent on integration (Dambudzo, 2015:15). Despite this silence, the current trend that embraces the use of Information and Communication Technology (ICT) in education, the revised curriculum subjects and proposed cross-cutting or transversal issues/themes all seem to point at IKI at classroom level, which is not evident in teacher training.

Promotion of IKI in teacher education would ease interdisciplinarity in Zimbabwean schools that use the same curriculum document (Dambudzo, 2015:23). The sameness of the curriculum is not exploited in relation to IKI because integration of content with the environment, industry and development of competences is erratic. There seems to be no intentional coordination of the promotion of interdisciplinarity across the education sector to reap the rewards beyond education. This disconnect may have led to the non-existence of integration in teacher education when the schools into which the colleges feed are grappling with its adoption. Kasembe (2011:44) blamed erratic integration of related knowledge in schools on teacher training programmes. Thus, this study explored the social factors influencing knowledge fragmentation by pre-service teachers in TTIs so as to engage them in IKI. Equipped with IKI skills, the student-teachers could assist learners to integrate diverse disciplinary knowledge in order to attain deeper understanding and use such knowledge across fields to solve academic, social, political, economic, individual, national and global problems.

1.2 BACKGROUND TO THE STUDY

Generally, the Zimbabwean teacher education curriculum is compartmentalised into Section 1 – Teaching Practice (TP), Section 2 – Theory of Education (TOE), Section 3 – Main Subject (MS)/Academic Study (AS), and Section 4 – Professional Studies (PS) (Chivore, Mavundutse, Kuyayama-Tumbare, Gwaunza & Kangai, 2015:26;

Mavhunga, Mavundutse & Mamvuto, 2008:94). This structure varies slightly at universities that offer teacher education. Combined, the four sections should mould a holistic and competent student-teacher. Unfortunately, the knowledge content of each section is rarely integrated in assignments, examinations, tutorials, discussions or in the classrooms during TP. The segmented structure may be influencing segmented treatment of knowledge from these sections.

Some lecturers who seem unperturbed by such compartmentalisation of sectional knowledge tend to fuel strict disciplinarity and regard some sections as more important than others. In a study on stress antecedents among student-teachers, Mavundutse (2004:14) recommended that “Lecturers need not tell students that some subjects are more important than others hence failing them may mark the end of the world for the student.” The behaviour of such lecturers could be promoting segmentation of knowledge, instigating conflict or fostering disciplinary cultural hegemony. The fulcrum of this study was that disciplinary knowledge fragmentation could be driven by hegemonic tendencies. It sought to explore this line of thinking and promote interdisciplinarity.

This study assumed that the isolation of disciplinary knowledge could be related to differential and inconsistent performance by some students in HEIs. Generally, students tend to perform noticeably well in the subjects that are labelled important but not in ‘others’. This phenomenon of building walls between disciplines could be the social wellspring of the disconnect between theory and practice which, ideally, should be combined.

It is rare for students to cross-reference disciplinary ideas to clarify, exemplify, critique or weigh in on one another. They tend to confine ideas to specific disciplinary boundaries from which assignment tasks or examination questions are set. This is the situation even though concepts from different course subjects have material that is usable “to establish connections, application across contexts and synthesis into a novel, new whole” (Barber, 2012:600). Student-teachers who try knowledge integration may even unnecessarily deviate and digress from their focus and get carried away. Barber (2012:600) supported the view that some people may identify a straightforward similarity between two ideas but fail to eloquently articulate issues and pin down the essentials demanded by the task at hand. The ability “to think

across, beyond and through academic disciplines to encompass all types of knowledge about an idea, issue or subject” (Park & Mills, 2014:299) is a skill that needs to be nurtured in pre-service teachers provided the social reasons for compartmentalisation are established and addressed.

In light of the above, Lachieze (2010:27) points out that education can only be effective if it is interdisciplinary and decompartmentalised. This implies that although disciplinary and compartmentalised knowledge is valuable, it may not be as effective as hybrid knowledge. Disciplinary knowledge knows one truth, but interdisciplinary knowledge incorporates various shades of truths because the truth is never absolute but ever transient. Kaltenack (2021:11) sees the truth as messy and never neat and Nyawaranda (2014:173-175) adds that it is subjective as it resides in the knower. Such characteristics of the truth can be unveiled if viewed from different disciplinary angles such as psychological, sociological, philosophical, mathematical and linguistic. As Siyakwazi (2014:188) concedes, correlation and integration of knowledge are critical in the teaching-learning process. If they are critical, then they must be embraced by pre-service teachers in order to prepare for identifying and using connections between college disciplines and practice, as well as classroom subjects and real life.

These occurrences can lead to the conclusion that the pre-service teachers may be oblivious to disciplinary synergistic relationships due to the rigid, compartmentalised nature of teacher education programmes. Wang, Lin, Spalding, Kalka and Odell (2011:337) criticised teacher education programmes for forming complicated patterns composed of disparate bits of coursework and experience. Due to this disconnect, student-teachers may fail to see and use disciplinary knowledge integratively because presentation of course programmes is fragmented. Therefore, IKI in teacher education is a possible solution for the disparate and uncoordinated bits of course content and experience but it is critical to trace the historical development of the compartmentalisation of knowledge into discrete disciplines in teacher education.

1.2.1 Historicisation of compartmentalisation in teacher education

Historically, parents, elders, priests, prophets and wise men have traditionally taught noble and wealthy children skills that were needed to excel in business and politics

with Confucius recorded as the first private teacher in 5thC Before Common Era (Coleman, 2021; Taylor, 2023; Yu-lan, 1951:7). The term “teacher education” refers to the structures, institutions, and processes by means of which men and women are prepared for work in elementary and secondary schools (Taylor, 2023). In earlier times, the assumption was that anyone who had completed a given level of education could turn around and teach children (Misra, 2013:10).

The state, church, politicians, local authorities everywhere have long recognized the importance of the teachers’ work in maintaining or establishing particular patterns of social organization and systems of belief and have looked to education to disseminate their particular brands of truth (Coleman, 2021; Taylor, 2023). As a result, in medieval and post-Reformation Europe, there was considerable concern with the qualifications and background of teachers, such as their religious beliefs. For example, in 1559, Queen Elizabeth I of England prohibited anyone from teaching without a license from bishops. The license was granted only after an examination of the applicant’s “learning and dexterity in teaching,” “sober and honest conversation,” and “right understanding of God’s true religion” (Taylor, 2023) all suggestive of social influences on the teacher education processes.

Taylor (2023) records that the earliest formal arrangements for teacher preparation, introduced in some of the German states during the early part of the 18th century, included both pre-service and in-service training. A seminary or normal school for “young men who had already passed through an elementary, or even a superior school, and who were preparing to be teachers, by making additional attainments, and acquiring a knowledge of the human mind, and the principles of education as a science, and of its methods as an art” was set up in Halle in 1706.

Specific teacher training originated in France in 1685 by St. John Baptist de la Salle who founded the first teachers’ training college (*école normale*) in France (Cole, 2021; Misra, 2013:10). The *École Normale* (later the *École Normale Supérieure*), founded in 1794, closed after a few months but it was re-established by decree of Napoleon in 1808 to train teachers for the *lycées*. The training spread through Europe under the monitorial system introduced by Andrew Bell and Joseph Lancaster (Marlow, 1987:3) and was spread through Europe by August Hermann Francke and Johann Pestalozzi. Dominating USA, Britain and elsewhere. the

method involved the teacher teaching a large class through instruction of monitors who would then teach and supervise their peers (Tschurenev, 2008:247).

Dissatisfied by the monitorial system of teacher training, David Stow founded the Glasgow Normal Seminary in 1834 from which his “trainers” went to schools in Scotland and many of the British colonial territories (Taylor, 2023). In the United States, the Massachusetts Normal Schools founded by Horace Mann in the 1830s became a model for similar developments in Connecticut, Michigan, Rhode Island, Iowa, New Jersey, and Illinois (Rekowski, 2008:3). In England, churches and voluntary foundations were in the process of establishing the first of the teacher-training colleges. Australia began the organised preparation of teachers in the early 1850s. Normal schools emerged to address an unmet need for teacher education (Gowen & Kimball, 2017:130). At this early stage, certain issues were already emerging that were to remain alive for the next hundred years and that are to some extent still relevant today such as that of knowledge fragmentation into discrete subjects.

Amid these developments in teacher education globally, the situated nature of knowledge raged on as some educators asserted that the curriculum of the normal school should be academic, on the ground that the future teacher needed nothing more than experience of conventional subjects soundly taught (Taylor, 2023). Others argued that training should have a purely professional function, including only such subject knowledge as the teacher would need in his classroom work, yet others still claimed that the liberal and professional elements could readily be harmonised or integrated (Taylor, 2023). In the United States, leaders of the common school movements, like James Carter, Horace Mann, and Henry Barnard, were also strong advocates for teacher education (Labaree, 2008:291). Horace Mann supported the value of a training in the “common branches” of knowledge, as a means of mental discipline. The views of Derwent Coleridge, Kay-Shuttleworth, and Horace Mann, in common with those of many other educators of the time, reflected social as well as pedagogical considerations (Taylor, 2023) which shows the social nature of knowledge.

Between 1870 and 1890, legislation was enacted in several countries to systematise and broaden the work of the normal schools. In Japan, an ordinance of 1886

established higher normal schools providing a four-year course for boys and girls who had completed eight years of elementary education (Anderson, 1962:154). A French law of 1879 established a nationwide system of colleges for training women primary teachers (*écoles normales d'institutrices*). In Russia, a statute on teachers' seminaries was promulgated in 1870 and a further statute in 1872 provided for institutes to train teachers for the new higher-grade schools that were beginning to appear in the larger towns. In Scotland, the universities of Edinburgh and St. Andrews established chairs in education in 1876. In the United States a large number of universities had by 1895 set up education departments, and in some of them the preparation of teachers for work in the schools was beginning to be combined with systematic study and research in education processes (Taylor, 2023).

According to Taylor (2023), until about 1890, the "theoretical" elements in teacher preparation were the study of certain principles of teaching and school management but after 1890, psychology and sociology began to crystallize as more or less distinctive areas of study; students of education had a wider and more clearly structured range of disciplines to draw upon for their data and perspectives and to provide a "scientific" basis for their pedagogic principles. One of the greatest influences on teacher-training curricula in the United States and many other countries was the pragmatist philosopher John Dewey's project method or inquiry-based learning (Firmanto, Degeng, Rahmawati & Chusniyah, 2019:114), along others such as the development of religious ideas in the Roman Catholic countries, the imposition of Marxist and Leninist ideologies in the former Soviet Union. All these influenced the nature of the social commitment that teacher-preparing institutions strove to instil in their students in different countries, including the fragmented organisation of the curriculum. Moreover, the philosophers, psychologists and sociologists helped to redefine the teacher-pupil relationship, for instance, the significance of the child's needs and interests, the weaknesses of the formal academic curriculum, and the nature of individual development (Taylor, 2023). The new contributions affected the organisation of learning through the measurement and assessment of abilities, the diagnosis of special learning problems, the placing of children in homogeneous age and ability groups by means of "tracking" and "streaming," the emphasis on problem solving, and the project method. These

changes reflected both in the way in which teachers were trained and in the architecture of teacher education curriculum organisation into disciplines.

Taylor (2023) makes very relevant observations regarding the social nature of teacher education curriculum when he points out that the educational doctrines that inspired, conceptualised, and legitimated teacher education transformation themselves reflected other social, political, economic, demographic and technological changes that shaped the progress of teacher education during the decades after 1900. Although among the countries of the world the arrangements for the preparation of teachers vary widely, in nearly all countries, course categories fragmented into the study of one or more academic, cultural, or aesthetic subjects for the purpose of continuing the student's own education and of providing him or her with knowledge to use in his subsequent teaching career. The courses also include the study of educational principles, organised in terms of social science disciplines such as psychology, sociology, philosophy and history including professional courses and school experience. Primary school teachers may also receive instruction in the content and methods of subjects other than their own specialties that feature in the primary curriculum. Similar arrangements exist in Zimbabwean teacher education owing to the fact that the structure was adopted from the pioneering countries. The next part explores teacher education in Zimbabwe.

1.2.2 Positionality

The term positionality describes an individual's world view and the position he or she adopts about a research task and its social and political context which influence the researcher's world view (Holmes, 2020:1). A researcher may identify positionality by acknowledging personal positions that have the potential to influence the research, considering own views and those of participants, locating, acknowledging that research will necessarily be influenced by him or her and the research context (Holmes, 2020:3). Positionality necessitates that the researcher consciously examines his or her own identity to allow the reader to assess the effect of the researcher's personal characteristics and perspectives in relation to the study population, the topic under study and the research process (Wilson, Janes & Williams, 2022). In light of these views, the researcher, a lecturer in Sociology of Education in teacher education, was intrigued by the student teachers' tendency to

use course knowledge along disciplinary lines. This position may have had influence on the researcher's world views and research design though observation of ethical principles guided him to avert biases and subjectivity.

1.2.3 Teacher Education in Zimbabwe

The Zimbabwean government provides teacher education alongside churches under the University of Zimbabwe's Department of Teacher Education's (DTE) scheme of association (Musarurwa, 2011:952-953) while teacher training colleges that provide it enjoy some autonomy. The scheme of association is for certification authority and quality assurance of the standard of tuition. However, each of the colleges designs its own curricula in various disciplines for approval by the DTE. Despite this, all the curricula have the same broad sections. Thus, all pre-service teachers are generally socialised through the same four broad areas in all the accredited associate institutions (i.e., colleges in the scheme of association) (Chivore et al., 2015:15). Except for minor variations, universities also have similar coverage where depth and breadth have to meet the first-year degree level requirements.

1.2.4 Staffing

The quality and qualifications of the lecturing staff could influence them to focus on disciplinary knowledge in isolation from other disciplines. Such an assumption may lead one to want to know the academic qualifications of the lecturers. Evidence to date shows that the majority of lecturers in colleges are holders of first degrees, master's degrees and a sizeable number of doctoral degrees (Ministry of Higher and Tertiary Education, Innovation, Science and Technology Development [MHTEISTD], 2016:313), while universities have a significant number of PhD holders and professors. Despite such a highly qualified staff complement, teacher education still experiences knowledge fragmentation. Therefore, this study seeks to explore this phenomenon.

1.3 RATIONALE FOR THE STUDY

To promote the general quality of education, the most important starting point is to improve the quality of the teacher because the quality of an education system depends on the quality of its facilitators (Barber & Mourshed, 2007:13). Teacher quality can be improved by inculcating IKI in trainee teachers. This is imperative for

two major reasons. Firstly, teacher education course content is designed to mould the teacher-trainee into a finished product by combining GPK and CK. Accordingly, all disciplinary knowledge is expected to be complementary through the integration of ideas across subject boundaries. Secondly, if teachers are to promote integration of knowledge in schools, then it is sensible to initiate the same in teacher education. Once teachers are socialised to embrace interdisciplinarity during training, they are likely to teach in the same way in schools. However, it is surprising that there is a greater degree of content separation than collaboration in teacher colleges. Thus, this study is an exploration of the reasons for compartmentalised when interdisciplinarity is an ideal practice.

Barber (2012:590) affirmed that interdisciplinarity is beneficial to the education system and beyond because it develops competencies in teachers to connect disparate elements of knowledge, synthesise concepts and apply ideas across contexts. Such practice has been signalled as an essential skill for success in the knowledge economy of the twenty-first century (Barber, 2012:590). Kidron and Kali (2015:1) also contended that the twenty-first century and the knowledge revolution pose challenges demanding creative thinking to develop new skills. Frodeman (2010:106) concurred with these views and pointed to the value of the ability to think and integrate knowledge across disciplines by recognising the relationships between the fields of knowledge. If that ability is critical, then it becomes a cause for concern when teachers undergoing training are not able to practise it. This failure to practise it is puzzling and merits investigation to establish why student-teachers generally fragment course knowledge.

To attain the critical skills to think and integrate knowledge from diverse disciplines requires the grasp of what Boix-Mansilla (2010:289) calls interdisciplinary learning. Through interdisciplinary learning, recipients develop integrative insights that are needed to solve problems and understand issues better than when siloed disciplinary knowledge is used. Therefore, as vital players in the preparation of young people to deal with the challenges of the modern era, TTIs in Zimbabwe need to use models and didactic approaches that promote interdisciplinarity. Despite the glaring need for interdisciplinarity, it seems knowledge organisation in TTIs is biased towards knowledge compartmentalisation.

The above observations justify the importance of exploring the reasons behind the compartmentalisation of course knowledge by pre-service teachers. Once the reasons are established, promotion of IKI for combined interaction of disciplinary knowledge for quality assurance can be achieved. Arguably, these disciplines should be combined in teacher preparation, and therefore, efforts should be put in place to promote IKI. Proficiency in linking knowledge from these disciplines is critical in teacher training because the diploma or degree is passed based on coursework, examinations from the various disciplines and practical teaching (Chiore et al., 2015:26). Clearly, all disciplinary knowledge feeds into the entire course programme. Therefore, integration of the knowledge from these areas is imperative if the course is to produce a competent teacher.

As teacher preparation plays a fundamental part in the academic achievement of learners (Darling-Hamond, 2010:39), equipping student-teachers with skills to integrate knowledge across subjects could be a vital cog in this pursuit. This could be possible once the reasons behind compartmentalisation are established and addressed for active learning. In active learning, the learning objectives and content are distinguished to enhance the transfer of skills within and across disciplines (Clarke, 2008:87). The transference of knowledge across disciplines potentially closes the theory-practice discord.

Jumani (2013:789) stated that “a fundamental component in professional education is the link between theory and practice”. Regarding the theory-practice debate, an age-old goal for teacher training programmes is to link theory to practice (Allsopp, DeMarie, Alvarez-McHatton & Doone, 2006:20). The teaching profession is not immune to the problem of the theory-practice disconnect as student-teachers complain about the mismatch between what is taught at the university and what they ought to do during their practical training (Kinyaduka, 2017:102). Similarly, Mhlolo (2014:34) argued that even though a symbiotic companionship exists between theory courses and practicum experiences, fragmentation of the two continues to haunt this relationship. In other words, the ideal and real are separate. Although Mhlolo placed the blame on traditional practices, this study contends that the cause could lie in the social nature of knowledge that culminates in disciplinary cultural hegemony. As a result, this study argues that the absence of interdisciplinarity is rife in teacher training in Zimbabwe, with the Midlands Province being a case in point.

Thus, this study's purpose was to explore the causes of its absence and ways to redress this anomaly. Once this is addressed, the institutions might produce teachers who are conversant with interdisciplinarity.

Another fundamental reason for undertaking this study was to address the knowledge gap that exists on the compartmentalisation of subjects in teacher training. Like many other puzzling areas, interdisciplinarity has been extensively looked at from various angles by researchers and scholars. For instance, Gordon and O'Brien (2007) studied bridging theory and practice in teacher education, while Jones (2009) discusses interdisciplinary advantages and disadvantages. Boix-Mansilla (2010) wrote about correlation and integration, among other issues, and Kidron and Kali (2015) focuses on boundary breaking for interdisciplinary learning. In looking at the social history of school subjects, Goodson (2006:59) observes that except for patchy sociological contributions, there is little in the way of study of the process of the social history of the curriculum. However, none of these focused on the factors that influence the phenomenon of knowledge fragmentation by pre-service teachers. This is the breach that this research planned to fill with the hope that the results could provide the sociological explanations regarding compartmentalisation of what Mhlolo (214:35) calls "campus taught courses" and ways of promoting interdisciplinarity.

1.4 RESEARCH PURPOSE

The purpose of the study was to explore the factors that cause student-teachers to use course subjects along strict disciplinary lines. Although the curriculum is presented in a compartmentalised format, all the compartments should normally merge in shaping a holistic teacher. In that regard, knowledge integration should be practised unless there are social hindrances. The study was conducted in purposefully sampled Zimbabwean TTIs in order to promote interdisciplinarity in the use of teacher knowledge. Specifically, its thrust was to find out why pre-service student-teachers used course discipline knowledge in fragments. The intention was to then find ways of addressing the factors in order to promote interdisciplinarity towards SDG4 for quality assurance in education generally, and teacher education specifically. Thus, study explored the reasons behind course knowledge usage in compartments by student-teachers in Zimbabwean TTIs in the Midlands Province. It

sought to come up with ways of assisting student-teachers to embrace interdisciplinarity when using the course content.

1.5 SIGNIFICANCE OF THE STUDY

The significance of the study refers to the extent to which the findings matter, that is, their importance. The researcher wanted to find out why student-teachers perpetuated fragmentation and stratification of knowledge by using campus taught courses in compartmentalised form, despite collaboration being vital in equipping them with GPK and CK. According to Arneback and Blåsjö (2017:299), the organisation of disciplines in higher education often differs from that in primary and secondary schools. For instance, social studies, a school subject covering sociology, political science, economics and human geography shows that teacher education needs to reflect interdisciplinarity to meet teachers' future professional requirements. Higher education courses, on the other hand, are presented as standalone pockets of knowledge named accordingly, such as Sociology. In addition, student-teachers in Zimbabwe conduct research projects as part of their coursework where interdisciplinarity comes in handy. Interdisciplinarity in teacher education has become an important and challenging technique in modern programmes of study that are beneficial to education (Jones, 2009:76). Although interdisciplinary education has expanded to both primary and graduate levels (Boix-Mansilla, 2010:304), advocacy for disciplinary integration in schools before teacher education is confounding.

In a study that evaluated the effectiveness of educational innovation, Santaolalla, Urosa, Martín, Verde and Díaz (2020:2) observed that implementation of an interdisciplinary approach across all stages of the education system affects everyone. The knowledge gained from findings from this study could be valuable to institutions that offer teacher training, especially teacher educators and student-teachers on how to embrace interdisciplinarity. Bryant, Niewolny, Clark and Watson (2014:85) concurred that interdisciplinary teaching benefits students and instructors. They explained that lecturers stand to gain from interdisciplinary teaching experiences when they face divergence that can lead to instructor growth. In their view, the integration of disciplinary perspectives forces instructors to re-examine

their disciplinary conceptions, develop new ones and navigate differences across disciplinary cultures.

The findings of the study are likely to help practitioners in teacher education, especially those in the Ministry of Primary and Secondary Education on policy formulation, quality assurance bodies, and those involved in teacher education curriculum development and institutional performance. Ultimately, the research is expected to contribute practically to the recipients' ways of dealing with life problems and viewing issues from divergent standpoints by releasing them from the disciplinary silos. Fuller (2016:2) affirmed that interdisciplinary approaches are widely recognised as necessary in tackling the large, global challenges facing the world. According to her, this is because a wide range of skills and knowledge offered to students may boost their employability, give them new perspectives on issues and enable them to explore different viewpoints. All these are possible if the real reasons behind the prominence of disciplinarity are established and the ways to promote interdisciplinarity are identified. The next part of this chapter states the research problem and explains why it is necessary to explore the reasons behind the dominance of outmoded disciplinarity so as to embrace interdisciplinarity.

1.6 PROBLEM STATEMENT

Student-teachers study an array of course disciplines whose knowledge must be merged to holistically develop their skills and abilities in preparation for practice in schools. Clearly, this calls for IKI but the problem is that the pre-service teachers in TTIs in Zimbabwe's Midlands Province use the knowledge in compartmentalised form. The fragmented use may compromise the quality of the students' theoretical and practical knowledge which impedes the realisation of SDG4. Fuller (2016:3) which demands proactive development of interdisciplinary thinking to avoid leaving it up to the students to figure out. The teacher education course in Zimbabwe consists of sections that house different subjects designed to prepare students holistically and become knowledgeable across disciplines because they are expected to teach eight subjects in the ECD phase, 11 at junior levels and at least two at the secondary school level. This requires the students to juggle the GPCK and CK to enrich their knowledge base, a feat that is possible they are exposed to interdisciplinarity during training. This is critical as understanding many important, but complex problems,

phenomena and concepts is unattainable from a single disciplinary viewpoint (Golding, 2009:2). Thus, if student-teachers continue to compartmentalise knowledge from course disciplines, this will lead to poor quality of teachers and ultimately, poor quality of education. This is especially so since it is accepted that teacher quality greatly impacts the quality of education (Barber & Mourshed, 2007:13). In this regard, it is imperative to first improve the quality of teachers by socialising them into an interdisciplinary culture for holistic understanding which echoes the Sustainable Development Goal4 (SDG4) that strives to ensure inclusive, equitable quality education and promote lifelong learning opportunities for all (Advocates for International Development [A4ID], 2020:3; Government of Zimbabwe, 2017:12). Quality education means the effectiveness of education in achieving cognitive development and its ability to promote creative and emotional development, supporting the objectives of peace, citizenship and security, fostering equality and passing global and local cultural values down to future generations (A4ID, 2020:4). It ensures effective learning and the acquisition of relevant knowledge, skills and competencies. It means fragmentation would be contrary to functionalism's central idea of a society as one whole unit of interconnected cooperating parts (Henslin, 2014:17) espoused by IKI. Since the world is generally a whole, it must be experienced as such (Maxwell, 2005:73) through interdisciplinarity for quality education.

Student-teachers' general knowledge is an integration of GPK and CK, and to this end, student-teachers in Zimbabwe are exposed to theoretical knowledge in TOE/Foundation Studies, PS A & B, MS and TP. Such exposure is meant to help them navigate the academic and professional terrain through interdisciplinarity. Thus, if they continue to fragment this knowledge, they may fail to effectively navigate the terrain, which may result in failure to resolve academic, professional and social challenges. Integration of knowledge obtained from the various disciplines allows it, like rivulets, to flow from the disciplinary directions towards assignments, examination answers and teaching discourse as a unified sea of knowledge. Since all the disciplines have been designed to help them become competent teachers, IKI should supplement disciplinarity. This arrangement is likely to assist student-teachers to establish disciplinary knowledge connections, move the knowledge across boundaries, respond to challenges that transcend disciplines and work in a

confluence of multidisciplines (Contardi et al., 2005; Golding, 2009:2). The subscription to the view that disciplinary convergence, reminiscent of real life, may help pre-service teachers to learn at a deeper level is noble. Hence, the study sought to unmask the hegemonic social forces behind this scourge and promote IKI for quality education. To succeed in this search, the study was directed by research questions stated below.

1.7 RESEARCH QUESTIONS

Cohen, Manion and Morrison (2011:111) avers that research questions turn a general purpose or aim into specific questions looking for data-driven, concrete answers. To that end, the research was guided by questions formulated as follows:

1.7.1 Main Research Question

Why do student-teachers in Midlands Province of Zimbabwe use knowledge acquired from their course disciplines in compartmentalised form?

1.7.2 Sub-research Questions

- What is the origin of knowledge compartmentalisation?
- What is the place of interdisciplinary knowledge integration (IKI) in teacher education?
- Why do students fragment course disciplinary knowledge?
- How does theory-practice contribute to interdisciplinarity?
- How best can interdisciplinarity be embraced towards theory-practice nexus?

1.8 AIM AND OBJECTIVES OF THE STUDY

1.8.1 Aim

The study aimed to establish the social reasons behind the compartmentalised use of course knowledge by student-teachers in Zimbabwe's Midlands Province in order to promote the embrace of interdisciplinarity.

1.8.2 Objectives of the Study

The objectives to be realised in the process of undertaking the study were to:

- trace the origin of knowledge compartmentalisation;

- determine the relevance of interdisciplinarity in teacher education;
- explore the social reasons of knowledge fragmentation by student-teachers;
- demonstrate the contribution of theory and practice to interdisciplinary knowledge integration; and
- establish possible ways of promoting the embrace of interdisciplinarity by student-teachers towards linking theory to practice.

1.8.3 Purpose of the study

Siyakwazi (2012:10) averred that the study is expected to relate to the practical world so that it can be used to solve real-life problems. To this end, the purpose of this study was to investigate social reasons behind student-teachers' fragmented use of course subject knowledge. The purpose was to then address these factors and promote interdisciplinarity for quality teacher production and hence, quality education as espoused by SGD4. SGD4 was prioritised because quality education is key in imparting the necessary skills required in all sectors of the economy and enhances labour productivity (Government of Zimbabwe, 2017:12; Shava, Chasara & Hahlani, 2021:146). This purpose was realised through a comprehensive literature review and an empirical investigation.

1.9 CONCEPT CLARIFICATION

The following technical terms feature prominently in the study and are defined contextually to facilitate understanding.

1.9.1 Compartmentalisation

Stegeman and Rouw (2007:85) explained that compartmentalisation in knowledge domains between and within departments is reflected in the way the knowledge infrastructure is organised in separate domains that hinder an integral approach. Spectre (2019:2788-2789) argued that, in a psychological sense, knowledge compartmentalisation simply shows that the thinker's knowledge is fragmented. Thus, compartmentalisation means fragmentation of knowledge along disciplinary lines where student-teachers fail to move knowledge across disciplinary boundaries to enrich a focal subject.

1.9.2 Academic Discipline

An academic discipline is the accumulated data, information, knowledge and wisdom of people that is broken down into disciplines and sub-disciplines (Vashishtha, 2014:74). Gozzer (1982:286) described it as a compartmentalised process in which thorough learning finds expression. Therefore, an academic discipline is an area of specialisation or subject of study in education.

1.9.3 Academic tribalism

Becher (1974:2) described this as the key distinctions between different disciplines leading to knowledge communities being categorised into tribal names and territories, settles its own affairs, warring with others, speaks a distinct dialect and demonstrates its apartness from others in many ways. Rogers and Cage (2017:49) view academic tribalism as a situation where students are unwilling or unaware that they can, and should be, synthesising different sources of knowledge into an individual 'skill-set' or 'knowledge silo' as many students struggle to integrate their existing knowledge generated within their subject across the disciplines; showing unwillingness or inability to implement constructivism. Thus, academic tribalism means disciplinary consciousness and loyalty that leads to some form of resistance on the part of academic 'locals' to integrate ideas beyond tribal 'borders' around their academic fields.

1.9.4 Interdisciplinarity

Interdisciplinarity means 'blending' or 'integrating' disparate types of disciplinary knowledge (Frodeman, 2014:35). It is characterised by integrating, linking, focusing, fusing and blending knowledge collaboratively for new insights (Thompson-Klein, 2010:16). Interdisciplinary learning is a conceptually complex process by which people integrate insights and modes of thinking from more than one discipline or fields of study to advance fundamental or actual use of a subject that goes beyond the scope of a one subject (Boix-Mansilla, 2007:289, 2016:5). It entails integrating information, data, techniques, tasks, perspectives, ideas, concepts or theories from two or more disciplines to create new products, explain phenomena or solve problems in ways unattainable through disciplinarity (Boix-Mansilla, 2010:289). Therefore, interdisciplinarity means the integration of various aspects of subjects,

from vocabularies to theories, to enhance understanding of the main aspects of a selected subject.

1.9.5 Pre-service Teacher

Some scholars use the terms such as student-teacher, student of teaching and prospective teacher to refer to the pre-service teacher (Benjana et al., 2016:13; Siyakwazi & Siyakwazi, 2013:85). Contextually, the term is used to mean a teacher-trainee, student-teacher or a new teacher candidate either in a college/university or on the TP attachment. All these terms are used interchangeably.

1.9.6 Subaltern class

The term subaltern suggests an inferior rank and it is used as a name for the general attribute of subordination in society that is expressed in terms of class, caste, age, gender and office or in any other way (Green, 2011:387). It is a group formed by all the dominated masses but without any class aggregation (Galastri, 2017:7). Therefore, Gramsci relates the subaltern to the social classes such as the working class or the masses, together with the organic intellectuals, that seek to build a new civil society which is ant-capitalism.

1.10 DELIMITATIONS OF THE STUDY

Simon (2011:2) explained delimitations as those characteristics that limit the scope of the study by defining its boundaries controllable by the researcher, for example, the choice of objectives, the research questions, variables of interest, theoretical perspectives adopted, and the population. It refers to the boundaries deliberately set by the researcher concerning the definitions that he or she decides to set as the parameters of the work so that the aims and objectives are achievable (Theofanidis & Fountouki, 2018:157). For this study, the delimitations were categorised into four as explained below.

1.10.1 Choice of Problem

The first delimitation of this study was the choice of the problem itself, namely to establish the causes of knowledge fragmentation by student-teachers in Zimbabwe in order to promote interdisciplinarity since all course knowledge is designed to

holistically contribute to teacher knowledge. Accordingly, this study explored social factors that influenced disciplinarity and ways to embrace interdisciplinarity.

1.10.2 Participants

The second delimitation concerned the research participants. Since the research sought to determine why student-teachers compartmentalised course knowledge by discipline, it was restricted to final-year student-teachers and experienced lecturers. These participants were deemed to be the right sources of information but not all could be involved, so purposive sampling was used to select a few.

1.10.3 Geographic region covered

The third delimitation factor concerned geographic coverage. This study covered three TTIs located in the Midlands Province of Zimbabwe. This choice was influenced by the intercity travel ban in Zimbabwe because of the COVID-19 pandemic. Although the study was restricted to one province, it is relevant to other TTIs in other provinces because of the similarities in their course programmes.

1.10.4 Course Programme

Another delimitation consideration was about the course programme. In Zimbabwe, colleges and universities offer a variety of course programmes that lead to various professions. Although students studying these different course programmes may also exhibit the same tendency of course knowledge compartmentalisation, this study, focused on the teacher-training course programme and selected student-teachers in higher and tertiary education.

1.10.5 Temporal delimitations

The final delimitation consideration was the temporal delimitations which specify the duration of the study, from inception to completion. The study was embarked on in 2017 and completed in 2022 despite deferral in 2018 after failure to secure bursary funding for that year. It took three years to complete.

1.11 THEORETICAL FRAMEWORK

This section briefly presents cultural hegemony as the theory that guided this study on the social causes of knowledge fragmentation by pre-service teachers. From a

sociological point of view, social factors can lead to the establishment of cultural hegemony as some disciplines end up being dominant in various ways. According to Nemeth (2005:2), Gramsci's cultural hegemony postulates that the dominant ideology has a strong hold on consciousness and society. Other neo-Marxist views taken on board include Louis Althusser, Michel Young and Samuel Bowles and Herbert Gintis.

Gramscianism presents cultural hegemony as a way of implementing ideas, which in time becomes 'common sense' through persuasion where ideas that were once seen as ideas become the norm (Dirzauskaite & Ilinca, 2017:18). The theory postulates that domination and leadership are maintained by one social group over others by means of ideology or culture transmitted through social institutions to powerfully influence the culture of the society (Winkler, 2020:11). This results in one worldview replacing another.

The theory is premised on the view of rule by consent as people are not ruled by force alone but by ideas too, because the foundation of a ruling class is comparable to the creation of a *Weltanschauung* (worldview) of the rulers to which members consent as the culture of their society (Herrmann, 2017:1). The ideological subordination of the working class by the bourgeoisie enables the latter to rule by consent (Gosh, 2001:2). Thus, domination is based on the voluntary acceptance of the ideology of the dominant bloc by the subaltern class. In this study, the acceptance of separate, rank-ordered subjects is viewed as contributing to knowledge fragmentation by student-teachers who in turn promote it to benefit the dominant group through role selection and allocation that culminates in the vice of social stratification shrouded in the myths of equality and meritocracy.

Cultural hegemony frames the worldview of the dominant bloc that is then embodied as just and beneficial to all when, in reality, it only benefits the ruling bloc (Boronski & Hassan, 2015:63). From this angle, the researcher believes that with the power of socialisation under the stewardship of the institution of education, the thoughts and senses of the majority are shaped by the ideological state apparatuses, for example, segmented knowledge into disciplines. The recipients of such knowledge live according to the common sense of their socialisation because the culture of their

society tells their social story and expresses the group's social narrative of common sense, ideologies and other ways of life (Herrman, 2017:497).

The next section presents a synopsis of the research methods used in generating data for this study. A detailed coverage appears in Chapter 4.

1.12 RESEARCH PARADIGM, METHODOLOGY AND DESIGN

In conducting research, researchers are guided by paradigms. Kivunja and Kuyini (2017:26) defined a paradigm as constituting the abstract beliefs and principles shaping how a researcher perceives the world, interprets and acts within that world. In other words, a paradigm is the lens through which a researcher observes the world. Pilarska (2021:64) indicated that it is a set of assumptions, beliefs and models of conducting research, fundamental in the design of the inquiry. It orientates a researcher towards the (social) worlds to be studied by providing the appropriate 'tool' for getting insight. It reflects the values that inspire a researcher to undertake research.

A paradigm comprises epistemology, ontology, methodology and axiology (Kivunja & Kuyini, 2017:26). The paradigms for qualitative (subjectivist) approaches are critical theory and constructivism/interpretivist (Mittwede, 2016). Asghar (2013:3121) advised that selecting an apt paradigmatic framework is central for researchers where ontological, epistemological and methodological concerns shape the dimensions of any paradigm. For this study, the researcher adopted critical theory and constructivist paradigms to study the causes of knowledge fragmentation by student-teachers. The combined use of the two is predicated on the view that both critical theory and constructivism have transactional, subjectivist epistemologies (Mittwede, 2012:27).

1.12.1 Critical Theory as Paradigm

This critical theory paradigm provides a researcher with an awareness and understanding of their actions in society (Fuchs, 2015). Thompson (2017:12) credited it for its own explanatory efficacy. It fits under interpretivism because it is more strictly qualitative (subjectivist) together with constructivism.

It was chosen to critique and transform, recompense and emancipate disciplinarity. The paradigm oriented the researcher towards appraising and changing society by digging beneath the surface of social life to uncover retrogressive assumptions impeding a full understanding of social phenomena (Bolanos, 2013:6). This is relevant for this study that seeks to question the phenomenon of knowledge fragmentation by student-teachers.

Emerging out of the Marxist tradition and developed by the Frankfurt School, the paradigm challenges the status quo in favour of a democratic society by addressing power relations that manifest in the social institutions' interactions (Asghar, 2013:3123). This was selected since the study sought to persuade stakeholders in teacher education to move from the taken-for-granted reality of disciplinarity to interdisciplinarity by critiquing the former approach.

1.12.2 Constructivist paradigm

In addition to critical theory paradigm, the researcher considered constructivism. Born out of the interpretivist paradigm, constructivism is associated with the qualitative research approach that seeks to understand phenomena from the experiences or angles of the participants using different data collection methods (Adom, Yeboah & Ankrah, 2016:5). According to these authors, the researcher constructs meanings from the phenomena using their experiences combined with those of the participants. Mittwede (2012:27) observes that constructivism has a relativist ontology where realities are perceived as an array of impalpable mental constructs that are based on human experience. Central to constructivism is the idea that an individual's mind mirrors reality (Galbin, 2014:82). In the current context, the student-teachers' minds mirror the reality of knowledge fragmentation whose image the researcher tries to understand. This is based on the assumption that people construct their own understanding and knowledge of the world through experiencing things and reflecting on those experiences. Constructivism was chosen because, according to Pilarska (2021:64), it is a deeply humanistic and respectful approach to the researcher's realities because of its dialogical, interpretive nature. Thus, Adom et al. (2016:5) stated that for constructivists, reality is subjective, multiple and varied, emanating from the perspectives of participants.

To establish why student-teachers used course knowledge in a fragmented form, the researcher chose the qualitative approach along with the case study design to generate data. People's judgements, emotions, ideas and beliefs can best be recorded qualitatively and described in words to produce qualitative data because words cannot be manipulated mathematically (Walliman, 2011:71). This fitted the current study exploring why fragmented course content in teacher-training programmes exists while it should be combined. All the course subjects are the building blocks in moulding the prospective teacher. For instance, MS provides CK that is to be taught guided by theories of teaching-learning from TOE. PS (Syllabuses A, B, C & D) develop professionalism with methods of for teaching and learning various subjects. All these contributions culminate in TP that provides practicum contexts where all the sections are practised by prospective teachers. In line with the case study design, interviews, document analysis and observation were used to generate data from student-teachers and lecturers, documents and institutional interactions.

1.13 RESEARCH METHODOLOGY

This section describes the actions taken to investigate and research the knowledge fragmentation problem of student-teachers. Research methodology explains the methods and procedures guiding the use of a design by the researcher to proceed systematically with research to solve a problem (Creswell & Creswell, 2018:352; Goundar, 2012:8-9). The research adopted the qualitative methodology and along these lines, chose a case study design that Cohen et al. (2011:289) and Crowe, Creswell, Robertson, Huby, Avery and Sheikh (2011:1) recommended for studying a specific or single instance to explain a general principle. In this case, the single instance was teacher training in the Midlands Province of Zimbabwe. This design enables researchers to generate an in-depth understanding within a defined boundary of space and time pertaining to the phenomenon of interest (Brundrett & Rhodes, 2014:57).

1.13.1 Case selection

The study was undertaken to find out why student-teachers used course knowledge fragmented according to disciplinary lines. It focused on one purposefully sampled Zimbabwean province and subsequently three purposefully sampled institutions

offering teacher education. Plays (2008:697) viewed purposive sampling as synonymous with qualitative research that employs case sampling. From its variants, the critical case sampling was chosen for a decisive, information-rich case (Plays, 2008:698) about the causes of use of knowledge in fragmentation by student-teachers. The province and institutions were purposefully selected as sites of research because they are in the business of teacher preparation and to limit inter-provincial travelling due to the COVID-19 pandemic.

1.13.2 Participant selection

The participants for the research who were purposefully sampled for interviews were 16 student-teachers and 10 lecturers and 42 student-teacher's documents. Of these, 60 were female and 30 were male. These represented a critical case since the knowledge fragmentation phenomenon has several plausible explanations. The student-teachers and lecturers were critical to the research because they had first-hand information of knowledge fragmentation. The selection was deemed useful because it could allow generalisations. Of the three sites, one provided seven, another four and the third five students and five, one and four lecturers.

1.13.3 Data collection methods

The research data were collected from students and lecturers from all three sites and documents and activities from one of the sites. The methods of data generation were telephonic semi-structure interview, document analysis and covert observation with participant-as-observer using appropriate instruments.

1.13.3.1 Semi-structured interview guide

A semi-structured interview guide was used which allowed the researcher to systematically ask questions and objectively compare interviewee responses. It provided an opening to spontaneously explore relevant issues and the participants to talk about the issue in depth. The interviews were followed by document analysis.

1.13.3.2 Document analysis guide

A document analysis guide helped to generate data from selected documents including student-teachers' essays, timetables and syllabus. The use of these instruments ensured triangulation of instruments together with an observation guide.

1.13.3.3 Observation guide

An open observation guide was used to observe social interactions at one of the three sites due to the travel restrictions necessitated by COVID-19 pandemic. This allowed the researcher to capture live scenes pertaining to hegemonic nature of disciplinarity during lectures and general interaction during working hours.

1.13.4 Methods of Data Analysis

The data generated from interviews, document analysis and observation were analysed through content analysis. Content analysis is a data analysis procedure for subjectively interpreting the content of textual data by systematically classifying data into codes and identifying themes or patterns therein (Hsieh & Shannon, 2005:1278). It involves data reduction and sense-making in qualitative research that recognise core consistencies and meanings taken from a volume of qualitative material (Patton, 2002:453). Through content analysis, the researcher first transcribed the data, coded it and identified the themes, sub-themes and sub-subthemes. These were subjectively and scientifically interpreted to establish the causes of the phenomenon.

1.13.5 Ethical Considerations

This research did not expose participants to any harm. Despite this, relevant ethical principles were observed. These included confidentiality, beneficence, anonymity and protocol. It was also ensured that participants consented to take part uncoerced. Their identities were concealed by the pseudonym 'S' for all student-teachers plus a different letter from 'A' to 'P' representing specific student-teachers (e.g., SA, SB, SC etc.) and 'L' for all the lecturers with numerals 1 to 10 (e.g., L1, L2, L3 etc.) representing particular lecturers. The raw data from the sites and participants were stored securely in a password-locked personal laptop.

1.14 ORGANISATION OF THE STUDY

This section gives an outline of the study, which is organised into six chapters.

Chapter 1 covers the background to the study, the rationale for the study, the purpose and significance of the study. The problem statement, research questions,

aim and objectives of the study are part of it. It also includes the clarification of concepts, delimitation of the study, and research design, among others.

Chapter 2 reviews literature related to knowledge compartmentalisation in the Zimbabwean educational context and the theoretical framework that underpins the study based on Antonio Gramsci's (1971) cultural hegemony theory. It includes other like-minded theorists such as Althusser, Michel Young, Bowles and Gintis, and Manheim.

Chapter 3 presents a review of academic disciplines and disciplinarity towards theory-praxis merger.

Chapter 4 presents the research methodology and design, population and sampling of participants, data generation processes and ethical considerations.

Chapter 5 deals with the research findings, which entail data presentation, analysis, interpretation and discussion.

Chapter 6, being the closing chapter, sums up the study, highlights the limitations of the study, draws conclusions, proposes recommendations, presents a TEIP model for nurturing IKI and suggests areas for further research.

1.15 CHAPTER SUMMARY

This first chapter set the stage by providing the background to the study to contextualise the research problem. It presented the global development of fragmented teacher education curriculum, the nature of teacher education in Zimbabwe and highlighted different constituent subjects that make up the curriculum designed to build teacher knowledge. The segmented structure of teacher education knowledge and divisive behaviour of members in different disciplines were looked at vis-à-vis disciplinary knowledge fragmentation. It was indicated that teacher knowledge is a total of GPK and CK obtainable through integration of different campus-taught courses. Despite this, it was noted that, student-teachers in Zimbabwe tend to stick to disciplinarity at the expense of interdisciplinarity. According to Golding (2009:2), interdisciplinarity promotes knowledge mobility across disciplines to respond to the challenges transcending disciplines. Interdisciplinarity is vital in teacher education and teaching because the world

functions as an integrated whole (Maxwell, 2005:73). The chapter showed that a disciplinary approach stops students from critical thinking and innovation resulting in failure to move from theory to practice. The chapter also highlighted the statement of the problem, research questions, objectives and delimitations of the study.

The next chapter presents a theoretical framework and reviews literature on compartmentalisation of knowledge into disciplines and interdisciplinarity.

CHAPTER 2

COMPARTMENTALISATION IN TEACHER EDUCATION IN ZIMBABWE

2.1 INTRODUCTION

The previous chapter set the tone by discussing the introduction to the study, covering the background that revealed the fragmented nature of teacher education curriculum and players in the provision of teacher education in Zimbabwe. Other aspects included rationale, purpose and significance of the study among other introductory aspects. The current chapter presents a theoretical framework based on Gramsci's cultural hegemony, and reviews literature related to disciplinarity, interdisciplinarity and theory-practice in Zimbabwe.

Ajei (2007:90) contends that fragmentation of knowledge has yielded unnecessary distinction in real life as ideas that could easily be collated and conflated have had disciplinary walls erected between them. For example, student-teachers could easily integrate ideas from Psychology of Education, Sociology of Education and Philosophy of Education or use ICT in assignments, yet they do not. Arguably, humanity stands to benefit more if subjects are combined to address the requirements of the Fourth Industrial Revolution (4IR). The 4IR is a global, comprehensive, technological transformation with the potential to radically alter lives (Zimbabwe Mail, 2018). The revolution requires an interdisciplinary, holistic, integrated and comprehensive approach involving global stakeholders including multilateral institutions, national governments, the public sector, civil society, the private sector, academia and the media (British Business Association [BBA], 2018:4, Schwab, 2016:12). Bulawayo24 News (2019) reported that Mutambara argued that industrialisation required blended learning using integrative approaches, where, for example, students could talk about philosophy and mathematics, among other topics. This is supported by Schwab (2016:12) who explains 4IR as the synthesis of technologies and their collaboration across the physical, digital and technological domains that make it fundamentally different from the previous revolutions. This concept may face resistance if stakeholders subscribe religiously to the culture of knowledge compartmentalisation as shaped by their teachers. If the 4IR requires interdisciplinarity, it is imperative that the approach should be embraced by student-teachers as they are change agents in-the-making.

For student-teachers to embrace interdisciplinarity, it must be practised in teacher education colleges and universities offering teacher education by integrating knowledge acquired from various course disciplines. These institutions are conducive environments for the promotion of IKI because they expose pre-service teachers to a wide array of subjects to develop them holistically into competent practitioners. For example, TOE is designed to equip the trainee teachers with theoretical knowledge of psychology, sociology and philosophy that is useful in understanding learners and learning. On the other hand, Professional Studies (PS) is intended to provide pedagogical and CK that is useful in teaching learners. Though the subjects are compartmentalised for rational and convenient reasons, in the end, they all merge in shaping the desired teacher who is armed with adequate knowledge to traverse the diverse teaching-learning landscape. However, embracing IKI may be hindered by social factors which this study sought to explore and address.

To understand how academic disciplines are possibly deployed covertly to achieve cultural hegemony that influences student-teachers to use of knowledge in fragmented ways, it is important to begin by looking at the conflict view based on cultural reproduction ideas of the neo-Marxist Antonio Gramsci, supported by other theorists with similar perceptions.

2.2 THEORETICAL FRAMEWORK

This exploration of the factors that influence knowledge fragmentation by student-teachers draws upon a neo-Marxian cultural hegemony theory by Antonio Gramsci (1891-1937) that he considered as an organising force within unequal societies. In his *Prison Notebooks* (cited in Haralambos et al., 2013:597; Jaques, Islar & Lord, 2019:3), Gramsci believed that ideology is decisive in maintaining the status quo. Nemeth (2005:2) explained ideology as a social tool that can change what is into what can be and encompasses a system of values, beliefs, assumptions and expectations, which one clings to and defends against various competing ideologies. For example, Marx saw economic interests representing the ideas of the ruling class as the societal culture. Gramsci influenced critical and progressive thinking by theorising the role played by culture in politics and the need to develop a reflective relationship between praxis and popular beliefs (Zembylas, 2013:2).

Addressing the culture and power dynamics under capitalism, Gramsci used the concept of cultural hegemony where he saw the realm of ideas as a more important site of ideological contestation than Marx's economic determinism because hegemony is consent supported by force (Gundogan, 2010:61, 78; Winkler, 2020:43). These views make this theory relevant to this research as it pursues a critical exploration of social factors that discourage student-teachers from embracing interdisciplinarity. The work argues that knowledge compartmentalisation has become a hegemonic culture in academia because it seems that very little effort is put in place to break the disciplinary boundaries to integrate knowledge as observed in teacher training colleges in Zimbabwe.

Nemeth (2005:2) held the view that Gramsci's theory posited that the dominant philosophy has a stronger grip on consciousness and society than Marx had thought, which helps to explain why the anticipated revolution did not occur. Syukur (2019:71) echoed similar sentiments that the upper class impose their mind set and experience on the lower classes. In the context of this study, it is noted that the dominant ideology of fragmented subjects has a strong hold on student-teachers' awareness to the point that the anticipated humanistic embrace of IKI in teacher education is invisible. Rather, knowledge fragmentation is perpetuated. To understand this view, culture and hegemony are clarified in the following sections as they are the bedrock of cultural hegemony.

2.2.1 The Concept of Culture

Culture entails values, norms, habits and beliefs that characterise a social group's life reproduced through social institutions such as education (Giddens, 2016:1055). Schaefer (2013:57) explained it as the totality of learned customs, knowledge, material objects and behaviour socially transmitted through social institutions. It is the shared way of life of a group of people that influences social behaviour (Spencer-Oatey, 2008:3, 2012:6) produced through interactions that are unevenly shared and distributed but held in common among particular networks of persons (Patterson, 2014:22). While culture is a way of life that is learned, hegemony signifies a mechanism of domination or leadership of one sort or another leading to the dominant and oppressive status of one class by another (Clark, 2011:18-19). The definitions converge on culture as all the learned behaviours and ways of life that

can be reproduced by social institutions. In the context of this study, disciplinarity is unevenly produced and distributed as a given through the culture of specialisation. This presents a conducive environment for some specialists to claim hegemony and foment disharmony between subjects and social conflict among members.

For their social environment to be sensible, people acquire and transmit culture generationally through socialisation using cultural institutions such as education, church and family. A dominant group may capture these institutions and impose its culture for generational transmission to its advantage, leading to cultural hegemony. According to Becher (1994:152), culture guides conduct between people, for example, on how to use things, and how to get 'what from where' in order to cope in the real world. It can be controlled by the dominant bloc by setting "the mental and structural limits within which subordinate classes 'live' and make sense of their subordination" to sustain dominance (Hall, 1977:333). Therefore, disciplinarity could be used as a strategy to attain hegemony that promotes the fragmented use of course subjects by pre-service teachers. The benefits of this accrue at micro, meso and macro levels. At the micro level, students and lecturers in certain subjects are held in high regard and enjoy related advantages. At the meso level, those who specialised in subjects with the valued currency call the shots in communities, organisations and workplaces. Finally, and most importantly, the benefits are enjoyed by the dominant groups nationally in the form of powerful politicians, employers and the privileged because they are the originators of the fragmented curriculum. Through it, they fool the subalterns into consent on issues of national interest. To win their support and cooperation. This ultimately influences the culture of the rest of society where power could be exercised through coercion and consent (Herrmann, 2017:1-2; Maglaras, 2013:2) that may lead to cultural hegemony.

2.2.2 The Concept of Hegemony

The term hegemony signifies a mechanism of domination of one sort or another as the leading and repressive position of one group over others (Yilmaz, 2010:194). It expresses the combined socio-political ability of a ruling bloc to construct a system of legitimisation in which individuals' actions are enclosed within preordained forms of conduct permitted by the powerful, accompanied by coercion (Filippini, 2017:18). As Jones (2006:41-46) explained, hegemony refers to cultural power where the leading

group wins by adopting a universal appeal, which helps to understand social divisions. It is, thus, logical to argue that the disciplinarity culture has become a dominant ideology used by some in TTIs to divide, gain and maintain power as a kind of cultural hegemony.

2.2.3 The Basic Premise of Cultural Hegemony

As Jones (2006:10) notes, Gramsci changes ideological domination to hegemony, which means the process of transaction, negotiation and compromise between the ruling block and the subaltern. In Syukur's (2019:73) words, the dominant group convinces the subaltern to accept its moral, political and cultural values. According to this theory, domination and leadership are maintained by one social group over others by means of ideology or culture transmitted through social institutions to strongly influence cultural patterns of society. In this sense, it is argued that knowledge fragmentation by student-teachers is influenced by some social groups, for instance, politicians, the rich and corrupt that seek to exert their domination and leadership by presenting a worldview of compartmentalised subject knowledge to society where subjects are rank-ordered. If enforced, knowledge integration stands to benefit the organic intellectuals, student teachers, working class (povo) and learners, as they become critical thinkers in the revolution towards unmasking myths of equality, achievement and meritocracy. The organic intellectuals would then organise the subalterns to provide an alternative subaltern hegemony. This position may sound strange because people's worldviews regarding categorisation of knowledge into disciplines have been successfully ingrained into them as a second nature which proves the efficiency of cultural hegemony. The hierarchical arrangement of subjects seems to have established an accepted social stratification mediated by education as observed in Zimbabwe teacher education. Gramsci (1976) called this state of general subscription to consensus a 'rule by consent'.

2.2.3.1 Rule by consent

Gramsci's cultural hegemony is premised on the view of rule by consent as man is not ruled by force alone but also by ideas presented as the worldview by the ruling block and is consented to as *the* culture by society (Herrmann, 2017:1). The theory's foundation is that man is ruled by force and ideas because, as Marx posited, the ruling ideas of each epoch are always the ideas of the ruling class (Pitsoe & Letseka,

2018:177). Gramsci believed in the power of ideas to create and conserve social unity by muting dissent to allow class societies to function. He believed cultural ideas were able to establish the dominance of a custom-made culture that met the needs of the majority but served the interests of the dominant social class by carefully manipulating the social institutions (Patil, 2018). The manipulation imposes the dominant bloc's culture on the subalterns as the naturalised, accepted norm.

The belief outlined above dovetails with this study's position that the ruling ideas mute dissent by presenting disciplinarity as the ruling idea that has an influence on compartmentalised use of course disciplines by the pre-service teachers. Viewed from various perspectives of subjects such as history, sociology, literature, theory, practice and cultural studies (Tok, 2003:239), the theory ties in with this study that explores the social reasons for knowledge fragmentation by Zimbabwean student-teachers. The ideological subordination of the proletariat by the bourgeoisie empowers the latter to rule by consent (Gosh, 2001:2). Thus, domination is based on the voluntary acceptance of the ideology of the dominant bloc by the subaltern class. In this study, the acceptance of separate, rank-ordered subjects is viewed as contributing to knowledge fragmentation by student-teachers. In turn, the students promote it for the benefit of the elite through role selection and allocation that culminate in the vice of social stratification shrouded in the myths of equality and meritocracy. This arrangement silences dissent.

Cultural hegemony falsely presents the dominant bloc's worldview, prevailing social and economic structures as just and legitimate for the good of all, yet they only benefit the ruling bloc (Boronski & Hassan, 2015:63). With the power of socialisation under the stewardship of education, the thoughts and senses of the majority are shaped by the ideological state apparatuses, for example, segmented knowledge into disciplines. Players in an institution intentionally or incidentally may enable and embed cultural hegemony in various ways. Generally, thinking of holistic academic knowledge is unfathomable because of the culture of disciplines that has been advanced by the powerful in society. The recipients live according to the common sense of their socialisation because the culture of society tells their social story, expressing the group's social narrative of common sense, ideologies and other ways of life (Herrmann, 2017:497). Syukur (2019:75) posited that the dominant social groups shape a permanent approval system that becomes a way of life or culture.

According to Chakraborty (2016:19), cultural hegemony describes how states use cultural institutions to sustain power in capitalist societies. The theory connects ideological representations to culture because ideological proclamations by the state manifest in cultural expectations. What is announced in ideological parlance becomes cultural, accepted as the common-sense way of living that may lead to subjugation of culture dressed ideologically (Williams, 1976:145). Possibly, the reasons behind knowledge partitioning by student-teachers lie in disciplinary ideological proclamations misconstrued for fragmented use of pedagogical knowledge (PK) and CK. In education, the ideological proclamations manifest in the curriculum are presented as neutral by the state, yet policies do not exist in a vacuum (Kariwo, 2014:26). This leads to another important concept of the state.

2.2.3.2 Superstructure: Political society and civil society

The superstructure is the range of mass cultural and ideological replication at the civil society (the ensemble of organisms commonly called private) and political society levels both called the State or government (Gramsci, 1971:12; Haralambos et al., 2013:597; Katz, 2010:2; Wilderson, 2003:228). There is no organic division between political society and civil society, but the modern bourgeois-liberal state (Buttigieg, 1995, cited in Wilderson, 2003:228). The two often overlap because civil society is a significant part of the state which is used as an instrument to continue the hegemony through cultural means. In this sense, teacher education in Zimbabwe belongs to civil society of the superstructure and may function to promote cultural hegemony alongside the state.

2.2.3.2.1 *The State*

Gramsci (1976:207-208) defines the state as “political society + civil society” that balances the two because civil society and the state are one. It is the complete complex of practical activities which the ruling class uses to justify and maintain domination (Haralambos et al., 2013:597). Gramsci claimed that the capitalist state rules through force and consent through political and civil societies (Maglaras, 2013:2). He argued that various institutions directly help the state to propagate its ideas to normalise abnormal proclamations which could explain the state’s interest in controlling education. Like all states, the Zimbabwean government is responsible for

education through its ministry of education and seems to endorse knowledge fragmentation through policies and conditions for academic entry.

As the sum total of political society and civil society, the state exerts hegemony that is protected by coercion (Hoare & Smith, 1971:263). Control is gained by approval and consent of members of society, which results in hegemony, not through the brute use of force, but cultural dynamism that extends into private life and social realms (Giddens & Sutton, 2006:641). Understanding this relationship between the state and its institutions is crucial for comprehending Gramsci's idea of hegemony (Chakraborty, 2016:24); hence, the need to look at the political and civil societies in the next sections.

2.2.3.2.2 The political society

Ali (2015:242) described a political society as the realm of force that is a formal, coercive apparatus that legislates and regulates. This level consists of the state machinery, that is, concerns us using force by the police, army and legal system to repress population elements (Chakraborty, 2016:24). It is a set of enforcement structures that are established when the civil society ensemble is regressive or fails to lead (Maglaras, 2013:6; Wilderson, 2003:228). In Gramsci's view, "what appears to be spontaneous consent is a product of consent manufactured by intellectuals of the ruling class" that is backed up by the political society, for example, the courts, army and police (Wilderson, 2003:228). Like Althusserian Repressive State Apparatus (Haidi, 2020:8), it is the arena of political institutions, legal and lawful control used as a last resort when the school, family and religion fail to sustain cultural hegemony. However, Gramsci did not give this level a pivotal place in the cultural hegemony theory, which makes the structure of less interest in this study. The researcher is convinced that the social factors behind strict disciplinarity are more ideological than coercive.

2.2.3.2.3 Civil society

Civil society is a critical structure of cultural hegemony theory. Maglaras (2013:5-6) and Wilderson (2003:228) defines civil society as "the ensemble of so-called private associations and ideological invitations to participate in a wide and varied play of consensus-making strategies". Gramsci defined it as "the ensemble of organisms

commonly called private” contrasted with political society (Tok, 2003:240). Gramsci perceived civil society as being characterised by ideological hegemony unlike the state that uses force to establish authority (Chakraborty, 2016:26). Ali (2015:242) and Maglaras (2013:2) concur that, as the realm of consent, it is the range of private associations and activities entered into freely by the citizens. It is in civil society that teacher colleges are found arbitrating consent variably, including by knowledge fragmentation practice. This makes civil society also pertinent to this research and worth a closer look.

Wilderson (2003:226) posits that civil society must be rearranged before a revolution can take the form of a frontal attack because Gramsci maintains that it represents a terrain to be occupied, assumed and appropriated in a pedagogic project of transforming ‘common sense’ into ‘good sense’ that calls for ‘destruction-construction’ to build ‘qualitatively new social relationships’. Similarly, this research sought to transform the disciplinarity norm in teacher education towards the good sense of IKI. The pre-service teachers’ habit of fragmenting knowledge requires revolutionary deconstruction to reconstruct an integrative approach that breaks disciplinary boundaries in knowledge creation and production of goods and services. Of course, this may be resisted by the ruling bloc that is anxious to retain superiority.

Gramsci’s claim that civil society belongs to the superstructure comprising ideological or cultural relations departs from the classical Marxist tradition that views civil society as the infrastructure and the totality of material conditions and relationships (Chakraborty, 2016:24). This departure presents civil society as both enslaving and liberating. Civil society organisations (family, church, trade unions, education and so on) are usually seen as the private or non-state sphere, interceding between the state and the economy where the intellectuals operate (Boronski & Hassan, 2015:63). Historically, the Zimbabwean private players provided enslaving education but at independence, liberating education was the mantra though much remained enslaving, including knowledge fragmentation. However, in both epochs, the state’s hegemonic education is discernible in its desires and protection. Although civil society runs without “sanctions or compulsory ‘obligations’”, it exerts collective force and gets objective results in the form of cultural evolution (Gramsci, 1971:242). Arguably, by virtue of being composed of agents of socialisation, civil society is more effective than the state institutions of police, judiciary and army.

Anderson (1976:35, 77) described civil society as a system of superstructural institutions that is the locus of hegemony. Its ideological/cultural relations (social institutions) mediate between the state and economy (Boronski & Hassan, 2015:63; Chakraborty, 2016:24; Tok, 2003:240). It is instrumental in continuing hegemony through cultural means “without force predominating excessively over consent” (Gramsci as cited in Saito & Azevedo, 2017:112) by controlling, supervising and regulating all the spheres of civil society (Marx, 1973:186) to manufacture social consent. With reference to this research, the causes of knowledge fragmentation may emanate from interested parties that are determined to continue their hegemony at various social levels.

2.2.3.2.4 The state, civil society and hegemony

For the ruling bloc to achieve hegemony, it often engages the state structures of political and civil societies with the latter playing a more pronounced role. Tok (2003:239) commented that Gramsci’s cultural hegemony describes how the state and ruling capitalist class use cultural institutions to uphold power over the subaltern in capitalist societies. In Althusser’s (1970:9) view, the elite use the state apparatuses to maintain the status quo. They do this by monopolising coercion through the dictatorship of the state apparatus to acquire domination and consent of the subaltern (Ali, 2015:242). Clearly, the state employs institutions such as teacher education to garner consent by presenting disciplinarity as the norm, collectively pressuring student-teachers towards disciplinarity that is cast in stone. When the same student-teachers finally qualify, they perpetuate knowledge fragmentation into a vicious cycle that helps the ruling bloc to maintain domination. For instance, disciplinarity stratifies society into social classes through specialisation. It is possible that other sections of society have also joined the band wagon to use disciplinarity for political ends in their various stations including in teacher education.

Gramsci’s (1971:238) position is that the civil society institutions function behind the state as a controlling system of fortresses and earthworks that assert themselves whenever the state trembles. Put differently, civil society’s ideological institutions strengthen the state’s hegemonic cultural arrangements using ideology, not coercion. The state is, therefore, propped up by the network of cultural and ideological institutions called civil society (Mayo, 2015:38). This way, the state

spreads its own values and norms as the common-sense values of all to the advantage of the ruling bloc. To achieve and retain state power in an integral manner, Ali (2015:243) asserted that a class should become hegemonic by making its particular interests appear universal in the realms of civil society. Similarly, disciplinarity seems to have been universalised in teacher education, resulting in student-teachers creating disciplinary islands. This has the potential to propagate the idea that some subjects and those subscribing to them are better than others. It promotes differential academic achievement and social stratification for the benefit of the dominant class. In teacher colleges, the practice accrues entitlements to the dominant subjects, students studying them, the dominant class and state.

The process of hegemony is operationalised through several deliberate (but sly) constructive measures, reactions and conservation (Gramsci, 1971:174). Knowledge fragmentation by teacher trainees could be one such deliberate but crafty conservative way the elite operationalises hegemony to bar collaboration of ideas and people in teacher education and society. Representing intellectuals, student-teachers who are socialised into knowledge compartmentalisation go on to teach learners to do the same, inadvertently reproducing the status quo. Gramsci (1971) as cited in Ali (2015:243) asserted that upholding social hegemony and state domination is organised by traditional intellectuals prepared by schools and institutions.

From this view, pre-service teachers are part and parcel of the intellectuals in both senses. They are products of education and should become active agents of change towards egalitarianism using knowledge integration for production of novel ideas, products and services. Unfortunately, the reproduction function of education restricts them to the mere role of regurgitating dysfunctional and compartmentalised facts from their course subjects. Barefoot (1978:76) explained that Bourdieu and Passeron argue that every power manages to impose meanings as legitimate by hiding the power relations which are the source of its force and adding its own specifically symbolic force. This mechanism perpetuates and reproduces structured social disparities based on effective transmission of familial parental endowments to the children (Tzanakis, 2011:76). This means that the ruling bloc wields power to determine that its cultural capital of disciplinarity is better than the holistic approach of the subalterns. The same views apply in education since Bourdieu argued that

social institutions aid and abet this reproduction by rewarding students for possession of elite cultural capital as they set elitist standards rigged to favour the upper- and middle-class children only (Tzanakis, 2011:76). Thus, it is possible that categorisation of knowledge is a way of embedding the separate use of course content by student-teachers into the knowledge economy and social arrangements. The result is a false picture of the value of specialisation and stratifies society, facilitating the practice of divide-and-rule.

Through reproduction, the Zimbabwean teacher education system seems to subjugate the pre-service teachers' intellectual function by presenting subjects as part of cultural capital. Sullivan (2001:3) and Tzanakis (2011:77) defined cultural capital as understanding the dominant culture in a society that is capable of securing a return on investment to the dominant class. Bourdieu and Passeron's (1977) reproduction theory argues that for an effective ingraining of an arbitrary culture, it is necessary to produce a 'habitus' – a physical embodiment of cultural capital (Broadfoot, 1978:77) that affects academic and employment achievement as well as social class. The siloed disciplines that the student-teachers pursue may be working to keep the state stable by denying the student-teachers a chance to play an intellectual role in bringing about social change by exploiting the knowledge integration approach. The separate disciplines keep the students (and subsequently the nation) divided leading to the sustenance of the status quo.

Class differences are perpetuated to maintain the status quo because of the covert operations of civil society institutions. The subalterns accept the dominant thought as normal reality (common sense) that is clearly visible in experience and consciousness (Williams, 1976:145). The current study argues that disciplinarity in teacher colleges in Zimbabwe, for example, Sociology of Education, Psychology of Education, Mathematics and Computer Studies, has ideological roots and has become accepted as the norm. This acceptance may have influenced the intellectual development of pre-service teachers because of knowledge fragmentation. To execute its mission, civil society is managed and operated by intellectuals who are also an important part of cultural hegemony.

2.2.4 Intellectuals

Saito and Azevedo (2017:115) defined an intellectual as a person whose intellectual status is recognisable by academia due to accumulated titles from rigorous study. Gramsci includes scholars and artists (the organisers of culture) and functionaries who exercise “technical” or “directive” capacities in society such as administrators and bureaucrats, industrial managers and politicians in this category of intellectuals (Ramos, 1982:22). They are experts in the application of practical knowledge, including lawyers, mathematicians, doctors and teachers who are products of history committed to their social class. Different types of intellectuals are engaged politically to forge an alternative hegemony or are committed to the conservation of the ruling bloc hegemony (Saito & Azevedo, 2017:116). Seen from this angle, it can be argued that pre-service teacher intellectuals subscribe to disciplinarity for the preservation of the status quo. Herrera-Zgaib (2009:145) maintained that the intellectuals perform organisational and directive functions of the state structures to lay the ground for hegemony. However, the seeming spontaneity is in fact a product of consent that is man-made by the ruling bloc intellectuals (Buttigieg, 1995:28) as the foundation for hegemony. Student-teachers are intellectuals in the making who are to be ejected into civil society to organise and direct functions to either change or conserve hegemony. Teacher education contributes wittingly or unwittingly to the formation of intellectuals and hegemony through disciplinarity.

Gramsci made a contentious observation that “All men are intellectuals, one could therefore say: but not all men have in society the function of intellectuals” (Gottlieb, 1989:115). In other words, all men are hypothetically intellectuals by virtue of possessing an intellect and using it, but not all are intellectuals by social function (Hoare & Smith, 1999:131). Thus, despite students’ mental potential to functionally merge psychology, sociology and philosophy knowledge, there could be social factors inhibiting them for personal and disciplinary ascendancy.

Wright (1989:26) averred that hegemony constitutes the capacity of a bloc to methodically tie the interests of other classes to the realisation of its interests. In other words, bourgeois ideology appropriates the lived experiences and cognitive categories of subalterns, integrates them into an intellectual structure, which is coherent and compelling, but which organises these categories around a logic

supporting rather than undermining the domination of the ruling bloc (Wright, 1989:26). An example of this is segmenting knowledge into disciplines to be studied in a specific order. Riley (2011:12) asserted that a fully established hegemony is a form of intellectual and moral leadership in which the majority of the population understands its interests as being essentially compatible with the dominant bloc. In teacher education, this inclusion is in the form of indigenous religions, histories, vernacular languages, practical and academic areas as disciplinary entities to be studied to win subalterns' consent to knowledge fragmentation. However, the inclusion is subjectively evaluated by different camps of intellectuals that may influence use by student-teachers in Zimbabwe. The intellectual camps, produced by each epoch, are classified by Gramsci (1971:1) as either traditional or organic.

2.2.4.1 Traditional intellectuals

As Herrera-Zgaib (2009:147) noted, historically, the traditional intellectual performed a leading cultural and moral role by possessing *esprit de corps* (a sense of elitism in society). In modern times, traditional intellectuals include professors, doctors, lawyers, businessmen, scholars, scientists, philosophers, preachers and media practitioners. Their living standards differ from the peasantry which motivates the subaltern to improve their living standards (Chakraborty, 2016:22). In this sense, the Zimbabwean student-teachers should lead the knowledge integration revolution as models towards knowledge generation and utilisation provided no social forces stop them.

Even though Gramsci (1971:1) believed that the traditional professional intellectuals possess a certain inter-class aura about them, the reality is that they derive this ultimately from social capital but conceal that attachment to the class formations. They mythically appear independent of the dominant group, yet they are essentially conservatively allied to one another and work together (Bodenheimer, 1976:20; Burke, 2005; Herrera-Zgaib, 2009:147). They collaborate to establish a consensus among subordinates for their submission to the ruling class and ensure state coercion during crises (Gottlieb, 1989:113; Hoare & Smith, 1999:131). The same cooperation cannot be ruled out among the student-teacher intellectuals, which may influence them to shun integration in support of the ruling block to maintain hegemony by advancing knowledge compartmentalisation. Ultimately, some student-

teachers may subscribe to and advocate the dominance of certain subjects that counteracts interdisciplinarity. However, the role of student-teachers as traditional intellectuals can be replaced by that of organic intellectuals.

2.2.4.2 Organic intellectuals

Gramsci (1971:1) theorised that these intellectuals are the thinkers and organisers of a specific fundamental class distinguishable by their professional jobs. The new, specialised organic intellectuals replace the traditional public intellectuals (Herrera-Zgaib, 2009:147). Resende (2006:6) defined an organic intellectual as someone who participates, acts and helps in the construction of a new hegemony or engages in the preservation of hegemony. This means an intellectual is committed to and participates in the formulation of ideas to aid hegemonic or counter-hegemonic political action. Counter-hegemonic action is the opposing action of the subaltern groups involved (Resende, 2006:6). Thus, Saito and Azevedo (2017:117) asserted that organic intellectuals could support the hegemonic bloc or act in the context of the production of an alternative hegemony in favour of the subaltern. Both exist among student-teachers with the former successfully consolidating their position judging from the prevalence of the disciplinary approach to knowledge acquisition and use.

Maglaras (2013:5) explained that in the processing and socialisation of values, the organic intellectuals function as an “ideological state apparatus” by producing convincing political ideas, analysing social phenomena and the actual role of the cultural element of the superstructure in social formation. However, it is envisaged that the student-teachers can serve a counter-hegemonic role as organic intellectuals in organising a new IKI culture, unifying disparate social classes, giving a voice to the subaltern disciplines, inspiring them to fight disciplinary oppression and end academic tribalism. All this is possible provided social deterrents are known and addressed, as this research intended to do.

The organic intellectuals influence the ideological and political unity of the prevailing hegemony depending on whether they are affiliated with and inclined towards the subordinate or dominant group (Hoare & Smith, 1999:131). Their task is to contribute to an “intellectual and moral reform” to establish the foundations of a fair society (Schettini, 2008:9). In the struggle for social hegemony, they reason with the masses

and engage in a decisive 'war of position' to consolidate the hegemonic influence of the class whose interests they share, for social change or to maintain the status quo (Semararo, 2006:378). Student-teachers should take on this role depending on the social factors that influence them. They can either be for the ruling bloc or subaltern class warring with hegemony to gain concessions or demystify the myth of concession towards interdisciplinarity.

2.2.5 Concessions

Bourgeois ideology does not deny the lived experiences of the workers nor cognitive categories generated out of daily life of people in a capitalist society but appropriates and integrates them into an intellectual structure supporting domination as propaganda (Haralambos et al., 2013:598). The subordinate class is made to understand that its own interests are compatible with those of the dominant bloc (Riley, 2011:12). This may take the forms of education for all, meritocracy, gender equality and disciplinary choices because "it is impossible to indoctrinate the population completely" (Boronski & Hassan, 2015:63; Haralambos et al. 2013:598). The efforts of the ruling bloc culminate in concessions that hoodwink the subalterns. For example, in teacher colleges, student-teachers have the freedom to choose the MS, which propagates disciplinarity and specialisation. Moreover, teacher education curriculum knowledge is presented as fragmented, independent and absolute.

Gramsci's tenets of cultural hegemony covered so far have shown how the ruling bloc manipulates cultural institutions and culture to attain and maintain hegemony over subalterns. Other neo-Marxist theorists who share similar views are covered in the following sections.

2.3 LIKE-MINDED THEORISTS

The research is prefaced on the hypothesis that disciplinarity overrides interdisciplinarity in teacher education because there are social factors behind knowledge fragmentation. Due to the assumed social conflict, related sociological theories are used as the lenses to guide the study. Conflict results from purposeful interaction between competing groups because of opposing goals. Theorists such as Althusser, Young, Bowles and Gintis, and Mannheim address conflict from multiple perspectives.

2.3.1 Luis Althusser: State Apparatuses

Born in Algeria in 1918, Althusser developed the concepts of repressive state apparatus and ideological state apparatus (ISA) (Margulies, 2018:183). He wrote about ideology and ISAs in 1970 in which he systematically explained his conception of Marx and Hegel's ideas (Brewster, 2014:x1x).

While the RSA advances the use of brute force by the army, police, legal and judiciary institutions, ISA postulates that the central ideology of any society is sustained and reproduced through ISAs (Margulies, 2018:183). Wolf (2004:1-2) blames ISAs for promoting the ruling class by making dominant ideology universally valid, justifying the social, political and economic status quo as natural, presenting common sense as inevitable, perpetual and beneficial for all.

Wolf (2004:1) likens Althusser to Gramsci for turning to the realm of ideology to clarify and help the working class's inability to successfully transition to communism. Like Marx, Althusser (2014:48) admits that in order to exist, every social formation must provide conducive environments for its existence and its relations of production. The reproduction of diversely skilled labour-power, as required by the social-technical division of labour into specialised jobs and posts, is ensured by the education system (Althusser, 2014:50). Although the fragmented school curriculum solves the division of labour need, it promotes fragmented knowledge in the labour force and society through the hidden curriculum. These are the unplanned powerful, sometimes contradictory messages, conveyed indirectly in the learning situations such as cultural habits, customs, skills and behavioural and social expectations with positive or negative effects on learners (Andarvazh, Afshar & Yazdani, 2018:198). Through the hidden curriculum, student-teachers may not realise the linkages between the subjects that they study. Depending on their station in society, students are ready to submit to the established order of the dominant ideology or are capacitated to police the dominant ideology properly. It means education and other apparatuses, teach 'know-how' in forms that ensure subordination to the dominant ideology (Althusser, 2014:52). Thus, the reproduction of labour-power relies on the reproduction of qualified personnel with fragmented knowledge as portrayed by student-teachers in Zimbabwe. All this is enabled by what Althusser calls repressive state apparatus (RSA) and ISA.

2.3.1.1 The repressive state apparatus (RSA)

Since this research assumes ideology is behind the social factors that influence strict disciplinarity to achieve cultural hegemony, it shall suffice to understand what RSA is, and the institutions therein. Althusser (1970:9-10) conceived the state as a repressive apparatus, that is a 'machine' of repression that enables the ruling class to ensure its control over, and exploitation of, the working class. In concurrence with Gramsci, Althusser (1970:10; 2014:75 & 78) postulated that the RSA makes direct or indirect use of physical violence. It comprises the head of state, the government, administration, army, police, courts and prisons. Therefore, the RSA is a force of repressive execution and intervention where ISAs have failed to fool the proletariat to remain docile to oppression and exploitation through such ideologies as specialisation and disciplinarity for the division of labour. This implies that some of the social forces behind fragmented use of knowledge could emanate from institutionalised force, for example, imposition of curriculum.

2.3.1.2 The ideological state apparatus (ISA)

The ISA is of special interest to this study. It houses teacher education riding on disciplinary ideology. Althusser added the concept of ISA to the Marxist theory of the state that functions on ideology, not force. Althusser (2014:77) defined the ISAs as:

a system of defined institutions, organisations, and the corresponding practices. Realised in the institutions, organisations, and practices of this system is all or part (generally speaking, a typical combination of certain elements) of the state ideology. The ideology realised in an ISA ensures its systemic unity on the basis of an 'anchoring' in material functions specific to each ISA; these functions are not reducible to that ideology but serve it as a 'support'.

Therefore, the ISA is a group of state institutions advancing the state ideology by promoting unity through their own choice secured in activities like studying or learning for the purpose of supporting the state ideology. According to Althusser (2014:75-76), the grouped ISAs include the Scholastic Apparatus, the Familial Apparatus, the Religious Apparatus, the Political Apparatus, the Associative Apparatus, the Information and News Apparatus, the Publishing and Distribution

Apparatus and the Cultural Apparatus. In Althusser's view, this set of apparatuses is less scrutinised or understood in the Marxist tradition, yet it plays a parallel role to the RSA in sustaining capitalist class structures (Wolf, 2004:3-4). These apparatuses have 'institutions' or 'organisations' that correspond to them. For the purposes of this study, the scholastic apparatus is of interest because it has various schools and levels, from primary to tertiary (including teacher colleges) and various institutes. These function on ideology without recourse to physical violence.

Generally, the ISAs inculcate in people specific ways of imagining, thinking and understanding their social positions (Wolf, 2004:4). For example, teacher education through disciplinarity, socialises student-teachers to subscribe to academic tribalism. Althusser (1978:182) propounded that individuals are fashioned by ISAs to believe that their conformity to the needs of capitalist class structures is different. He strongly believed that ideology and ISAs worked by bringing into reality on the individual within modern capitalist societies the idea of freedom so that individuals freely accept subjection (Wolf, 2004:5). Wolf emphasises that institutions "call" individuals in particular ways that prescribe and enforce particular ways of thinking about their identities, relationships with other individuals and their association with social institutions and acting accordingly. The Althusserian notion of free will matches Gramsci's view of consent.

The education system is the most effective ideological state institution especially in sorting and selecting learners into homologous hierarchies that are reflective of society (Macris, 2002:26). Consequently, educational practices of disciplinarity, fragmentation, streaming, categorisation, specialisation and compartmentalisation elements of the hidden curriculum reproduce and sustain the status quo. The practices are part of ideology, which is just rhetoric that makes truth claims of individuals as resolute and unified subjects in relation to their conditions of existence (Nemeth, 1996:242). The consequence produces social practices (Wright, 2008:24) such as disciplinarity.

Teacher colleges as part of ISAs impose certain identities upon student-teachers, how they relate and connect to other knowledge domains. For instance, mathematicians relate more to sciences than languages and so on, in ways that such individuals imagine that their prejudices are internally self-generated. The

identities may be part of the social factors that cause knowledge compartmentalisation as competing subject associations/departments come into existence and inhibit knowledge integration. The competition could be spurred by the social construction of knowledge proposed by Michael Young.

2.3.2 Michael Young: Social Construction of Knowledge

The sociologist Michael Young has written several articles claiming that 'powerful knowledge' should be at the core of the school curriculum which has attracted the attention of scholars, academics, policymakers and educators (Hordern, 2022:196; White, 2018:325). His idea of 'powerful knowledge' is based on Emile Durkheim's view that knowledge is social as it takes its meanings from people as social beings (Reiss, 2018:123, Young & Muller, 2013:230).

Durkheim acknowledged the fact that knowledge is culturally and historically mediated but argued that truth and knowledge have a givenness that is historical and social (Balarin, 2008:508). He disputed the relativist view of the socially grounded nature of knowledge but viewed it as a social and historical product (Reiss, 2018:123; Young, 2008:19). This is valuable for this study that tried to understand why student-teachers' curriculum is fragmented and the students use its knowledge separately. Young was concerned with how the groups of schooling (pupils, teachers and knowledge) were socially constructed, with "some in a position to impose their constructions and meanings on others" (Young, 1971:2). The same position was held by Siegel (1987: xiii) who argued that an absolutist posture was untenable because knowledge (and/or truth) is relative to time, place, society, culture, historical epoch, conceptual framework, personal training or conviction. In other words, what counts as knowledge is variably determined. This is quite pertinent in this exploration of social factors that hinder knowledge integration by student-teachers because it is likely that some people wield power to influence knowledge compartmentalisation. Young (2008:5) condemned theories and misguided arguments that equated the legitimacy of knowledge with the social positions of its creators. However, that position is arguably plausible when looking for the social roots of knowledge fragmentation by pre-service teachers

Young's (2008:15) work on the sociology of the curriculum focuses on how the changing form of specialisation in relation to the production of knowledge and the

division of labour shaped the organisation of educational knowledge. He distinguished between insular and connective specialisation with insular representing disciplinary grouping of separate subjects and connective a redefinition of their role in relation to the purposes of the curriculum. With regard to this research, insular specialisation could be one of the social reasons encouraging student-teachers to keep subjects siloed. The connective seeks to break down the disciplinary walls and release knowledge in the teacher education curriculum for purposes of shaping integrative teacher knowledge.

Deng (2015:723) observed that knowledge questions that are tackled by Young are largely ignored in educational policy and curriculum development as the focus is on competencies. In discussing knowledge and the curriculum, Young (2008:20) presents neo-conservative traditionalism and technical-instrumentalism as competing imperatives or ideologies. The former holds that knowledge has enduring value and is confined to a given body of knowledge while the latter advocates for education towards the needs of the economy for employability of all students. The conservative traditionalism attempts to perpetuate disciplinarity while technical-instrumental seeks interdisciplinarity. Young supports the idea of a subject-based school curriculum, based on specialist research and pedagogy, with all subjects as repositories of powerful knowledge (Reiss, 2018:124; White, 2018:326).

The two ideologies wrestle for dominance in curriculum development because “intellectual fields are typically structured by competing traditions and positions, and that the dominance of one is only ever partial and transient” (Young, 2008:26). Conflict between these ideologies covers the dimensions of insulation and connectivity between disciplines and subjects (Young, 2008:33-34). Young saw conflict between knowledge and its application emanating from the separation of general and vocational knowledge and learning and its integration, from linear sequencing to modular choice as curriculum principles and from hierarchical to facilitative or collaborative approaches and pedagogy. These areas of conflict could be part of the reasons behind disciplinarity by student-teachers.

In the knowledge sphere, Young (2009:13) distinguished between ‘knowledge of the powerful’ concerning the question of who has the most access to knowledge and ‘powerful knowledge’ regarding who defines what counts as knowledge. According to

Young (2011:150), powerful knowledge refers to useful knowledge that provides dependable explanations or new ways of thinking about the world. It is subject-specific, intelligible, conceptual disciplinary knowledge that empowers students to make decisions and competently execute actions in ways that influence lives positively (Gericke, Hudson, Olin-Scheller & Stolare, 2018:428). The power is derived from subjects' systematically related concepts and influence, their power over other people (podestas) and to do something (potential) as well as generating new ideas (White, 2019:430-432). In this context, interdisciplinarity is the gateway to powerful knowledge. It is the knowledge that parents want their children to acquire, thus making sacrifices to keep their children at school because it is not available to them at home (Young, 2009:13). Unfortunately, children may not acquire useful knowledge that develops in them new ways of thinking if trainee teachers compartmentalise knowledge which they take with them into the classroom. The knowledge dichotomy presents a scenario that is fertile ground for conflict, competition, knowledge separation and cultural hegemony in teacher education.

In modern society, powerful knowledge is increasingly specialist knowledge with borders between disciplines and subjects (Gericke et al., 2018:430; Young, 2009:14). It is separated from experiences that learners bring to school which gives prominence to disciplinary knowledge (Gericke et al., 2018:430). These views seem to locate the origin of knowledge fragmentation in specialisation. Although Jiang (2018:11-12) celebrated fragmentation of content, time, environment and thinking, differentiated knowledge makes it difficult to keep up to date with an area of specialisation because it leads to knowledge becoming outdated or to increased specialisation in more limited areas. Some knowledge gets lost, distorted or is denigrated along the way. Knowledge differentiation and binary ranking along a useful/useless continuum leads to value-laden hierarchies informed by the disciplines with great potential to influence the fragmentation of knowledge by student-teachers.

2.3.2.1 The purpose of schools

From a lecture he gave at the Royal Society of Arts on 'What are schools for?', Young (2014:6) narrated how he was attacked during the question time for arguing that the main purpose of schools was to provide access to knowledge for all

students. The participants disputed this because they could not fathom the knowledge that they had learned being an entitlement for all children. This rigid mentality highlights the existence of strict disciplinarity that seeks to deny some learners certain kinds of knowledge to maintain the status quo. It is possible that some people work hard to privatise knowledge and criminalise trespassers, which could be the case with pre-service teachers. The findings by Widdowson, Dixon, Peterson, Rubie-Davies and Irving, (2014:23) suggest that stakeholders believed that the purposes of schooling for all learners included acquisition of academic learning and self-knowledge; life and social skills development; improving life chances and quality; and preparation for future social roles. Attempts to privatise knowledge could be the reason why schools have been reported by Bass (2008:128) to receive criticism that they do not do enough to promote the values of the majority culture. This is suggestive of cultural hegemony in education that could be originating in teacher education. There will always be multiple and competing interests engaged in the endeavour of educating the world's children resulting in tension between the ideal and real (Zion & Blanchett, 2017:82). That endeavour produces strata of future workers through correspondence as posited by the theorists Bowles and Gintis who are covered next.

2.3.3 Samuel Bowles and Herbert Gintis: The Correspondence Principle

Shomar (2015:168) credits the correspondence principle (CP) to Niels Bohr's greatest contributions to physics that postulates that old science is "indispensable" to the understanding of new science. In Alabadi's (2014:41) words, "successive successful theories in the history of science which satisfy the CP, 'build on' the successes of previous theories by somehow taking over slices from them". It states that a new theory uses ideas of older well-established theories as its springboard, which serves this thesis well as it postulates that the IKI approach depends on disciplines as stepping stones towards new and functional knowledge. By adopting CP from physics and applying it to sociology, Bowles and Gintis (2002:8) demonstrated the utility of interdisciplinarity. This supports the position of this research that IKI should be the norm unless social forces interfere.

CP constitutes the centrepiece of Bowles and Gintis' (2002:12) analysis of the way schools produce future workers. While schools socialise learners to relate to the field

of work through fragmented subjects for specialisation, learners' critical judgements have a part to play as they may deem them as irreconcilably separate.

The CP advances that school norms and values correspond to those of the capitalist workplace (Bowles & Gintis, 2002:12). The resemblance is noted in production of subservient, uncritical, passive and docile workers who unquestionably accept hierarchy and authority, motivation by external rewards and fragmentation of subjects at school (Ramsay, 1989:138). The fragmentation of subjects in education is of interest for the purposes of this thesis that advocates for subject fusion because it could be the root cause of the fragmented use of knowledge by student-teachers. According to Bowles and Gintis, school knowledge is fragmented into different subjects, split up into Mathematics, English, History, Sciences and so on, with 45-to-60-minute lessons (Cole, 1988:318). Thus, knowledge fragmentation is inherent in academic subjects which may cause disparate rather than holistic use. This resembles workforce fragmentation through specialisation into particular fields, without an appreciation of the whole process for easy control and exploitation of the divided and disunited employees unable to confront their exploitative conditions (Thompson, 2017:86). It is possible that student-teachers socialised through the fragmented school curriculum have embraced that culture, practise and transmit it. This disciplinary culture is problematic in that it does not allow for transfer of knowledge from one academic discipline to another.

Bowles and Gintis saw the capitalist economy using education to perpetuate the status quo in society as school activities correspond with the demands of social and work life such as the culture of specialisation (Cole, 1988:318; Ramsay, 1989:138). If the workplace wants a fragmented workforce, education socialises learners into a fragmented curriculum that is disciplinary and boundary-tight. Therefore, demands of the workplace could be a source of knowledge partitioning by student-teachers. As a result, Bowles and Gintis (2001:1-2) asserted that education cannot rectify social inequalities or solve all life's problems because of the fragmented structure and content of schooling. Hence, education potentially promotes compartmentalisation of knowledge by student-teachers under the guise of meritocracy and social mobility.

Parsons, a functionalist, posited that schools operate on meritocratic principles where status is achieved based on effort, worth and ability (Haralambos et al.,

2013:601). Everyone is given an equal chance and individuals compete to achieve rewards through effort. For Bowles and Gintis, meritocracy is a myth that legitimises social inequality (Cook, 2008:32), which is efficiently executed through competing disciplinarity and specialisation. Meritocracy could be fuelling compartmentalisation of knowledge and society in subtle ways, for example, disciplinarity, that needs unmasking through Mannheim's sociology of knowledge presented next.

2.3.4 Karl Mannheim' sociology of knowledge

The term "sociology of knowledge" (SOK) (*Wissenssoziologie*) was first used by Scheler (1874-1928) and Mannheim (1893-1947) as a subfield in sociology that would provide a method for unmasking the assumptions of political ideologies and indicating their truth content (McCarthy, 2000:2953). They agreed that truths do not exist apart from historical and social processes. It is devoted to the interplay between social conditions and ideas (Pooley, 2016:1). In other words, it focuses on knowledge and knowing as socially grounded processes to the end that knowledge is understood to be a social production. According to Mannheim (1984:121-122), SOK is concerned with the scientific study of the "social origins of knowledge" as it studies the relationship between society and knowledge. It interrogates the view that better ideas win out over worse ones because the former ideas are better which mismatches the messy, earth-bound reality in which knowledge is created, circulated and adopted. All knowledge, for Mannheim, is socially grounded by experience, class and location (Pooley, 2016:2). This dovetails with this study that argues that the fragmented use of knowledge by student teachers is an ideological creation.

As such, Mannheim's contributions to the SOK are intricately linked to the focus of this study. This is so as Mannheim views knowledge as determined by social existence with the individual actor standing between or mediating the relationship between the social world and knowledge (Mutekwe, 2012:806). It means that the ideas of a social group relate to that group's position in the social structure. Mutekwe observes that Michael Young also viewed SOK as a distinct body of writing concerned with the social character of knowledge. This perception of the social nature of knowledge is valuable in this research that seeks to respond to relevant questions of what knowledge is, what counts as knowledge and, particularly, whose knowledge it is. These ideas intersect with cultural hegemony that emphasises that

the knowledge of the dominant or elite is considered to be mainstream ideas that becomes taken-for-granted. This leads to the uncritical acceptance of the dominant class ideas as *the* knowledge for society which culminates in the establishment of cultural hegemony, for instance, the fragmented of knowledge into subjects.

Simonds (1978) argued that SOK promises its “disciples” a careful unmasking of the distortions associated with what counts as knowledge in any given society. Mannheim’s SOK is more academic and scientific in its approach. It seeks not to become a means for discrediting, undermining or devaluing knowledge, but to become a tool of understanding the social roots of knowledge, its stratification and social distribution in any given society (Mutekwe, 2012:807). Interestingly, it implies that even Mannheim’s ideas of SOK are also a product of a section of society. This rekindles the objective-subjective debate of the nature of knowledge vis-a-vis knowledge fragmentation. The next section reviews literature related to disciplinarity and interdisciplinarity in Zimbabwe.

2.4 DISCIPLINARITY AND INTERDISCIPLINARITY IN ZIMBABWE

This part looks at the disciplinary and interdisciplinary manifestation in Zimbabwe from the colonial period to the independent and post-independence eras.

2.4.1 Historical Context

Before the advent of colonialism, education in Zimbabwe was holistic, humanistic and contextual. The colonial government introduced formal education and the curriculum in the country, which was overly academic for blacks but manual and practical for white learners (Nziramasinga, 1999:7). The education system was dualistic, radicalistic and fragmented. However, the current competence-based curriculum pays more attention to competence development where learners are expected to be able to manipulate knowledge, skills and attitudes independently and creatively in order to address different challenges (Ministry of Primary and Secondary Education [MOPSE], 2015:8). The Zimbabwe’s 2015 revised competence-based curriculum demands linking to the expected outcomes This can be achieved if trainee teachers embrace interdisciplinarity.

2.4.1.1 The dualistic and segmented nature of colonial education in Zimbabwe

In a study on 'Educational Legislation in Colonial Zimbabwe (1899-1979)', Kimberly and Govere (2003:140-146) identified and tracked the pieces of legislation that shaped the educational terrain. These promoted social inequalities through segmented, racial education that advantaged colonialists. The acts include the 1899 Education Ordinance, 1903 Education Ordinance, 1907 Education Ordinance, 1929 Department of Native Development Act, 1930 Compulsory Education Act, 1959 African Education Act, 1973 Education Act and the 1979 Education Act.

The different pieces of legislation had different far-reaching consequences for education in Zimbabwe. According to Kimberly and Govere (2003), the 1899 Education Ordinance authorised the settler government to control education, what was taught and how it was taught (probably fragmented disciplines). The 1903 Education Ordinance tightened the government's control on education as it denied Africans equal access and opportunity in education. This was followed by the 1907 Education Ordinance that was enacted to prevent competition between the colonialists and Africans and resulted in the setting up of three categories of schools classified as first (boarding schools under European supervision), second (day schools under European supervision) and the third, which was meant to only have the requisite number of students being taught to speak and understand English (Kimberly & Govere, 2003:140-146). Kimberly and Govere further noted that the 1929 Department of Native Development Act separated administration of schools for the Euro-Rhodesians and Africans. One positive thing about this Act is that it introduced African teacher training. These developments seemed to have introduced and fostered perennial compartmentalisation in education in Zimbabwe. The 1930 Compulsory Education Act promoted further segregation between the races in colonial Zimbabwe as it was designed to benefit the Euro-Rhodesian children by giving them further privilege through the provisions of the 1973 Education Act. This idea was perpetuated many years later by the Judges Commission (1962) which, although it recommended access to primary education for all, it also introduced the compulsory use of English as a medium of instruction and the setting up of Local Advisory Committees (MOPSE, 2015:13) showing the historical pervasive nature of knowledge fragmentation. The superiority of English as a subject was officialised at that point. According to Nziramasanga (1999:6), the Commission's policy on

language resulted in downgrading and marginalising of indigenous languages. The Commission's observation confirms the researcher's position that ideological and philosophical proclamations emanate from the powerful in society, either natives or foreigners, who desire cultural hegemony.

Despite some concessions, the 1979 Education Act entrenched separate, unequal and racialised educational opportunities. The policy classified schools into Group 'A' Schools that were government-run and reserved for Europeans, Asian and Coloured children. Group 'B' Schools were government-run African schools in urban areas, while those operated by the government as African schools in Tribal Trust Lands (TTL) were categorised as Group 'C'. Those that used to serve European, Asian and Coloured communities became Community Schools while mission schools and independent schools were labelled Private Schools (Kimberly & Govere, 2003:146). Education was only democratised on attaining independence in 1980. The Rhodesian Front government diluted the Judges Commission recommendations on vocational and technical education for African schools into the F2 secondary school system while developing highly sponsored and furnished comprehensive secondary schools for whites (Nziramasanga, 1999:6). Such classifications tend to have ripple effects on the knowledge made available at these racialised schools and a bearing on knowledge compartmentalisation by pre-service teachers.

The policies were enacted as a deliberate move to protect the colonialists' economic advantage by promoting differential rights and privileges for the two cultural groups (Nziramasanga, 1999:1-2). This ultimately promoted racism in the country based on and perpetuated by a dual system of education. The impact of these policies was not noticed by the victims who assumed the unfolding hegemonic patterns were a given. During those days of struggle, the victims did not know that there was a colonial system or policy put in place to stop the Africans from getting comprehensive education. Consequently, very few Africans made it past the Rhodesian Junior Certificate (RJC) examinations (Sekai, 2016:8). The majority ended up enrolling in apprenticeships such as domestic science, woodwork and building. Such specialisation is viewed as leading to division of labour that promotes inequality (Rodney, 1973:10). Thus, Africans were educated to live a separate life from the colonisers and their kith and kin, which confirms this thesis' position that there are social forces that influence student-teachers in Zimbabwe to compartmentalise

course knowledge. After independence in 1980, despite an array of educational reforms, disciplinarity has persisted up to now across education, and especially in teacher education, which motivated the researcher to undertake this study to find out the causes.

2.4.2 Educational Policy Guidelines in Zimbabwe and Integration

For the Government of Zimbabwe to achieve its national goals after independence, it enacted educational policies to guide the implementers generally and particularly teachers. Maravanyika (1990:14) contended that policies in education are supported by current economic, social and political factors in the communities where they operate and are influenced by their historical antecedents. Nziramasanga (1999:8) concurred that past commissions and committee recommendations which were significant were not implemented by the previous regimes because they were focused on maintaining political power rather than promoting the education needs of the African learner. Maintaining power could still be the focus today engineered through knowledge fragmentation in teacher colleges and other sectors of the society.

Some policy guidelines include the 1987 Education Act, as amended in 2006 that focuses on the right to education (Part II), classifying schools and right to access (Part III) and the use of the mother tongue in teaching and learning (Part III), which are critical in this study. The right to education and the use of mother language are positive moves towards integration of learners, languages and content. However, classification of schools and right to access are subjective and possible sources of conflict that may lead to cultural hegemony as some schools end up being better classified, but less accessible to all learners. The products of these different schools may finally be enrolled at similar teacher colleges where they may display superiority or inferiority complexes that could reflect as academic tribalism to the detriment of interdisciplinarity.

The Government of Zimbabwe's (2012: v) Second Science Technology and Innovation Policy of Zimbabwe [SSTIPZ] stresses ICT literacy as a cross-cutting issue among all socio-economic sectors. In the preface to the policy, the late President Robert Mugabe highlighted that, to meet its basic human needs sustainably, Zimbabwe required interdisciplinary programmes focusing on mastering

technologies and integrating them in socio-economic activities, including education (Government of Zimbabwe, 2012: v). This ideal may be unattainable if social factors impeding interdisciplinarity are unknown and unresolved, especially in teacher education that trains curriculum implementers. The challenge to develop innovative ways of bringing scientific and technological contributions to all developmental efforts at both individual and national levels (Government of Zimbabwe, 2012:3) may be attributable to fragmentation of subjects that seems to stop experts from collaboration. In education, the policy expects teachers and students to use the internet to learn and evaluate scientific topics taught, which falls short of interdisciplinarity as the extent is limited to scientific topics. The expectations like this impact the intention to integrate ICT across the school curriculum. For student-teachers, the expectation is that they should use skills they learn from ICT across subjects, for instance, to research, type their work, teach and so on.

The Education Act and Article 6 of the Constitution (Government of Zimbabwe, 2013:17) officially recognised 16 official languages in Zimbabwe. Notably, the constitution envisions a united people with common goals which could be attainable if student-teachers embrace IKI for practice in life and schools. Even the Zimbabwe Agenda for Sustainable Socio-Economic Transformation (ZIM ASSET) calls for a curriculum that skills learners for life and work to match national development needs (Government of Zimbabwe, 2018:22; MOPSE, 2015:13-14). Life, education and work are inseparably intertwined, and this should be reflected in teacher colleges through interdisciplinarity.

All the policy guidelines have semblances of integration across the education sector such as using mother languages and ICT. However, the policies do not categorically or specifically emphasise interdisciplinarity. This gap in policies possibly influences knowledge fragmentation as portrayed by student-teachers. Nziramasanga (1999:10) observed that educational expansion in provision and access put pressure on resources, which led to the production of students deficient in relevant practical training skills because the curriculum was largely academic and theoretical. This anomaly could be due to the general knowledge fragmentation in teacher colleges. Murwira (2020:2) cited Zimbabwe's National Critical Skills Audit Report (ZNCSAR) that arose from a government commissioned audit that revealed that, although the national literacy rate was 94% in Zimbabwe, the national skills levels were at 38% in

2018. The report categorises the critical skills into engineering and technology, natural and applied sciences, business and commerce, agriculture, medical and health sciences, as well as applied arts and humanities with all revealing critical skills deficits except for business and commerce (MHTESTD, 2018:vi). These observations possibly spurred the amendment of the Manpower Planning and Development Bill to promote research and develop human capital for all sectors through universities, polytechnics, science and technology institutes and teacher colleges (Murwira, 2020:3). However, such noble intentions may be wasted if all these stakeholders, particularly student-teachers, compartmentalise their knowledge and operations.

2.4.3 International Conventions and Agreements

Apart from the national policy guidelines, Zimbabwe is a party to international conventions and agreements that stress cooperation and relevance among other pertinent issues (MOPSE, 2015:14), for instance, it is a signatory to the UN's SDGs. The SDGs are part of the United Nations 2030 Agenda for Sustainable Development agreed upon by 193 countries in September 2015 as a collection of 17 interlinked global goals to transform the world (Fritz, See, Carlson, et al, 2019:923; Shava, Chasara & Hahlani, 2021:146; Webb, Holford, Hodge, Milana & Waller, 2017:509). This confirms that knowledge should merge as these policies and conventions feed into each other with the aim of uniting nations just as teacher college course subjects should combine to form holistically competent teachers out of pre-service teachers. The SADC Protocol on Education and Training identifies basic education, intermediate education and training, higher education and training, research and development, lifelong education and publishing and library resources (SADC, 1997:8-13) as areas of cooperation. Cooperation suggests merging ideas and expertise across these areas on the assumption that there are no stumbling blocks.

2.4.4 Generic Principles Guiding the School Curriculum in Zimbabwe

The Curriculum Framework for Primary and Secondary Education recognises the value of a holistic curriculum that incorporates policy provisions, international conventions and agreements as well as standard generic principles (MOPSE, 2015:14). This reflects integration, which sets an example of interdisciplinarity. One of the general principles controlling curriculum development and implementation is

that of balance, which “refers to the comprehensive development of all aspects of a personality (intellectual, emotional, social, psychomotor) for diversified teaching, learning and assessment” (MOPSE, 2015:14). This principle stresses holism that is attainable through knowledge integration which needs to be practised during teacher training. The other principle is integration, which “fosters meaningful linkages among learning areas and subjects that the curriculum offers” (MOPSE, 2015:15). The framework includes continuity which means the developmental sequencing of learning experiences to allow learners to build on previous experiences considering the level of their mental development.

The principle of relevance is about a curriculum that caters for the developmental needs of the learner, the community and the nation by addressing the real needs and issues and equips learners with global competencies for life and work (MOPSE, 2015:16). The principle of coherence entails clustering and sequencing of learning experiences for holistic and comprehensive learning towards sustainable learning progression. For example, operative links should be made between general and vocational education. All these principles advocate for knowledge convergence, but it seems this is hindered by social reasons.

Notably, the Curriculum Framework plainly specifies learner exit profiles at various levels in Zimbabwean education system. These describe knowledge, skills, values, attitudes and attributes that a learner should have acquired as a result of learning experiences. Learners are expected to have acquired all the outcomes, including problem-solving, critical thinking, leadership, communication and teamwork, and technological skills. The stress is on all skills, not one. Learners are expected to be knowledgeable in various literacies, content mastery and numeracy which emphasises integration (MOPSE, 2015:14-19). In contrast, Maravanyika (1990:16) indicated that colonial church policy by missionaries merely sought to “teach the natives religion and how to work but we do not teach them how to read and write”. Similarly, the British South Africa Company policy wanted “African education to develop along vocational lines, in order to train Africans in rural areas some trades and simple skills that would enable them to improve rural life, without aspiring to compete with Europeans for artisan jobs” (Maravanyika, 1990:16). According to Mugabe (2015), cited in MOPSE (2015:1), curriculum changes were necessary because Zimbabwe had inherited legacies of discrimination, a pyramidal structure in

education and differential investment in racially based education. As Maravanyika (1990:21) observed, education policies in the colonial era were guided by the need to preserve white economic, political and administrative interests against possible black competition. The colonial epoch promoted separatism of content and people which independent dispensation sought to correct through policies that clearly confirmed cultural hegemony evidenced in knowledge fragmentation.

Independent Zimbabwe continues to use and perpetuate cultural hegemony through education despite the 2015 curriculum revision efforts. The government controls the formulation and direction of curriculum change using the centre-periphery approach, which moulds the opinions of the educated (Gomba, 2018:79). Thus, authorities create artificial situations to keep people separate and apart. This is true considering the situatedness of knowledge as a product of the activity, situation and culture in which it is developed and used (Brown, Collins & Duguid, 1989:32). Generally, it seems that Zimbabwe crafts good policies but falters on implementation.

2.4.5 Higher Education Provision

Kariwo (2014:25) noted that Zimbabwean higher education has moved from a small elite system to a mass system considering that the University of Zimbabwe was the only university at independence in 1980 with 2 200 fulltime students. That scenario seemed to have created a superiority complex in the institution and its graduates as the only source and bearers of knowledge who were not to be contaminated by others who were not part of the elite. Arguing that higher education policies are a product of contexts, Kariwo (2014:26) observed that the current economic crisis has negatively impacted higher and tertiary education institutions (HEIs) and other sectors. Arguably, such factors may cause knowledge compartmentalisation in higher education, including teacher education.

In 2019, the Government of Zimbabwe promulgated Education 5.0 where universities' traditional three missions of research, teaching and community service were increased to five pillars (research, teaching, community service, innovation and industrialisation) in pursuit of the national ambition to attain middle-income status by year 2030 (Government of Zimbabwe, 2019; Wuta, 2022:26). The Minister of Higher Education, Professor Amon Murwira, revealed that University of Zimbabwe's Engineering Syllabus of 1974 was in use up to 2017 "because the feeling was it

cannot be tampered with” (Mlambo, 2019; Wuta, 2022:26). This hegemonic conservative mentality has caused HEIs to produce superficial graduates, incapable of innovating and industrialising the nation. To address this, Mlambo (2019) argued that students must be given an education that will mould them into well-rounded twenty-first century innovators, capable of productively serving the nation. On that basis, the nation’s higher and tertiary education sector is expected to scale up its efforts to innovate and industrialise Zimbabwe (Jaravaza, 2020). Jaravaza argued that there is a need for lecturers to transform their teaching if innovation and industrialisation are to be integrated in universities because Doctrine Education 5.0 does not separate research from teaching but brings it into teaching and learning (Jaravaza, 2020). The Minister of HTEISTD defended the philosophy arguing that it advocates for the use of “the most cutting-edge competitive STEM knowledge; knowledge from anywhere in the world but is applied in the local environment” (Tirivangana, 2019). Philosophically, this shows a plan to use knowledge beyond subject borders which should be the norm in education. Such articulation could be missing in teacher colleges; hence, the fragmented use of knowledge by student-teachers persists.

2.4.6 Teacher Education Provision in Zimbabwe

There is no system of education that can work effectively without a robust teacher education training plan because teacher quality determines education quality (Zvobgo, 1986:82). The colonial education system was used as an instrument of oppression which created conflict between the indigenes and white settlers (Siyakwazi, 2014:25) culminating in the overthrow of the latter in 1980. The African teacher training introduced through the 1929 Department of Native Development Act (Kimberly & Govere, 2003:146) led to teacher training by the state and church. Missionaries of diverse origins and backgrounds (Seventh Day Adventist, Roman Catholic, Dutch Reformed Church, Anglican Church, London Missionary Society, Salvation Army, Wesleyan, American Board and American Methodist) and the state antagonistically provided teacher education for competing ulterior motives (Siyakwazi, 2014:25). As a result, the 1925 Hadfield, 1951 Kerr and 1962 Judges Commissions concluded that this diversity was the underlying problem that caused teacher education to produce poorly trained teachers (Mandiudza, Chindedza & Makaye, 2013:124).

The chaotic nature of teacher education provision resulted in some college staff being ignorant of the syllabuses to be used by the student-teachers while others had little understanding of the context in which teachers in rural areas operated (Siyakwazi, 2014:4). Others responsible for certain aspects of courses had little or no knowledge of the work of their colleagues in cognate and other areas (Siyakwazi, 2014:4). It is likely that teacher education lacked a unified education policy as there were separate Departments of Education for Europeans and Africans coupled with discriminatory admission of lowly qualified students to teacher-training schools based on religion and church affiliation which excluded nonconformists (Siyakwazi, 2014:87, 89). Separatism seems to have dogged Zimbabwe even after independence. Thus, in 1988, the government created the Ministry of Higher Education responsible for university and college education (Kanyongo, 2005:66). This has led to confusion between the two resultant ministry (MOPSE and MHTEISTD), for example, regarding such curriculum issues as Continuous Assessment Learning Areas (CALA) that is an aspect of MOPSE but not in teacher colleges. Further confusion is reported on implementation of Education with Production (EWP) by Chitate (2015:47) and Maravanyika (1990:19) who maintain that it was poorly articulated by most implementers resulting in its varied misinterpretations and subsequent failure. For instance, its activities closely resembled the vocational F2 system of education that the Africans strongly objected to during the colonial era. In addition, a student's day was regimented, and activities were prescribed resulting in creativity and independence being 'criminalised' which conditioned student-teachers into passively accepting the roles that did not teach decision-making or critical-thinking abilities (Siyakwazi, 2014:92). Despite such blemishes, the system produced the epoch's intellectuals who were aligned to the oppressed populace and inspired the liberation struggle. However, in many respects, these liberation intellectuals assumed the deposed masters' stance including perpetuation of knowledge compartmentalisation.

The Department of Education introduced uniform examinations based on a prescribed syllabus as early as 1928 where student-teachers studied theory and practice of teaching and industrial work along with Vernacular, Arithmetic, English, Geography, History, Physical Exercises, Hygiene and School Method (Siyakwazi, 2014:94-95). Siyakwazi explained that only selected aspects were covered; for

instance, Vernacular included reading selected Bible excerpts, dictation and simple pronunciation while History focused on Rhodesia, South Africa and the British Empire in tandem with missionary objectives. The historical development of teacher education in Zimbabwe from 1928 to 1980 reveals that the churches' concern was more with their religious objectives than with the teachers' professional education and competence. On the other hand, the government's interest was in controlling African education and prescribing certain pedagogical strategies. This portrays fragmentation of interests that could have had a bearing on knowledge fragmentation in Zimbabwean teacher education. However, the spirit of initiating and experimenting with new ideas was undermined without regard for high quality education or coordination efforts to produce competent teachers.

According to Nziramasanga (1990:9), one new education policy at independence, the Zimbabwe Integrated Teacher Education Course (ZINTEC) launched in 1981 to train primary school teachers emphasised the transformation of teacher education. The integrated programme faced criticism and was abandoned as stakeholders clamoured for the conventional one with some calling it a dangerous experiment with learners. Today, Zimbabwean teacher education is still provided by the government and churches (at different colleges), under the DTE of the University of Zimbabwe (UZ) (Muasrurwa, 2011:952-953; Mudavanhu, 2014:31). Universities autonomously train pre-service teachers which allows them some freedom to innovate the curriculum. Under the scheme of association, the UZ is the accrediting institution mandated to oversee quality assurance leading to the issuance of a Diploma in Education (Colclough, Lofstedt, Manduvi, Maravanyika & Ngwata, 1990:57; Nyagura, 2015: v). The areas and content covered for all teacher colleges in subjects are generally the same, but colleges develop their own syllabi. Most college lecturers are holders of at least a first degree (Ministry of Higher and Tertiary Education, Science and Technology Development [MHTESTD], 2016:321). At universities, the situation is slightly different as each has its own teacher education programme, but, by and large, such programmes are similarly structured.

Although interdisciplinarity has been advocated for in policies and schools, it has not been addressed intentionally and concertedly in teacher education in Zimbabwe. During syllabus review sessions by the DTE, the focus seems to be exclusively on content but rarely on approaches such as interdisciplinarity. It is possible that due to

social drivers, the reviewers may have other ideas as they may also be products of a segmented education system. On the other hand, universities in the same teacher education business develop their modules and course outlines independently, which suggests a lack of coordination and collaboration. If knowledge integration is to bear fruit in schools, then interdisciplinarity should be evident in teacher education in Zimbabwe.

2.5 KNOWLEDGE COMPARTMENTALISATION IN ZIMBABWE

The then Ministry of Education, Sports, Arts and Culture, through Circular 2006, prescribed a general/academic and the business/commercial/technology/technical-vocational curriculum (Mandiudza et al., 2013:127). The prescription officialised compartmentalisation of knowledge and generated attitudes towards subjects in Zimbabwe. This resulted in practical subjects being looked down upon in some sections of society (Chiweshe, Edziwa, Jumo & Chakamba, 2013:892). Students and parents showed preference for traditional academic subjects over more practical and vocational ones because practical subjects are stigmatised and publicly scorned. Teachers, students and parents still believe that those who study technical subjects are not academically gifted. Even teachers who teach academic subjects enjoy some prestige while those who teach technical subjects (and commercials and arts too) are looked down upon together with the subjects they teach (Mandiudza et al., 2013:123). This has been worsened by certain denigrating terms used to describe practical subjects (Chiweshe et al., 2013:893). Accordingly, different subjects are perceived and regarded differently in Zimbabwe right from school to tertiary levels, which may promote knowledge fragmentation by student-teachers.

Another example of segmentation that possibly influences attitudes towards disciplinarity is making English an official and instruction language in Zimbabwe. English is elevated and categorically specified (together with other subjects) as a basic entry requirement (Nziramasanga, 1999:6). Admission requirements specify that the minimum entry qualifications are 5 'O' Level passes with Grade C or better, including English language, mathematics and science (Mkoba Teachers College, 2019; UZ, 2019; Great Zimbabwe University, 2017; Zimbabwe Standard, 2008). While this is a rational way of role selection and allocation on merit, it promotes certain knowledge and denigrates other. Thus, to pass 'O' Level in Zimbabwe, one

must pass at least five subjects including English language with a Grade C or better (Mano, 2001, as cited in Chiweshe et al., 2013:894). Passing 'O' Level English Language and Mathematics opens the gateway to further education for Zimbabwean learners because they cannot proceed to higher education with passes in other subjects only (Chiweshe et al., 2013:894). This practice creates attitudes towards different subjects in learners who may enrol in teacher colleges carrying disciplinary stereotypes and biases that make them resist interdisciplinarity.

The hegemonic conditions highlighted above have led to a significant drop in enrolments, raising concerns from some colleges about prioritising Mathematics and English for all courses even where these may not be of relevance (The Zimbabwe Mail, 2018). In reaction, the Minister of HTEISTD pronounced that Mathematics should not be a requirement for all programmes. He blamed inflexibility at universities, polytechnics and colleges characterising them as conservative institutions (disseminating cultural hegemony). He called upon the institutions to be more flexible with enrolment requirements to avoid cultural hegemony entrenched in rigid entry qualifications. According to him, this would promote academic freedom in tertiary institutions as sometimes certain subjects may not really serve the purpose to achieve the desired goals. Clearly, inflexibility and conservative attitudes could be among the social factors driving knowledge separation by student-teachers.

2.5.1 Harnessing Disciplinary Tribes

Whenever social needs arise, the tendency is to harness society's institutional capabilities to address the needs as happened during the eighteenth century when the spirit of science, commercialism, secularism and individualism accelerated in the Western world (Mcelreavy et al., 2017:3). Education, as a social institution, was called upon to satisfy the real needs of seamen, merchants, artisans and frontiersmen (Mcelreavy et al., 2017:6), which indicates the practical utility of disciplines. Those that yield the desired results are bound to be more celebrated than others. A society whose needs are met by particular discipline(s) is likely to incentivise the discipline(s) and its members with prestige as evident in Zimbabwe where some subjects are recognised and promoted more than others. This promotion of certain subjects has seen the advocacy for the Science, Technology, Engineering and Mathematics (STEM) programme, but not Commercials and Arts at

high school level. Due to this promotion, the Zimbabwe Manpower Development Fund (ZIMDEF), alongside support from other stakeholders often pays full tuition and boarding fees exclusively for students who study for qualifications in the STEM programmes (Chitate, 2016:32; Dekeza & Kufakunesu, 2017:12, 14). This potentially creates antagonism among the students studying the differently stereotyped subjects. Advertisements and programmes eulogising STEM subjects are often aired over the radio, on television and in print media accompanied by “STEMITISATION for addressing social and national economic challenges” and “IF WE STEMITISE, WE INDUSTRIALISE” slogans on roadside billboards testifying the high status given to the sciences.

In their diagnostic study of the STEM programme in Zimbabwe, Gadzirayi, Bongo, Bhukuvhani and Ruyimbe (2016:16-17) asserted that the preferential treatment of these academic subjects was a design by the government so that learners developed an appreciation of Science and Mathematics. Sadly, appreciation of one area may produce defective scientist, for example, ones who misuse science for destructive or harmful agent as because they may lack consciousness developed from the other areas. Furthermore, Ndlovu (2018) highlights this promotion when he cited the Minister of HTEISTD announcing that the training of secondary school Science and Mathematics teachers was to be stepped up at Mkoba, Joshua Mqabuko Nkomo and Masvingo Teachers Colleges. Moreover, the Zimbabwean government agreed to incentivise mathematics, science and technical-vocational teachers based on the notion that only STEM subjects had industrialisation potency. The like-minded in the functional discipline(s) are revered while those considered of little use are not. The difference in utility may widen the rift between disciplines and members, yet all could be engaged collaboratively. For instance, STEM education itself is an integrated, interdisciplinary principle to teaching and learning (Gadzirayi et al., 2016:1) that has the capacity to generate ideas that are usable for innovative economic products and services. The same is also possible with all the other subjects across the curriculum.

2.6 COMPARTMENTALISATION OF THE TEACHER EDUCATION CURRICULUM IN ZIMBABWE

In Zimbabwe, teacher education, disciplines are compartmentalised into Sections 1, 2, 3 and 4 representing TP, TOE, Main Study/Academic Study and PS, in that order, meant to prepare student-teachers holistically for effective teaching and learning (Mavhunga, Mavundutse & Mamvuto, 2008:94; Mavundutse et al., 2014:3-4; UZ, 2015:26). Although curriculum structures at universities may be different, there are similarities in most of the disciplines. Compartmentalisation into the four distinct sections was a result of various committees and workshops from 1974 to 1988 (Chiromo, 1999:59; Mavhunga et al., 2008:94), which indicated the underlying wrangles.

2.6.1 Disciplinary Sections in Zimbabwean Teacher Education

Organisationally and conceptually, the discrete and unrelated courses making up Professional Studies arose from the clear otherness created between Education Studies (another name for TOE), Subject Studies (now Main Study), PSA, B, C & D) and School Experiences (TP) (Mukorera, 1999:35). Mukorera indicated that this distinction has led most student-teachers to perceive their course's theory and practice components as unrelated and has instigated the compartmentalisation of the teacher education curriculum. Some teacher educators also assumed that one only needed a thorough knowledge of the subject to teach well, yet others thought that a competent teacher needed an understanding of children and appropriate classroom skills (Mukorera, 1999:38). These perceptions seem to indicate the social roots of knowledge fragmentation.

The structural organisation presents the clusters as divorced and incompatible. The main teaching subject is viewed as providing personal education and CK of teaching a subject in the classroom. Similarly, TP is taken to test the teaching skills, while TOE provides theoretical knowledge. The distinction has promoted fragmentation that is blamed upon lecturers and discrete compartmentalisation (Mudavanhu, 2014:221-222). The reality is that the fields are like the constituency of a dish that requires that all elements be served at once because to pass the teacher training programme, candidates should satisfy examiners in the broad areas (TOE, PS, MS and TP) of teacher education competence (UZ, 2015:15).

According to Mukorera (1999:37), the organisation of teacher training programmes compartmentalises the components constituting the Zimbabwean teacher training. The programme may fail to promote holistic development of student-teachers, their academic work and the learners they teach since the success of the system of education depends on its teachers' competencies in translating theory into practice in schools (Colclough et al., 1990:58). Student-teachers cannot be competent if they only know a part of what makes competent teachers. Arguably, a compartmentalised curriculum results in student-teachers who acquire a fragmented and distorted view of a course programme, which subsequently informs their practice, and perpetuates and reinforces existing divisions (Ottewill, McKenzie & Leah, 2003:3).

The general trend in Zimbabwean teachers colleges reveals that curriculum areas covered are similar across the sector. Reporting on Teacher Education Curriculum Review, Chivore et al. (2015:90) found that professional subjects offered are PS that include Syllabus A, Syllabus B, Syllabus C and Syllabus D, TOE and Main Studies. They also found that TP covered the schemes, content and structure of a course, planning, monitoring and evaluation, record keeping, instructional media, community development and core curriculum activities. Notably, they indicated that among PSBs, TOE and PS Syllabus A, there were areas with duplication that included educational administration, monitoring and evaluation, educational management and others (Chivore et al., 2015:91). The duplication shows the relevance of interdisciplinarity. However, duplication should not be used as an excuse to hide other areas but should be a great opportunity to integrate them. The Chivore review found that student performance was celebrated though it noted several factors that affected it, including human, material and financial resources (Chivore et al., 2015:227). However, it was found that the absence of harmonisation led to situations where some teaching subjects offered at some colleges were not offered in schools. As a result, during TP, some student-teachers did not practise the subjects of their specialisation due to negative attitudes towards technical and vocational education in schools (Chivore et al., 2015:257).

2.6.2 The value-laden nature of Zimbabwe teacher education curriculum

Mukorera (1999:38) contended that the value-laden nature of the areas lies in their traditional divisions such as TOE and TP. Mukorera argued that the division had

placed MS at the top of the hierarchy while PS is less valued on the conception that it lacks the rigour of theory and the relevance of practice despite its mediating role between all other subjects and TP. Consequently, PS has tended to be seen as theoretically disrespected and practically invalid while TOE takes the central position of attention. Thus, “For most students, what they perceive as the theoretical and practical components of their courses seem unrelated” (Mukorera, 1999:38). This study sought to find out why students reached this perception.

Furthermore, Kasembe (2011:344) blamed a lack of deliberate effort to infuse Science, Technology and Society (STS) on the teaching methods course for teachers. Treating disciplinary knowledge as unrelated may divide academic institutions along disciplinary groupings and shape academic identities and careers (Becher & Trowler, 2001:41; Ottewill et al., 2003:6). For example, segmentation is viewed as responsible for rank-ordering areas resulting in some subjects being more powerful than others in institutional politics. Mukorera (1999:39) pointed out that lecturers under TOE and MS are more recognised than those in other clusters because most of them are former secondary school teachers who are subject specialists with a secure professional identity as they possess the most universal currency. On the same note, Mavundutse (2004:14) observed that both lecturers and students often describe some sections as the “backbones of the course” that must be passed at all costs. This endorses some course sections but denigrates others and possibly fuels compartmentalisation. This could be the reason why Davies and Devlin (2007:2) contend that traditional categorisation of the university’s organisational and pedagogical structure limits the range of possibilities as the discrete, self-sufficient and bound subjects cannot address all social issues.

2.7 INTERDISCIPLINARITY IN ZIMBABWEAN TEACHER EDUCATION

Although the Education Act of 1987 amended in 2007 seems silent on integration (Dambudzo, 2015:15), the use of ICT, the new curriculum subjects and cross-cutting issues point towards interdisciplinarity. In a study on teaching for sustainable development in developing countries, Dambudzo (2015:23) found that while Zimbabwean schools had the same curriculum document to follow, integration with the environment and industry, and developing competences when teaching was erratic. There seems to be no deliberate effort to move from knowledge

compartmentalisation to interdisciplinarity in Zimbabwe (Kasembe, 2011:344), and no study seems to have focused on why this is so.

In a study on interdisciplinary learning, Kidron and Kali (2015:13) conjecture that interdisciplinary understanding involves a deep understanding of disciplinary concepts and the ability to see connections between different disciplinary ideas. A good example of promoting interdisciplinarity is through establishing cross-cutting themes in teaching-learning. For instance, the 2015 Zimbabwean revised English Language Syllabus for Forms 1 to 4 (that is Grade 8 to Grade 11) addresses the topics of gender, children's rights and responsibilities, disaster risk management, sexuality, HIV and AIDS Education, child protection, heritage studies, human rights, collaboration, environmental issues, financial literacy and communication and the use of ICT, as cross-cutting themes to be considered through selected texts, projects and assignments (MOPSE, 2015:5). This is one way of helping learners to see disciplinary relationships for integration. However, since this is not covered adequately during teacher training, integrating different themes is often difficult for teachers as implementers of the curriculum. No wonder that some student-teachers, after studying ICT, still hire the services of typists for their assignments instead of doing this themselves.

Staples (2005:10) posited that amalgamation of interdisciplinary studies develops in students "advanced thinking skills leading to discovery and real-world problem-solving". This view is in tandem with teaching-learning where the focus is on nurturing thinking skills in dealing with real-life social challenges. This is possible if the facilitators use all the knowledge at their disposal by linking it where applicable. They can reach more informed decisions and create a context for their own learning (Carmichael & LaPierre, 2014:60) through interdisciplinarity to learn something new or peculiar in their experiences, contexts and needs. Carmichael and LaPierre further stated that integration produces a real-world environment where individuals take in various pieces of information from disciplinary sources and combine them in different ways to reach conclusions. Various aspects of knowledge are looked at through multi-coloured disciplinary lenses and the sight is a beautiful, breath-taking knowledge landscape deployable in the knowledge economy for goods and services. This is possible if student-teachers are equipped with integration skills.

Teacher training is a professional procedure that prepares teachers to serve society in various capacities, for instance, as administrators, trainers and supervisors (Saif et al., 2017:272) and act *in loco parentis*. The teacher education curriculum is composed of the knowledge, skill and ability that are important for teachers who occupy an important position in the education system of any society (Saif et al., 2017:279). Through the curriculum, together with structural organisation of college programmes, student-teachers are holistically developed into professionals. This should be possible as teacher education programmes in Zimbabwe have a structural organisation indicative of IKI. In this regard, Mukorera (1999:27) notes:

The academic subjects supply personal education and knowledge of the teaching subjects. Professional Studies deals with the knowledge of teaching subjects at school level with some of the related executive skills..., which are acquired and tested through school experience and Teaching Practice. Theory of Education provides the educational processes as opposed to the everyday common-sense knowledge acquired through Professional Studies and Teaching Practice.

Clearly, teacher knowledge is a product of GPK and CK. Knowledge from academic subjects is central to teacher education and links to the theory-practice debate. Each subject has a momentous role to play in teacher development in Zimbabwe. The knowledge, skills and abilities relevant and crucial for teachers (Saif et al., 2017:279) are drawn from all these components of the college curriculum to develop professional competence. Professional competence covers subject competence, subject application, class management, assessment and monitoring of learning and further professional development (Mukorera, 1999:42). This would be attainable if student-teachers were released from an ensnaring segmented disciplinary “cage of limitations” (Kizel, 2016:5) towards the wholeness of integrated knowledge proffered by interdisciplinarity.

Despite advocating the prominence of PS as a key element of teacher education at the heart of the diploma in education programme, Mukorera (1999:48) called for the integrated approach to PS. He further explained that integration involved departing from compartmentalised courses to coordinated core and optional courses in the teaching-learning processes. Mukorera clarifies the concept of integration as

supported by the idea of the wholeness of knowledge that accepts the distinctiveness of various disciplines while concurrently recognising their interconnectedness. Arguably, wholeness in PS only may be incomplete and deficient.

The teacher training programme that culminates in the award of a diploma in education consists of various subjects, whose knowledge should jointly address teacher training. The knowledge should be used in an integrated way. In the process, this may inspire student-teachers to reason across, beyond and through academic disciplines to involve all types of knowledge about ideas, issues and topics (Ertas et al., 2003:289). This convergence of disciplinary power, according to Park and Mills (2014:300), offers possibilities for richer learning, spanning across the length and breadth of theoretical knowledge to practice.

2.8 THEORY AND PRACTICE IN ZIMBABWE

Once student-teachers have completed their residential stint, the assumption is that they are armed with the requisite teacher knowledge (GPK and CK) as baseline skills and are ready to deploy such during TP. However, Korthagen et al. (2006:1020) and Mhlolo (2014:34) agreed that compartmentalisation may account for the failure to discern the theory-practice nexus.

The scenario may be the reason behind the mismatch between Zimbabwe's claim to high literacy rate and expectations. Based on the survey by Zimbabwe National Statistics Agency (Zimstat), Zimbabwe's literacy rate stands at 94 % and is rated the highest in Africa (Moyo, 2018; Mudavanhu, 2014:29). However, it does not seem to translate into social, political and economic development as one would expect. In fact, there appears to be more social fragmentation and problems than unity and progress expected of an educated and rational population sharing a common vision. This messy situation could be linked to the discord between book learning, education, theory on the one hand, and practice on the other. The disharmony emanates from compartmentalisation of disciplinary knowledge characteristic of the colonial education system. The former late President Mugabe described it as discriminatory, pyramidal structured and unequally invested in and carved along separatist racial lines (MOPSE, 2015: i). The system is blamed for its contextually detached knowledge transmission that is not related to the production of goods and

services. Knowledge that does not result in goods and services is not useful in helping Zimbabwe to become competitive, industrialised and modernised by 2030 (Murwira, 2019). The discord between book learning (theory) and education (practice) arguably comes from compartmentalised knowledge traceable to teacher education.

The discord could have been noticed when policy directive B/14/6 OF 2001 from the Ministry of Higher Education and Technology (MOHET) (2001) mandated the design of a new primary teacher education programme unifying and harmonising teacher education programmes in the country. The initial focus was to unify the national diverse teacher education programmes and increase enrolments (Mswazie & Gamira, 2011:411) resulting in the teacher education programme called 2-5-2 model that required student-teachers to spend the first two terms (6 months) of programmes in college learning theory, five terms (15 months) on TP in schools and the last two terms back on campus. The TP component was prolonged from one year to a year and a half. All colleges would be required to teach mathematics to those students who had been enrolled without mathematics (MOHET, 2001, Mswazie & Gamira, 2011:412). The implementation of the policy generated acrimony and controversies among participants pitting the DTE of the UZ as the supervising and certifying authority against teachers' colleges and schools on the interpretation of the policy.

A memorandum from the DTE to teacher colleges seemed to have shifted the focus from unifying primary teacher education programmes to improving the quality of primary teacher education (DTE, 2001; Mswazie & Gamira, 2011:412). The intention of Policy B/14/16 of 2001 to unify primary teacher education programmes in Zimbabwe was partially accomplished due to policy goal ambiguity and competing interests among other factors. DTE placed more emphasis on the managerial aspect of the project leaving out the ideological, philosophical and pedagogical foundations of the programme (Mswazie & Gamira, 2011:420). The theoretical views were not actioned which could have negatively influenced downstream activities towards disciplinary integration. This shows that knowledge is situated, contextual and has a viewpoint that reflects particular perspectives of originators and knowers who are bound to defend it. Knowledge is embedded in language and culture. According to Haraway (1988:581), no importance is given to a certain insight whether from an

outsider or an insider perspective since all the interactions necessary for such knowledge production are power-related.

Power at play also manifests in decisions regarding who gets what knowledge and how. For instance, the secondary diploma in teacher education has different time requirements depending on subject specialisation and entry level (UZ, 2015:15). In this regard, post 'O' Level holders enrol for a three-year academic programme, while post 'A'-Level holders undertake a two-year academic programme. Post 'O' Level holders with requisite National Diploma (ND) qualification pursue a 16 to 20-month methodology programme to teach technical subjects and Agriculture. Such decisions have ramifications for the programme, content and student-teachers. One such consequence is knowledge fragmentation by student-teachers that lead to a theory-practice dichotomy.

The theory-practice interplay is synergic because student-teachers learn educational theory that they later practise in school settings during TP (Mudavanhu, 2014:90). However, that link could possibly be missing as a result of disciplinary knowledge compartmentalisation (DHET, 2011:6). There are some contestations that may limit the extent to which teachers use additional materials over and above the prescribed official school books due to knowledge sensitivity at local and national levels, which results in a culture of silence (Sigauke, 2012:214). The contestations compromise interdisciplinarity. Teacher education involves more than merging theory and practice. It can be conceded that there are contradictions between the two because, despite being aware of the need for TOE knowledge, teachers are unable to make it part of their regular practice (Mudavanhu, 2014:23). According to Mudavanhu, this is because the college is de-contextualised and differs from the practice context. This can be interpreted to mean that knowledge in teacher colleges is compartmentalised while the practice context demands knowledge integration. It is also likely that some lecturers fail to give prospective teachers the requisite tools for practice. They may prevent students from developing such tools through compartmentalised orientation and perceptions of some subjects as more important than others (Mudavanhu, 2014:221-222). For instance, there is a perception that academic subjects (English, Mathematics and Science) are better than practical subjects (Home Economics, Agriculture, Art, Music, Physical Education and Commercials). Such perceptions are

value-laden and may be due to cultural hegemony that tries to promote some subjects, although all subjects have something to contribute.

Historically, the closest resemblance of interaction between theory and practice in the Zimbabwean education system took the form of production EWP. It was designed that school experience should marry theory to practice (Chiweshe et al., 2013:896). It emphasised the application of basic skills to production work through theory-practice marriage, yet the continuous domination of academic and examination-oriented education system is one of the factors that led to its failure (Nherera 1994 & Zvobgo, 1994, cited in Chiweshe et al., 2013:896). Moreover, the negative perceptions of practical and commercial subjects doomed the theory-practice nexus to failure. These subjects are characterised as unacademic. From this perspective, knowledge compartmentalisation seems to influence the quality of teacher education practices in Zimbabwe to the point of hindering interdisciplinary presentation of course content, knowledge integration and the marriage between theory and practice.

2.9 CHAPTER SUMMARY

This chapter reviewed literature related to compartmentalisation of knowledge, starting with Gramsci's cultural hegemony theory that guides the research. The theory postulates that the ruling bloc uses consent and force to maintain dominance over subalterns. Consent, which is of interest to this work, originates from civil society where the dominant ideology creates a collective experience (worldview) using culture as a tool to naturalise social inequalities. The state and civil society, according to Gramsci, collaboratively engage cultural institutions to achieve hegemony. Other neo-Marxists reviewed included Louis Althusser, Michael Young, Samuel Bowles and Herbert Gintis, and Karl Mannheim.

The chapter also considered the historical development of education generally, and particularly teacher education in Zimbabwe in relation to knowledge compartmentalisation. It considered the compartmentalised nature of the teacher education curricula's possible influence on the divorced utilisation of knowledge by student-teachers. The next chapter looks at compartmentalisation and interdisciplinarity from international perspectives.

CHAPTER 3

A HISTORY OF EDUCATIONAL PHILOSOPHY AND INTERDISCIPLINARITY

3.1 INTRODUCTION

The previous chapter reviewed Antonio Gramsci's cultural hegemony theory literature that guides this exploratory study of the social forces behind knowledge fragmentation by student-teachers. It showed that domination and leadership are maintained by one social group over others by means of naturalised ideology or culture transmitted through social institutions. The literature showed that the domination was facilitated by civil society as the realm of consent, through private relations and activities entered into unwittingly by people living under the state. Other neo-Marxists reviewed are Luis Althusser, Michael Young, and Samuel Bowles and Herbert Gintis.

Disciplinarity and interdisciplinarity in Zimbabwe were also covered together with colonial and post-colonial educational policies. The theory-practice nexus was the last aspect to be reviewed because student-teachers learn educational theory to be practised in school settings during TP (Mudavanhu, 2014:90). From the review, it emerged that there was very little coverage on interdisciplinarity in Zimbabwe (Dambudzo, 2015:23). This chapter looks at international perspectives and the history of educational philosophy on compartmentalisation and interdisciplinarity.

3.2 THE HEGEMONIC NATURE OF COMPARTMENTALISATION INTERNATIONALLY

Billingsley and Ramos (2017:44) defined compartmentalisation as “the creation of rigid boundaries between subject disciplines that make it difficult, if not impossible, for students to bridge those disciplines”. It refers to fragmentation of knowledge into subjects which emerged in the western academy and is accepted by society as is normal in the wider society (Kirshner & Merrienboer, 2007:245) reminiscent of Gramsci's cultural hegemony. It has led to specialised, narrow partitioning of knowledge that blocks the production of meaningful and valuable knowledge (Hellman, 2015:345-346). Billingsley, Nassaji and Abedin (2017:27) found that the practice stifles student curiosity and inquisitiveness, leaving students with knowledge gaps, confusion and misconceptions about scholarship and a lack of epistemic

insight. According to their findings, compartmentalising subjects is supported by subject-specific curriculum documents, examinations and teacher education. In secondary schools, it is perpetuated by recruitment of specialist teachers and allocation of classrooms to specific subjects. Such entrenched compartmentalisation can be resolved through integration in an interdisciplinary manner. Unfortunately, according to Hannon et al. (2018:1428), there has been little attention to institutional processes with regard to interdisciplinary education. Ignoring the influence of institutional processes in sustaining compartmentalisation may be a result of Gramsci's cultural hegemony that has naturalised the arrangement. In themselves, the institutional processes are ideological because social institutions transmit ruling-class ideas that are consented to by the subalterns (Herrmann, 2017:1).

Metaphorically, Becher (1994) described the cultures of academic disciplines as 'tribes and territories' existing in a turbulent environment (Trowler, 2014:18). Such an environment is fertile ground for cultural hegemony and conflict. The good thing is that the traditional academic hierarchy based on the levels of expertise is reversible by breaking boundaries leading to different (yet related) disciplines integrating (Kidron & Kali, 2015:749). For example, John Bowlby's attachment theory on parental relationships' powerful impact on the personality of children (Scharfe, 2017:2) in Psychology of Education, posits that pre-service teachers can integrate this theory with the concept of primary socialisation in Sociology of Education in response to questions demanding analysis, examination, evaluation and assessment. To remedy secularisation requires an understanding of how "scientisation" in education and society has turned Aristotle's deductive method upside down so as to reorder the academic disciplines (Park, 2013:536).

Compartmentalisation of academic disciplines is strongly believed to be behind academic institutions' division of subjects on the grounds of disciplinary groupings that shape academic identities and careers (Becher, 2006:151-152). The diversity of academic disciplines that account for knowledge is punctuated by similarities and differences. This can create animosity as a significant outcome of the omnipresence of tribalism in academe is the process of sub-disciplinary specialisation, which hinders integration (Becher & Trowler, 2001:45). As Billingsley et al. (2017:31) notes, girls' learning preferences are squashed by deep-rooted compartmentalisation. While Ehn (2009:1) celebrated specialisation for making sure that people can use

individual differences, both genetic and learned skills, there is also an intrinsic risk with specialising as it divides knowledge between individuals. Disciplines are broken into subjects for specialisation and convenience in organising teacher education. The division into subject categories, clusters, faculties or disciplines may be for simplifying and clarifying the task of teaching and studying, but it results in the creation of academic tribes. The dysphemistic reference to tribalism in academe is worth a closer look to comprehend student-teachers' initiation journey into disciplinary cultural hegemony.

3.2.1 Compartmentalisation and Tribalism

The term tribalism is defined by Nothwehr (2008:5) as the attitude and practice of nursing strong feelings of loyalty to one's people by excluding or demonising others in discrete ways that include the use of force and ideology. It entrenches social segmentation, hatred, mistrust and antagonism. Just as tribes compete for superiority and scarce resources, so do academic tribes because specialised narrow compartments compete for value, sovereignty and relevance in understanding society (Hellman, 2015:345). In Becher's (2006:151) words, antagonism between subjects is engineered and exacerbated by subscribing to different disciplines because universities are made up of different academic tribes that operate as "a community culture" where:

Each tribe has a name and a territory, settles its (*sic*) own affairs, goes to war with others, has a distinct language or at least a distinct dialect and a variety of symbolic ways of demonstrating its apartness from others. Nevertheless (*sic*) the whole set of tribes possess a common culture: their ways of construing the world and the people who live in it are sufficiently similar for them to be able to understand, more or less, each other's culture and even, when necessary, to communicate with members of other tribes. Universities possess a single culture which directs interaction between the many distinct and often mutually hostile groups (Bailey, 1977:212).

In light of this, it is necessary to explore the social factors that fuel exclusive disciplinary tribalism and hostility. Interdisciplinarity, like reconciliation and unification that heal tribal discord sowed through education (Ashimolowo 2007:271; Baloyi,

2016:43; Baloyi, 2018:3), may be the panacea to academic tribalism that is detrimental to the twenty-first century knowledge economy.

It is highly possible that student-teachers are not predisposed to use knowledge across subject boundaries because of the compartmentalised nature of subjects. The value-laden arrangement has the potential to mislead them into assuming subject incompatibility. In the end, their answers become lean, scanty, impoverished of breadth and depth, and imprecise because of cultural hegemony as the students may stick rigidly to some disciplines. Contributing to the debate on the science of learning and development (SoLD), Darling-Hammond, Flook, Cook-Harvey, Barron and Osher (2019:97) observed that integrating insights across various fields, from the biological and neurosciences to psychology, sociology, developmental and learning sciences, and linking them to the knowledge of efficacious approaches that emerge in education is effective. Some subjects culturally dominate others and that may promote knowledge fragmentation by student-teachers as subject communities are comprised of competing factions that experience contest and conflict within themselves and with other communities just as social movements do (Jephcote & Davies, 2007:207).

Instead of disciplinarity, interdisciplinarity is preferable. The association between subjects is theoretically represented as sections and social networks that are involved in negotiating new coalitions and rationales as an expose of the skewed relationship between what counts as education versus power and control (Goodson, 2006:61). Goodson contented that the shape and content of the curriculum are products of continuing struggles. The struggles involve an interplay between power and control that reflects deep-rooted traditions that tend to reinforce the arbitrary division of knowledge into discrete disciplines. In the end, differentiation of subjects leads to differentiation of lecturers and student-teachers. For example, the reverence given to ICT staff and students may be different from that given to vernacular languages (ChiShona, IsiNdebele or Venda) ones. This reflects the ideas widely held by society regarding the despotic division of knowledge into knowledge pockets called subjects. This has the potential to promote the fragmented use of academic disciplines by pre-service teachers.

3.2.2 Academic Discipline

An academic discipline is the accrued information, knowledge and wisdom of humans that is broken down into disciplines and sub-disciplines (Vashishtha, 2014:74). Davies and Devlin (2010:16) defined it as a self-contained and secluded domain of human experience with its own community of experts, a peculiar constellation of distinctive components such as goals, skills and concepts. They go on to say that each discipline tends to end up becoming a conviction that it is the foundation for all learning that comprises distinctive, particular, and unique academic and social styles. Deductively, academic disciplines are special collections of human knowledge that are split into subject groups for rigorous study. The grouping could spell disaster for interdisciplinarity as disciplines clamour for dominance resulting in the permeation of cultural hegemony, for instance, TOE may desire domination over PSA or TP.

Disciplines and their members are likely to keep distance between themselves if the contrasts are emphasised. Becher's (1981:110) satirical characterisation of disciplines and their members is relevant here. He maintained that the cultures of disciplines and their practitioners describe historians as erudite, committed, patient and well-ordered, but narrow, bookish, dusty and foggy, while sociologists are seen as highly politicised, guilty of brainwashing students and "very left". Lawyers are viewed as not really academic but "arcane, distant and alien, an appendage to the academic world", and physics is somewhat grudgingly admired as "the extreme of pure science" because it is precise, clearly defined and deals in pure ideas but has little relevance to everyday life (Becher, 1981:110). As a result, its practitioners are often isolated from other academics as "boffins living in a Cloud Cuckoo Land" who "talk in jargon, look for certainties and wear white coats" (Becher, 1981:110). Biologists are described as fascinating, serious, committed and diligent, patient experimenters, "ethereal folk who spend time cutting up flowers and being very delicate" and the discipline is seen as less difficult and less interesting (Becher, 1981:111). The engineers are viewed as practical and pragmatic and respected for being "in touch with reality", but mediocre, unacademic, "not very clever", and as politically naive and uncultured "technocrats with no refinement" (Becher, 1981:110-111). These characterisations depict cultural hegemony stereotyping, bias and antagonism

depending on one's standpoint, regardless of the contributions made by each, which may influence the student-teachers to shun and resist interdisciplinarity.

The above anecdotes suggest that through the eyes of others, the profiles (or silhouettes) of the academic subjects are noticeably dissimilar (Becher, 1981:111). They all have different traits, positive and negative, that may court hatred and disdain or even scare others away from trespassing in attempts to integrate ideas. For example, student-teachers specialising in home economics may be afraid to wander into science even when it is relevant and beneficial. Similarly, mathematicians may shun borrowing ideas from social sciences, which they may regard as less rigorous. The rude, hostile, ideological and hegemonic differences reflect negativity and indicate strained relationships between the 'tribes' while other descriptions are high-sounding eulogies. These characterisations may promote fragmented us of knowledge and antagonism in teacher education. The subjects that share some knowledge similarities are grouped together to form departments which are, in turn, connected to professional associations. For example, in Zimbabwe, one teachers' college has Professional Foundations, Mathematics, Science and practical subjects, and humanities and contemporary studies as departments that operate in absolute isolation. Those subscribing to these departments may form exclusive associations, embedding Becher's "academic tribes" (Coughlan & Perryman, 2011:11). In the absence of disciplinary arrogance, disciplines could provide the steppingstones towards interdisciplinarity. A consideration of how disciplines came into existence may be helpful to appreciate their compartmentalised nature, and the need to decompartmentalise, regroup knowledge and integrate it.

3.2.3 The Hegemonic Traces in the History of Academic Disciplines

If it is accepted that knowledge is one body, it intrigues one to want to understand the origin of disciplinarity because that could be a source of cultural hegemony. The genesis of disciplines is traceable to Aristotle when the universe was viewed as naturally one and philosophy was not categorised and Plato taught rhetoric and religion (Mcelreavy et al., 2017:6). However, philosophy's aesthetics, epistemology, ethics, logic and metaphysics could not account for phenomena scientifically, which necessitated knowledge compartmentalisation to access the breadth and depth of all knowledges of the universe (Ramiz, 2016:313-314). The advent of the Scientific

Revolution in Europe, from the sun-centred cosmos of Nicholas Copernicus (1473-1543) to the universal laws of Isaac Newton (1642-1727) and the popular television series of the Mechanical Universe to the Big Bang Theory of Stephen Hawking (1942-2018) of how the universe began as a small singularity, but inflated over years to the cosmos that we know today, initiated knowledge segmentation (Jorink & Maas, 2012:228, Steiner, 2006:246) The differences in perceptions by proponents could have bred animosity and confrontation in pursuit of dominance of some groups' ideas over others as scholars began to question long-held truths. The same trend could be manifesting in teacher colleges in Zimbabwe.

Enlightenment thinkers dominated the Age of Reason that promulgated reason, science and categorisation of almost all things into disciplines (Goldmann, 1973:3). Ideas that dominated Enlightenment thought included rationalism (use of the cognitive faculty of reason to gain knowledge), empiricism (the view that knowledge comes from experience and observation of the world), progressivism (the belief that through powers of reason and observation, humans can make unlimited linear progress over time) and cosmopolitanism (that reflected enlightenment thinkers' view of themselves as actively engaging citizens of the world as opposed to provincial and closed-minded individuals) (Goldmann, 1973:3). Prominent figures of the era include Charles Darwin, Isaac Newton, Galileo Galilei, John Locke, Francois-Marie Arouet Voltaire, Auguste Comte and Rene Descartes among others (Beach, 2013:76). During that period, disciplines emerged and began to be split into sub-disciplines that continue to experience further fragmentation. The period instigated revolutionary developments in art, philosophy and politics as people celebrated reason in understanding the universe to improve their lives through rationality, knowledge, freedom and happiness (Berlin, 2017:4). It seems, however, that the segmented knowledge still fails to explain all social phenomena that could be achieved through integration.

According to Vashishtha (2014:84), Aristotle founded his Lyceum in 335 BC in Athens, similar to the Academy but it was wider in intellectual scope. The Lyceum covered music, botanical classification, biology, anthropology, ethics, law, logic, metaphysics, physics, politics, psychology, poetry and rhetoric (Vashishtha, 2014:85). This launched western knowledge on a route toward disciplinarity that endures to this day. However, this study advocates that interdisciplinary knowledge

is essential for creativity and innovation because, as Frodeman and Mitcham (2007:506) posits, dividing knowledge into separate disciplines hindered creativity, knowledge creation and problem-solving. Therefore, the ideal situation is to socialise student-teachers into interdisciplinarity of TOE, MS and PSA and TP. The theories in TOE should influence PSA methodologies in presenting MS content during TP. In other words, GPK directs CK in practice. Thus, while teaching Religious Studies (MS) on religions, student-teachers should be informed by sociology's multiculturalism to avoid 'otherness'. This integration sets subjects free allowing for knowledge creation, creativity, problem-solving through teaching, research, community engagement, innovation and industrialisation as espoused by Zimbabwe's Doctrine Education 5.0 (Muzira & Bondai, 2020:43).

Interdisciplinarity is appealing because disciplinarity is seen as the basis of the divide-and-conquer strategy of modern natural science (Frodeman & Mitcham, 2007:507). The strategy, this study projects, had an impact on all other subjects and those subscribing to them, thus, fragmented knowledge as they battled for dominance due to cultural hegemony.

Mcelreavy et al. (2017:4) acknowledges the historical existence of disciplines in fluid and unlabelled form. It seems that labelling disciplines was meant to conveniently organise knowledge and facilitate in-depth study of the world. Geuss (2009:2) submitted that the goal of disciplinarity is to learn to deal with the world by recognising its recurrent regularities. That goal should be exploited by student-teachers in their quest to become competent and successful by merging all course subject knowledge to deal with coursework and teaching-learning. This can be done by infusing theories from TOE in writing assignments or examinations in PSA, MS, scheming and planning, and so on. For instance, in an assignment on the relationship between leadership styles and learner performance, student-teachers may merge ideas from leadership styles from educational administration, academic achievement from sociology of education and psychology of education supported with practical examples from different MSs and PSs classes.

The interpretation of Plato's work on Socrates points to the birth of disciplinary boundaries where the import and traditional authority embedded in the isolated disciplines persists (Foshay, 2017:19) along the hard-soft dichotomy (Davies &

Devlin, 2010:16), and Becher's (1981:110-111) value-laden characterisation of the disciplines. During the period when Socrates initiated various theories of knowledge, human nature and learning, education was strictly for the upper class or male heads of families (Burgess, 2018:5; Vashishtha, 2014:86). The advent of a universal state education shows the resolution of the question about the regulation of schools in favour of the dominant bloc whose interests are expressed in the apparatuses of the state and their functioning (Sharp, 1990:117). The extension of education to all but the upper class was begrudgingly granted. This reluctant extension is disputable because even the subalterns benefited from that extension; for example, the citizens of former colonies in Africa gained literacy, numeracy and credentials.

The birth of disciplinary boundaries is justified by Geuss (2009:3) who pointed out that Kant was obsessed with intellectual and moral tidiness as he sharply and clearly set distinctions that allowed the division of the world into easily recognisable objects and sectors. Kant's tidiness was for the improved understanding of the world. It seems that the establishment of distinctions sparked ideological turf wars pitting different world views against one another to gain status, resources and capital, and claim dominance in the modern school.

3.2.4 The Modern School and Compartmentalisation

Comenius, the father of modern schooling, strongly advocated holistic education and knowledge collaboratively acquired from various sources and through various senses (Dryden & Vos, 2015:113). Modern knowledge segmentation is attributed to Prussia which disregarded Comenius's model by establishing a regimented factory classroom whose influence continues today, based on learners' age cohorts and mastery of a graded curriculum (Dryden & Vos, 2015:113). This was hegemonic and ideological as the fragmented education system conditioned workers for specialisation in jobs created by the industrial revolution (Hess, 2010:82). Prussia was the first to establish compulsory education in 1763 under Frederick the Great, followed by Denmark in 1814, the United Kingdom in 1880, France in 1882 and Ireland in 1892 (Green, 2013:11, 13, 14, 16; Zinkina, Korotayev, & Andreev, 2016:63-66). During a tour of European schools in 1843, Horace Mann was impressed by Prussia's strict and orderly age-based classroom-grading classification of learners which he ardently promoted in the United States (Zinkina et al., 2016:64).

The practice graded, classified and divided scholars and the content, which promoted compartmentalised presentation of knowledge and sparked superiority-inferiority complexes and debates that could be behind knowledge fragmentation by student-teachers. This makes sense when the development of Prussian education is analysed.

The Prussian model of schools developed when Prussian leaders instituted a highly regimented education system to instil a “higher and nobler spirit” in the youths in an attempt to bolster their citizens’ sense of national pride after their defeat by Napoleon’s French army (Hess, 2010:82-83). The Prussian education design was informed by the need to arouse patriotism and introduce political and social reforms in order to restore the lost national pride. This role of education is endemic globally, which determines how disciplines’ knowledge is deployed, including fragmented use that one can view as its side effects. For example, as a pioneer of general compulsory primary education, Prussia taught fragmented subjects that deprived learners of context and perspective use, which inadvertently and systematically stunted their thinking (Meshchaninov, 2012:4). Although it seems that fragmented subjects prevent interdisciplinarity and dwarf thinking, an understanding of the modern disciplines is necessary.

3.2.5 The Modern Disciplinary System

It is difficult to trace the evolutionary history of disciplines (Vashishtha, 2014:81), but the modern disciplinary system started to develop around the 1800s (Geuss, 2009:2; Mcelreavy et al., 2017:12). The disciplines emerged as scholars specialised in fields of interest and defined their fields of study, and as knowledge and communities grew, the need for professions grew too, carving out the academic discipline landscape (Geuss, 2009:2; Mcelreavy et al., 2017:12). Specialists in certain topics worked together but not with those working on other topics. The disciplinary boundaries were erected against other disciplines’ prying eyes that discouraged interdisciplinarity. This historical arrangement reveals disharmony among different scholars and their disciplines, which could have spilled into teacher education.

3.2.6 The Influence of Classification of Knowledge into Disciplines

Writing on “Knowledge and Knowers”, Maton (2014:3-4) observed that:

Knowledge is the basis of education as a social field of practice – it is the creation, curricularization, and teaching and learning of knowledge which makes education a distinctive field. Yet a subjectivist doxa in educational research reduces knowledge to knowing, and a deep-seated tendency towards constructivist relativism, based on a long established but false dichotomy with positivist absolutism, reduces knowledge to power. The result is knowledge-blindness...

Maton's observation shows that the classification of knowledge is based on power dynamics and culminates in fragmentation of theoretical knowledge and doing. Maton argued that such reduction makes recipients fail to see the value of integration and theory-practice interdependence. In this regard, Benstein (2000:86) contended that there is a new concept of knowledge and its relation to knowledge creators and users, yet knowledge should flow like money, to wherever it can create advantage and profit. This confirms that there are unpleasant consequences of categorising knowledge into disciplines as captured in Biglan's taxonomy.

3.2.6.1 Antony Biglan's taxonomy: Hard-soft dichotomy

The influence of classification of knowledge is discernible in Biglan's Taxonomy (Biglan, 1973:195). Out of 33 academic fields, Biglan's Taxonomy classified the disciplines into the "hard" and 'soft' categories in a kind of horizontal structuring along a continuum with the "hard" empirical sciences at one end, and the "softer" social sciences in the middle, and the "soft" humanities at the other extreme (Davies & Delvin, 2010:17-18), making friction and conflict inevitable. For example, human behaviour can be observed from the disciplinary prism, for instance, in terms of the sociological notion of class-based power structure, or psychologically in terms of conditioning and reinforcement schedules (Davies & Devlin, 2010:9). Squires (1992:202) claimed that conflict can arise at a distance or anywhere within the disciplinary pyramid, when a concept, approach or technique moves out of the boundaries of its home discipline to affect or attract others. The effects on disciplines of this kind may be transactional as the affected disciplines may contribute, in return, which, if exploited, could benefit student-teachers whose course content should interactively merge. This is useful because truths are not absolute but dynamic and

practical (Dewey, 1908:94). The classification into hard and soft disciplines has led to specialisation.

3.2.6.2 Specialisation: Giving up a part of the whole

The question of the part played by occupational groups in the modern social order is determined by society and has led to occupations infinitely separated and specialised which is appreciated and upheld by economists as functionally necessary (Durkheim, 1960:1). Specialisation means that people do not develop all their abilities and potential in pursuit of socially constructed knowledge. For Ehn (2009:12), specialisation refers to an individual or a single entity such as a clan or a nation choosing to focus on one or a few tasks or options while neglecting others. This is in line with the notion of Karl Mannheim (1893–1947) about the social character of knowledge (Mutekwe, 2012:806). This implies a social group's ideas relate to its social position. According to Laursen (2006:276), ideological power plays a more important role in education than political and economic power. Ideology shapes education systems (Fiala, 2007:15).

Although specialisation may be functional for society, it is sometimes dysfunctional. Based on Mannheim's conception of the origin of knowledge, it is tantamount to cultural hegemony initiated by policy makers who influence the form and content of the institutional order through education (Sharp, 1980:4-5). It leads to social warring, divisions and classes designed to subjugate the proletariat. In the absence of ideology, subjects, like estranged related enemies about to engage in a bloody academic war, present their genealogies only to realise that they are "guest-friends" from the same family tree who should not fight (Geuss, 2009:5), but interact.

Geuss (2009:18) attributed the continued divisions of subjects to individual champions and noted that any discipline can feed into and be fed by other disciplines because even architecture needs music. Therefore, the view that all teacher education subjects are designed to integrate, from TOE to MS, PS (A, B, C & D) and TP is feasible and there are no hegemonic social factors. However, before assuming the possibility of cultural hegemony in the subdivision of knowledge into discrete disciplines, it may be necessary to explore the human mental capacity to handle interdisciplinarity.

3.2.7 Information Processing: The Human Mental Capacity

Memory combines all mental experiences that are stored in the brain for information processing in a complex system of connections (Lutz & Huitt, 2003:1). Several automatic or deliberate cognitive procedures come into play in the process of making a judgement, depending on the goal, information available and constraints (Wyer, 2006:193). The processes occur in the mental faculties of the brain and mind that take in information at a phenomenal rate of up to three billion ‘bits’ of information in a second, storing it on expanding dendritic branches that grow to accommodate new information or file “like with like” (Dryden & Vos, 2015:154). The capacity ensures that if one is exposed to new learning experiences, one’s brainpower soars (Dryden & Vos, 2015:155). In other words, the brain’s elasticity makes its capacity infinite. Kolb et al. (2013:35) confirms that the normal brain demonstrates a remarkable capacity for plasticity in response to a wide range of experiences. Plasticity is the brain’s ability to physically rewire itself to become smarter, improve memory, develop new connections to create better solutions and function throughout life (Kolb, Gibb & Robinson, 2003:1). Thus, humans are born with a disposition to learn and assimilate knowledge into schemata that help them to understand the world (Nsamenang, 2005:330). Hence, the practice of knowledge fragmentation was not designed to aid information processing.

3.2.8 Knowing Two Millionths of the Total

Most learners fail because schoolwork is trivial, dull and makes narrow demands on the wide range of their potential (Nelson, Palonsky & McCarthy, 2010:19). Learners have the capacity to learn holistically but school practices force them to use only a small part of their intelligence and thinking capacities (Costley, 2006:5). For example, behaviourist approaches break subject matter into smaller bits of information which could promote knowledge fragmentation. Consequently, learners find it confusing and difficult to put the little fragments of information together into a meaningful and applicable “whole” (Costley, 2006:5). The evidence leads one to surmise that championed subjects could have had ideological intentions for breaking down the sum of knowledge into bits and pieces. In this respect, as Holt (1964:176) wondered:

How can we say...that one piece of knowledge is more important than another, or...that some knowledge is essential and the rest ...worthless? ... We must ask how much of the sum of human knowledge anyone can know at the end of his schooling. Perhaps a millionth. Are we then to believe that one of these millionths is so much more important than another? Or that our social and national problems will be solved if we can just figure out a way to turn children out of schools knowing two millionths of the total, instead of one?

Although it is debatable, the independent pieces may not be as important as the whole. Education seems to be responsible for disciplinary cultural hegemony transmission consented to by all (Sharp, 1980:103). It conditions people to operate unconsciously within hegemonic meanings that help in the perpetuation of the status quo (Wolff (2004:4) of knowledge fragmentation.

3.2.9 Assumptions drawn from the hegemonic nature of compartmentalisation

If it is accepted that there is one dense body of knowledge that the smart brain can handle, then the possibility of cultural hegemony persuading pre-service teachers into strict disciplinarity is strong. This could be the reason why education is blamed for the experts' failure to collaborate (Mcelreavy et al., 2017:12) because knowledge is divided into academic tribes (Becher, 1989:197) that condition and govern academics' behaviour and values leading to binary categories of hard/soft, pure/applied, convergent/divergent and urban/rural (Trowler, 2014:18). The territorial variances could create unique practices between the academic tribes; for example, the extent to which academics connect with each other or address research problems, what they regard as important or trivial and the suitability of research work for publishing (Trowler, 2014:19). For example, the publishing space for academic 'others' and journals are institutions in themselves and part of larger institutions of knowledge and power where only selected genres are accepted (Paasi, 2005:771). All these promote disciplinarity by pre-service teachers who may assume that it is natural.

Geuss (2009:5) asserts that "natural" and "social" properties are not markedly separate. He wondered if the issue of "origin" is natural since it is people who create knowledge, group and label it to satisfy their desires, whimsical ideas and purposes. Thus, humans' insatiable search for knowledge, truth and power is responsible for

naturalising socially constructed disciplinary knowledge, accepted and taken as a given. Normalisation of the abnormal ignites the argument that, from the moment Plato established his academy, he had authority over what obtained in it and the categories of knowledge it availed. Similarly, the like-minded scholars that influenced knowledge specialisation and disciplinarity further separated and protected disciplines led to conflict between competing ideas.

Once categorisation based on some criteria is considered, a hierarchical ordering is inevitable. This may become apparent when the knowledge is sought to be used for social development. The utility of a discipline's knowledge or a lack thereof in addressing social needs may determine their naturalised ranking. Evidence shows that during the eighteenth century, practical content competed vigorously with religious content as education was brought nearer to the everyday needs when disciplines such as history, geography, geometry, algebra, modern languages, navigation and astronomy were taught as physical and biological sciences, yet industrialism and capitalism demanded more and newer knowledge (Mcelreavy et al., 2017:9). In due course, integration led to innovative products as scientists, mathematicians and engineers worked together with the military during the Second World War and gave birth to interdisciplinary education with an emphasis on STEM subjects (Sanders, 2009:20; White, 2014:6). This means compartmentalisation has a history.

3.2.10 Knowledge Compartmentalisation and Social Stratification

Jephcote and Davies (2007:207) notes that school and subject curriculum are not a matter of chance but products of ongoing struggles between an assortment of agents, groups and individuals. They emphasise that subjects are arenas of conflict that are characterised by disputes within and between them. Outwardly, the disciplinary terrain seems stable, yet it is highly disputed, fragmented and fluctuating as actors involved deploy a range of ideological and material resources in pursuit of individual and collective missions (Jephcote & Davies 2007:208). In a study on fragmentation in the construction industry, Alashwal, Rahman and Beksin (2011:1531) explain that specialisation could cause a problem of knowledge-sharing in and between firms because the knowledge created in specific contexts is situated and the experiential knowledge formed remains tacit and difficult to transfer.

Arguably, these views show that knowledge fragmentation leads to streaming and stratification of knowledge mirroring the influence of the different social classes. In fact, it is this streaming and stratification of knowledge first that culminates in social stratification as education promotes disciplinary specialisation.

Disciplinary pursuit in education channels learners differently into social roles resulting in complex societies unequally distributing the stocks of valued resources and worthwhile knowledge (Semeijn et al., 2005:486). The most privileged individuals receive the most power, prestige and valued resources. The distribution of knowledge and qualifications is important to the division of labour and dependent on the education system, but it is never fair. It ultimately divides social classes and creates social stratification based on subjects. Like ranked subjects, social stratification ranks people in society (Azarkievic, 2015:1) and creates the structured inequalities among people (Oyekola & Oyeyipo, 2020:126). While this is functional, it obstructs integration and its creative deployment. This is because knowledge should not exist as isolated facts to be remembered and recalled for examinations only. It should exist as the scaffolding and building blocks for an interconnected, integrated world to produce new knowledge, newer innovations and bring about development (Dryden & Vos, 2015:108-109). This is what should drive teaching and learning in the current world knowledge economies to ensure that teacher trainees do not miss the critical aspects of knowledge needed for effective teaching and learning.

3.2.11 Knowledge Compartmentalisation and Streaming of Knowledge

Interactionists such as Nell Keddie and David Hargreaves posited that school practices of streaming learners according to ability have negative consequences such as streaming of knowledge and formation of subcultures (Haralambos et al., 2013:704-705). This argument supports Young's (2014:2) position that all knowledge is situated and reflects the position of the producer or knower at a particular moment in a particular cultural context. Haraway (1988:575) defined "situated knowledges" as a means of understanding that there are many forms of knowledge, which come from positional perspectives. In other words, knowledge reflects a context and originates with a viewpoint reflecting social power relations.

Furthermore, Haraway (1988:577) explained that all knowledge is condensed into separate disciplines, some of which are regarded as more important (or powerful)

than others. Similarly, Smith (2012:35) is of the view that history “is the story of the powerful, and then how they use their power to keep them in positions in which they continue to dominate others”. This understanding could account for situations in the USA where learners of colour have often been tracked into simplified and less dense “general” or “basic” courses (Nelson et al., 2010:257) based on the perception that they are incompetent. It is a possible way of keeping them in their ‘otherness’ status. There are always reasons behind curriculum issues.

Goodson’s (1990:58) argument is that the school curriculum is a social artefact conceived of, and made for, deliberate human purposes that have been treated as neutral based on considerations made in coming up with what knowledge to teach, how to teach it and for what purposes. Some subjects, topics or lessons are preferred to others for various reasons (Goodson, 1990:59). Some subjects are to be studied by some but not others; for example, teachers specialise in one subject for a diploma in primary education and in at least two subjects for secondary school teaching. This points to the political nature of curriculum-making disguised as a rational and objective choice consented to by all.

Apple (1992:222) maintains that the curriculum is not a neutral assemblage of knowledge, but it is always part of someone’s selective tradition, and some group’s vision of authentic knowledge. It is produced out of the cultural, political and economic conflicts, tensions and compromises that organise and disorganise a people. If the content and form of academic knowledge, including the one in teacher colleges, is ideologically determined, it means that the recipients, do not notice or question it because it is dressed in cultural hegemony. Instead, they perpetuate the status quo, which leads to knowledge mutilation by way of compartmentalisation.

Disagreements on the value-laden nature of subjects that should be taught is reflected by the different theories of the curriculum (Moore, 1982:54). Moore indicated that some propose the utilitarian theory considering the usefulness of subjects. Others posit the rationality approach that looks how subjects benefit society. Yet others advocate for the heritage theory that considers traditions that are worthwhile transmitting from one generation to another. This clearly shows the social construction of knowledge into disciplines. Based on the extent to which certain kinds of knowledge are necessary to realise the educational aim, a particular theory

can be used to inform the choice of subjects. The absence of consensus among the theorists is a possible sign and site of conflict. The most powerful endure because a curriculum is the organised and codified reflection of societal, ideological and hegemonic interests that are socially and politically constructed (Sadovnik, 1991:48). Given such a scenario, Hirst (2010:26) posits that the character of social institutions is shaped deliberately by human intentions and purposes. This cements the view that there could be social forces at work that hinder interdisciplinarity in Zimbabwean teacher education.

3.2.12 Power Dynamics and What Counts as Worthwhile Knowledge

The relationship between what counts as worthwhile educational knowledge and issues of power and control is strong. Goodson (2006:61) reveals that the educational organisation expresses the organisation of a culture and society to shape social ends in a particular way. Disciplines are split and differentially valued due to power and control matrices. Goodson (1987:7) acknowledges that “the battle over content” of curriculum has led to the arrangement of content into subject areas to be accepted as if it is cast in stone. Those in power define what counts as knowledge, its accessibility to different groups and the accepted associations between different knowledge areas and people with access to such areas (Goodson, 2006:61). Ultimately, this fits Gramsci’s conception of cultural hegemony that is consented to by all.

The above scenario has led Nsamenang (2005:327-330) to castigate classroom and book learning for being separated from reality because it divides knowledge domains into subjects unreflective of real life. The subjects promote individual achievement, personal ambition and competition (Oyserman, 1993:1006). Although there is little acknowledgement of the existence of knowledge division (Goldstein, 1988:225), Stengel (1997:556) traced the roots of school subjects to power and interest skirmishes between various university academics at university and concerned outsiders. Scheffler (1991:71) scoffs at the division of the learning content into familiar ‘subject’ categories because by dividing knowledge into subjects, people think that it simplifies and clarifies the task of teaching and learning, yet the subjects are dependent upon parent disciplines that have their distinctive and authoritative

purchase on the world. In other words, holistic knowledge is the bedrock of all knowledge.

All disciplines owe their existence to the power of unadulterated, unified knowledge. Even teacher colleges' subject areas owe their presence in the programme to the initial single body of knowledge. Therefore, it would be beneficial to reunite the same when need arises by engaging student-teachers in interdisciplinarity practices. Scheffler (1991:61) proposes linking philosophy with educational practice so that prospective teachers could tie the main thread of the coursework to particular teaching-learning issues with which students could be individually concerned upon graduation. All this may fail to materialise because the curriculum is not objective or free of vested interests since it is typically influenced by the developers' aims and objectives (Popkewitz, 1987:20). It means that some people have the power to influence the nature of knowledge in education like forming categories and fragments that could lead student-teachers into disciplinary antagonism.

3.2.13 Disciplinary Appreciation Amid Calls for Interdisciplinarity

Mcelreavy et al. (2017:6) posits that the wealth of specific knowledge is found in the disciplines since they are the building blocks of interdisciplinarity. While there is nothing wrong in pursuing disciplinary knowledge, it becomes worrisome when student-teachers pursue it without acknowledging and tapping into other course content disciplines. In the absence of social influences, it is a weakness for pre-service teachers to be monofocal in disciplinary terms in the knowledge economy generally, and in teacher education particularly.

The disciplines light the path of teacher education courses. Today, students in higher education can choose disciplines that they want to pursue in detail by taking courses from various options and integrate these disciplines with others in their programmes to create new knowledge (Mcelreavy et al., 2017:6). For instance, student-teachers have room to choose an area of study as an MS such as food and nutrition or fashion and fabrics, information communication technology, ChiShona, IsiNdebele, agriculture, biology, mathematics, religious studies, social studies and English, physics, ICT or history alongside other contemporary areas such as health and life skills, national strategic studies, TP, TOE, PSA, PSB and PSC, which all feed into the teacher course programme.

Regardless of various views justifying disciplinary practice by some, others view it as unnecessary, unbeneficial and almost harmful to society. There is a lack of incontestable evidence in defence of fragmentation of knowledge into discrete subjects, divorced from each other. Disciplines tend to exist in exclusivity, which seems unproductive in resolving academic and current social issues as it estranges subjects and people to the point of subjugation and conflict. The existence of a third force in creating the 'other' disciplines cannot be denied in segmenting academic areas. The force may have infiltrated teacher education and made student-teachers to look down upon or fear certain subjects whose knowledge forms are mergeable with others in suitable contexts. This possibility is evident as interdisciplinarity has become topical internationally because the Gestalt theory posits that "the whole is different, original and more than the sum of its parts" (Yalcin, 2021:183).

3.3 INTERDISCIPLINARY KNOWLEDGE INTEGRATION (IKI) IN EDUCATION GLOBALLY

Davies and Devlin (2010:4) comment that interdisciplinary studies are flourishing in some areas of higher education though this is far from the norm in higher education globally. This is corroborated by Tabulawa's (2017:11) observation that interdisciplinarity has assumed centre stage in calls for reimagining higher education. According to Tabulawa, interdisciplinary research and teaching are on the surge in Canada, Germany, the USA, the UK, South Africa and Australia, among other countries.

Cooke, Nguyen, Anastakis, Scott, Turetsky, et al (2020:69) report that Canada is making progress in formalising a national system of interdisciplinarity with potential to influence the Academy and scholarship through the Canadian College of New Scholars, Artists, and Scientists of the Royal Society of Canada (the College). In their view, the creation of a single collegium, new advances in understanding will emerge from the interaction of diverse intellectual, cultural, and social perspectives. The Canadian college represents emerging scholars and artists exploring multiple disciplinary research across established boundaries experimenting with new theoretical perspectives and methodological tools. As a result, interdisciplinarity has taken many forms in Canada such as integrated units, fused subject areas, team-

planning, unified departments, and harmonized objectives, among others (Clausen & Drake, 2010:70)

In UK's Edinburg, the Higher Education Academy (HEA) commissioned a short study to review the literature about the effectiveness of interdisciplinary provision and the pedagogies which provide distinctive opportunities for interdisciplinarity. It emerged that even though interdisciplinary courses, modules and programmes are conducted at every level of university education, their goals and planned outcomes are diverse (Lyall, Meagher, Bandola-Gill, & Kettle, 2015:vi). Within policy circles in UK, interdisciplinarity has been largely normatively accepted. Thus, in both teaching and research, the drive for interdisciplinarity is encouraged through the HEA and the Research Council (Chettiparamb, 2007:1).

In South Africa, Esler, Downsborough, Roux, Blignaut, Milton, le Maitre, and de Wit (2016:85) believed that achieving interdisciplinary research within South African Universities is possible but challenging because of the strong disciplinary focus. In their view, complex social-ecological problems need sustained interdisciplinary engagements across multiple disciplines, yet academic offerings continue to reflect disciplinary silos. The University of Botswana, on its part, plans to increase interdisciplinarity and decrease departmental compartmentalisation (Tabulawa, 2017:12). The international scene shows a paradigm shift from disciplinarity to interdisciplinarity such that failure to embrace the shift demands exploration, especially as it obtains in teacher education in Zimbabwe.

The purpose of teacher education is not certification of true knowledge entitlements but the academic advancement of understanding of teaching-learning processes holistically. This makes interdisciplinarity the ideal approach to embrace in teacher education as it promotes integration of different forms of expertise across the fields for effective teacher training.

Frodeman (2014:5) attacks the naive common sense across the academy for justifying the separate existence of subjects on the assumption that the fragmented disciplines in higher education represent every knowable aspect of the universe. Instead, he advocated for interdisciplinarity which he defined as 'blending' or 'integrating'. The point is that the world is better understood through integrating

subjects than through the separate disciplines. Thus, within a department, there are experts in more than one area, but the separation is deliberate because disciplines are not epistemic (cognitive) in nature, but political, economic and rhetorical devices, and situated (Frodeman, 2016:1).

Jones (2009:78) noted that the interdisciplinarity has been used in various ways and at all educational levels. The approach is widespread in higher education in Australia, Asia and Europe (Davies, Devlin & Tight, 2010: xiii). Peseta, Manathunga and Jones (2010:100) add that interdisciplinarity is topical in higher education as a potential answer to addressing the complex snags besetting the world today. The mismatch between its popularity and failure to embrace it by pre-service teachers deserves attention. This is so because covers several concepts by considering interrelations between the realms of knowledge (Youngblood, 2007:2) to help towards moulding pre-service teachers holistically. Of course, its successful utilisation may depend on instructional designs used.

3.3.1 Instructional Designs to Knowledge Integration

Approaches to knowledge integration include cross-disciplinary, interdisciplinary, multidisciplinary, multi-disciplinary and transdisciplinary (Collins, 2017:10; Haynes, 2002:17; Kambutu & Nganga, 2009:391; Kidron & Kali, 2015:3; Park & Son, 2010:82; Tabulawa, 2017:15). Cross-disciplinary approaches cross one discipline with the subject matter of another (Jones, 2009:76). Jakobsen, Hels and McLaughlin (2004:17) view intradisciplinary as coordinating interaction and integration across many disciplines resulting in the rearrangement of disciplinary knowledge and creation of new knowledge. A multi-disciplinary approach is the teaching of topics from more than one discipline in parallel with other disciplines, combining numerous disciplines as separate components of learning with each discipline maintaining its identity and knowledge structures (Jones, 2009:76). According to Maxwell, Rainey and Tanik (2003:289), transdisciplinary pushes one to think across, beyond and through the academic disciplines to include several kinds of knowledge about ideas, issues or subjects. In doing so, Tabulawa (2017:15) stressed that it takes knowledge production past the university borders. Using the models interchangeably creates misunderstanding, misconceptualisation, confusion and difficulty for educators and even careless exploitation of terms that leads to superficial use and understanding

(Dyer, 2003:187; Hollmen, 2015:3; Park & Son, 2010:82). This study focused on interdisciplinarity, an approach that requires an overhaul of existing curricula.

3.3.2 Interdisciplinarity

The founding father of modern schooling, Comenius, strongly advocated for holistic education (Dryden & Vos, 2015:113). Hadley, Janson, Reed, Gultig and Adendorf (2012:278) emphasised that the boundaries between the sets of content are not clear-cut but blurred, and do not insulate disciplinary content from each other. As a result, it is more beneficial to integrate disciplinary content when the subjects stand in open relationships with each other, divided by porous borders that permit content to permeate and feed into one another (Hoadley et al., 2012:98). However, Hollmen's (2015:1) contention that in academia, where the segregation and ever-deepening expertise of disciplines over years have fashioned siloed structures of faculties and departments, it is difficult to facilitate genuine integration of interdisciplinarity insights. The difficulty, as this study hypothesises, may arise from cultural hegemony in the form of social forces, bordering on subjugation, hostility, disdain, uncertainty, insecurity and perturbation.

Interdisciplinary learning is complex as it integrates insights and modes of thinking from more than one discipline to advance practical understanding of a problem that falls outside the scope of a single discipline (Boix-Mansilla, 2007:289; Boix-Mansilla, 2016:5). It entails integrating information, data, techniques, tasks, perspectives, ideas, vocabularies, concepts and theories from two or more disciplines to create products, explain phenomena or solve problems in ways that would have been unlikely through single-disciplinary means (Boix-Mansilla, 2010:289). Van der Waldt's (2014:4) analysis of the word formation of this concept reveals that the prefix "inter-" means between, among or mutually, or reciprocally and suggests an exchange of relationships between disciplines that can vary from "active" to "antagonistic" and "cooperative". Such variations are valuable as they help to address different academic demands depending on the task at hand.

Tasks in teacher colleges include essays, tests, examinations, teaching and research. These tasks, born out of a holistic course programme, are designed to collaborate towards preparing student-teachers to become qualified teachers. The tasks develop the teacher knowledge by combining GPK and CK to be deployed in

practice. Given this interdependent relationship, the natural course of action for student-teachers is to breach the weak boundaries between subjects through interdisciplinarity.

According to Jones (2009:76), interdisciplinarity draws upon several subjects to integrate their insights with what Collins (2017:10) terms the practice of integrating disciplines by collaborating in interdisciplinary teams. Thus, interdisciplinarity is a process of integrating knowledge across disciplines for higher levels of understanding, innovation and problem-solving, which can be done individually, in pairs or groups. In doing so, student-teachers use connections and insights to clarify, exemplify, critique and weigh educational issues and contribute towards a unified body of knowledge formed by convergent and divergent disciplinary streams of knowledge. This is germane because the fusion of disciplines is the hallmark of scholarship and competence. The practice breaks boundaries and leads to a better understanding of teaching and learning through identification of disciplinary insights.

Kambutu and Nganga (2009:391) observed that the interdisciplinary approach combines different subject areas into a single unit of study without emphasising the parent subjects. It breaks boundaries between disciplines and integrates various disciplinary perspectives (Kidron & Kali (2015:3). The process gives a new form of knowledge production and generates learner-driven learning in immersive contexts using several disciplines in pragmatic situations (Ibrahim, Fruchter & Sharif, 2006:445). Tabulawa (2017:15) defends interdisciplinary knowledge for integrating approaches or methodologies from different disciplines. Haynes (2002:17) embraces it for critically drawing upon two or more disciplines, to produce new insights. If used by pre-service teachers, the approach may help them to link all course areas as intended, infusing their views to create new perceptions of novel classroom situations.

At its simplest, interdisciplinarity involves knowledge transfer or disciplinary counsel with all the pieces strung together into a whole, where newly learned information crosses disciplines in scenarios that are unique and unexpected such as in assignments and classroom facilitation. The process is evidence-based reasoning involving intricate causal thinking, temporal and spatial presentations and critical argumentation (Boix-Mansilla, 2016:215). It aims to integrate various disciplinary

elements to craft products, explain phenomena or solve problems in better ways than using the perspectives of single disciplines. Just like systems build from lower order ones to higher levels, so does interdisciplinary learning (Fisher, Turnerchioire & Morling, 2009:17). Arneback and Blåsjö (2017:306, 308) characterise interdisciplinarity as a bridging approach focused on *bridging two parts* together, creating something new and bringing together different disciplines to work *side-by-side* to make it possible to study a phenomenon from different angles. This characteristic of interdisciplinarity makes it critical for pre-service teachers whose course programme is designed to develop their general knowledge of work holistically.

IKI's pragmatic nature allows building and validation of understanding that involves a series of contextual adjustments, where, as Boix-Mansilla (2016:7) puts it, novel insights are evaluated against each other and antecedent understandings of other subject matter. Many sources of varying strands of knowledge are the strength of interdisciplinarity as the conclusion reached is comprehensive. Boix-Mansilla stressed that a multitude of sources of evidence, including findings, statements, observations, analogies, metaphors and powerful exemplification are all engaged. Arguably, the evidence reached through this approach paints a forceful picture that may help student-teachers to understand their course content in a unified way as intended.

Golding (2009:3) commended interdisciplinarity for producing illumination, balanced judgement, viable solutions or products that creatively accommodate different perspectives. For Boix-Mansilla (2010:288) and Boix-Mansilla and Duraisingh (2007:219), the approach places aspects from different disciplines side by side and incorporates knowledge and ways of thinking to produce cognitive advancement that manifests in the form of explanations of phenomenon, problem-solving and creative production which are all unattainable by single-disciplinary means. It enhances unprecedented understanding reminiscent of real life, which is a nexus of various complementary or competing elements, environments, discourses, communities, belief systems and worldviews (Barber, 2012:611). Arguably, the approach is suitable in preparing hands-on prospective teachers who are conscious of the flux in knowledge and the relative nature of their coursework. Adopting interdisciplinarity

helps student-teachers to explain, analyse, discuss and critique issues in their practice using various disciplinary lenses

Describing knowledge integration as a 'positive disruption' in HEIs, Kidron and Kali (2015:1) explained that it involves breaking boundaries for deep understanding of disciplinary ideas. According to them, disruption combines with the ability to see links between diverse disciplinary thoughts in numerous domains gained through meaningful dialogue and exposure to a variety of ideas and thought ways. You (2017:70) added that integration for interdisciplinarity emphasises the role of a facilitator in encouraging students to establish a successful theoretical change by integrating the known with new ideas and practices towards more coherent understanding. This enables cross-pollination of ideas from more than one discipline to support, compare, critique or create new ideas at a higher level. It enhances understanding beyond the common and general. This approach fuses ideas, concepts, information, data, techniques, tasks, perspectives and theories and helps to address issues and solve problems. The fusion improves disciplinary comprehension and establishes disciplinary relations that students need to develop profound understanding of the nature of teaching and learning.

Surprisingly, Wernli and Darbellay and the League of European Research Universities (2016:3) observed that academic institutes are still organised along disciplinary lines, while social needs and the evolution of science require reconsidering the creation of knowledge; for example, creation through the development of interdisciplinary collaborations to address research questions and improve understanding of pressing problems. However, evidence on the ground suggests that integration and understanding across fields is rare in higher education including teacher colleges. You (2017:73) criticised the teacher education system for promoting fragmentation of knowledge since in some cases, individual teachers are certified in separate subjects after completing their training which focuses on specific disciplines such as chemistry and biology. The fragmented programme structure prepares teachers to teach a specific discipline that creates a tribalistic hornets' nest.

With the advent of technology, interdisciplinarity seems to be more compelling than ever before. For instance, after studying ICT, student-teachers could employ the acquired skills to type assignments (use the correct font themes, space and

proofread for errors through the review function or online software) reference properly, cite internet sources, send assignments electronically and partake in online classroom lectures, among others. If modern student-teachers in modern teacher colleges continue to separate one discipline from another, they risk being out of step with trends in their field of study and practice because disciplinarity may be ineffective in tackling current academic practice and social challenges. This is particularly so as Kidron and Kali (2015:1) hold the position that HEIs are vital players in preparing youths to cope with twenty-first century challenges. What is needed is to establish proven interdisciplinary techniques that can be adopted to socialise trainee teachers into the culture of interdisciplinarity. There is a plethora of theories and instructive approaches that can potentially promote interdisciplinarity, but cultural hegemony may impede interdisciplinarity in teacher colleges.

According to Boix-Mansilla (2016:1), it is imperative to nurture the individuals' capacities to coherently knit knowledge from vast and disparate areas together into wholes for contextual use and enable them to synthesise knowledge from life experiences through social activities. At a higher level, interdisciplinary synthesis infers the integration of knowledge and styles of thinking of several disciplines in search of better understanding through explanation or argumentation. However, Boix-Mansilla observed that very little is known about interdisciplinarity embodied in social functions and bemoaned the scarcity of studies of interdisciplinary learning since those that exist are non-pragmatic. Therefore, this study is in part a response to this gap and seeks to add to knowledge on interdisciplinarity by exploring social factors that discourage the approach in teacher education and cultivate engagement on the subject in order to address the problem.

3.3.3 The Benefits of Interdisciplinary Knowledge Integration

Haynes (2002:17) and Jones (2009:76) are of the collective view that interdisciplinarity critically borrows from many disciplines and leads to an amalgamation of disciplinary insights. Its techniques enable one to see different perspectives at work in groups. Unifying themes leads to synthesis (fusion, amalgamation, combination and blending) of disciplines and assists recipients to learn one discipline, solve a problem in a synthesised way and enrich their lifelong

learning traditions, academic skills, work practices and personal growth (You, 2017:67).

Jones (2007:76) indicated that this approach develops lifelong learning skills (LLS) in students and enables them to use various fields to address phenomena in multiple learning areas, topics and issues. Kaplan (2016:43) explained that LLS is based on all of an individual's life courses from birth to death and all actions aimed at developing individual knowledge, skills and competencies. McGarrah (2015:2) identifies critical thinking, problem-solving, creativity, leadership, communication, collaboration, information management and adaptability as components of LLS. These components are the resources by which students grasp academic content and translate that into action. The approach could help student-teachers to use knowledge from Section 1 (TP), Section 2 (TOE), Section 3 (MS) and Section 4 (PS that includes Syllabuses A, B, C & D) to deal with any given situation across the sections. Interdisciplinarity helps to use more than one discipline to focus on a specific issue to innovatively produce knowledge, create working networks to foster an informed and critical crop of students (Kleinberg, 2008:10; Weller & Appleby, 2021:8). It compels student-teachers to harness knowledge from more than one subject to create novel ideas. The approach ensures that when student-teachers work with TOE, for instance, some issues in it link with other sections, which makes them focus not only on TOE, but also others. This is significant because addressing teaching and learning issues fully requires multiple perspectives. According to Tormey, Liddy and Hogan (2009:4), experts may fail to solve problems adequately if they address them entirely along the disciplinary lines because some problems demand interdisciplinarity since each area brings part of the answer. Like bricks used to erect a building structure, each subject provides 'information bricks' in addressing teaching-learning issues holistically. In the end, quality education is achieved as intended by SDG4 that strives to ensure inclusive, equitable quality education and promote lifelong learning opportunities for all (A4ID, 2020:3). The different elements come together to produce one complete whole body of teacher knowledge, which is akin to the African traditional education that is holistic.

3.3.4 Traditional African Education and the Icosahedron

From an African perspective, Dolamo (2013:4) argues that one becomes a person through integration into society's holistic way of life that negates compartmentalisation of the human person and social experience. Holistic education focuses on the interconnectedness of experience and reality as it seeks to challenge the reductionist conventions of mainstream culture and education (Mahmoud, Jafari, Nasrabadi & Liaghatdar, 2012:179). The traditional African participatory curricula did not separate knowledge into discrete disciplines but interwove all strands into age-appropriate developmental tasks (Nsamenang, 2006:294). Omolewa (2007:604) praised that mode of education for including all aspects of life without compartmentalising them into disciplines. Such integrated knowledge deals with life issues, hence, if insights from different disciplines could be used together to compare, critique and evaluate issues, their combined contribution could help student-teachers to holistically comprehend teaching-learning issues better. In the same vein, holism has the potential to help student-teachers approach their course content as a coherent whole whose component parts are best understood together in context, in relation to one another and to the whole programme.

This is better represented by an icosahedron, a regular solid shape with 12 'corners' and 20 triangular sides where 30 'edges' naturally merge the disciplines into a holistic object (Fenyvesi & Lahdesmaki, 2017:95-96). The subjects are not separate but a composition of the other disciplines, which are facets or sub-categories of the area chosen to be the dominant focus of attention. If reality is seamlessly a whole, then all subjects investigating that reality (such as teaching and learning) are intimately connected without any one branch of knowledge developing separately. Holistic education advocates that the disciplines be integrated.

While it is acceptable that disciplinarity promotes deep understanding of a discipline, it is also true that fusing disciplinary knowledge promotes "deeper understanding" (Golding, 2009:3). Fusion promotes the capacity to integrate information and methods of thinking in two or more disciplines to produce cognitive advancement (Boix-Mansilla & Duraisingh, 2007:219). For student-teachers, this can take the form of explaining a phenomenon, solving a problem, creating a product, critiquing issues,

writing informed essays and teaching reflectively to come up with a comprehensive body of knowledge.

3.3.5 Interdisciplinarity Challenges

Although interdisciplinarity is celebrated for expanding student understanding and achievement between all disciplines and enhancing communication skills, it has weaknesses in that it can lead to confusion about concepts and is time-consuming (Jones, 2010:76). Similarly, Tabulawa (2017:13) criticises interdisciplinarity for not being a neutral, apolitical technical rearrangement of knowledge because it is directed by the ideology of neoliberalism in attempts to break academics' monopoly on the processes and products of higher education to form new academic identities and subjectivities that reflect a corporatist ethos. Tabulawa attributed interdisciplinarity's rise to the emergence of neoliberalism in the 1970s as an approach to wealth accumulation that privileges market rationality. Others pointed to the risk of students' isolation from the core of their field, focusing on the fringe areas, which lowers an academic's reputation in the eyes of their peers and the unaccommodating traditional fields of study (Jones, 2010:79). Despite the criticism, the relevance of disciplines as the structures around which higher education activities revolve has been questioned as the drive to interdisciplinarity is increasing globally (Johansen & Hojland, 2008:5-6). Ironically, all the criticisms confirm the fear that disciplinarity is ideological and hegemonic as critics sound apprehensively defensive, afraid that its normalised, taken-for-granted nature has been unmasked.

Regardless of global relevance, interdisciplinarity still needs disciplinary knowledge and appropriate methods and techniques for successful embrace by student-teachers.

3.4 INTERDISCIPLINARITY IN PRACTICE

From the review of literature related to knowledge compartmentalisation into discrete disciplines, it emerged that it is an ideological product. This influenced Becher to use a metaphor of academic tribes (Trowler, 2014:3). However, literature shows the porous nature of disciplinary boundaries that allows subjects to integrate where it is beneficial. This section reviews literature related to ways of practising interdisciplinarity and explores how it leads to the theory-practice nexus.

Korthagen (2006:78) deplored the obsolete methods of teacher education for their restricted relationship to the student-teachers' needs manifesting in the discrete presentation of subjects. This can be addressed by establishing the social factors that fuel the practice and addressing them so that there is disciplinary integration. Letseka and Zireva (2013:675) found that pedagogical principles and practices at Morgenster Teachers College in Zimbabwe were not supportive of critical and reflective thinking. They advocated a shift from monologic pedagogies to dialogism and pluralism that underline the need to promote two-way methodologies that allow for an exchange of ideas.

Addressing the "disconnect between disciplines", Youngblood (2007:3) and Duerr (2008:176) concur that teaching methodology is central to interdisciplinary success and a future of discovery and innovation. In the same vein, Van der Waldt (2014:7) asserted that interdisciplinary teaching approaches are important ways for learning and solving problems in a synthesised way. The methods enrich the students' lifelong learning, academic skills and personal growth (Jones, 2009:78). One example of such a method is dialogism that allows for an exchange of ideas in a conversation or shared dialogue to explore the meaning of something. According to Shirkhani, Nesaria and Feilinezhad (2015:514), this "inspires a challenge between thoughts though if not checked, it can give rise to the creation of too many voices". In other words, there is a need for moderation to align numerous voices that have ideas related to the crux of the focal learning area, topic or issue.

Although the world seems to disintegrate along disciplinary lines, several studies now advocate interdisciplinarity (Boix-Mansilla, 2010; Davies & Devlin, 2007; Golding, 2009; Park & Mills, 2014). Thus, it is necessary to unlock and free subjects from their tight little boxes (Dryden & Vos, 2015:433) in teacher education so that pre-service teachers can comprehend the connected nature of their course subjects. This kind of education helps one to arrange, direct and use diverse knowledge and information to achieve a desired effect in practice that is possible if the appropriate interdisciplinary methods and techniques are used (Dryden & Vos, 2015:156). These are reviewed next.

3.4.1 Knowledge integration

Knowledge integration involves integrating previous knowledge with new ideas and practices, which inevitably results in a more intelligible understanding by identifying current ideas, adding new ideas, distinguishing between them and sorting the ideas (You, 2017:70). Hoadley et al. (2012:3-4) advocated knowledge integration through an integrated approach to learning instead of a subject-based approach. They contended that focusing on the outcomes downplays subject content while emphasising competences (Hoadley et al., 2012:98). This helps related subjects that belong to the same learning area to stand in an open relation to each other for the sake of convenience. An open relationship allows the related subjects' knowledge to be used across disciplinary borders because their boundaries are breakable. It requires facilitators to meet often to plan integration strategies carefully and prepare outcomes. The need for facilitators to meet regularly could be its weak point as schedules and personalities may clash. Regardless of this challenge, Hoadley et al. (2012:297) emphasised that migration of content between disciplines makes them part of a greater whole whereby the place of the content in that whole is made explicit. For instance, Hoadley et al. (2012:281) pointed out that the emphasis shifts from 'states of knowing' to 'ways of knowing'. That shift in emphasis teaches student-teachers how to think better using all the subjects in their courses because teaching requires creative engagement with learners to help them understand.

3.4.2 Understanding connections between concepts from rudimentary, individual components

Interdisciplinary learning can also be promoted in teacher education by helping the student-teachers to understand the relationship between two concepts preceded by a lower-level appreciation of each concept in isolation. Thereafter, connecting, applying and synthesising information is possible. The resultant new insights can then be applied in multiple contexts, for instance, to write assignments, discuss, scheme, plan and teach. This approach comprises the ability to connect the sphere of ideas and philosophies to everyday experience, from different subjects, contexts and forms (Barber, 2012:613). Boix-Mansilla (2010:290) aptly added that through this method, learners construct abstractions in one relevant discipline and go on to get knowledge in additional disciplines and integrate the knowledge around a theme.

This process reveals the importance of understanding disciplinary concepts separately before integration and how the concepts can be used to further interdisciplinary practices.

3.4.3 Team-teaching/lecturing

Team-teaching can be used to promote encourage student-teachers to embrace interdisciplinarity. As Hibbert et al. (2014:98) noted, there is a need to develop a culture that supports interdisciplinarity for faculty and student interaction outside their home disciplines. Team-teaching nurtures the culture of collaborative relationships and opportunities for students to learn disciplinary intersection. Members from multiple disciplines, friends or foes, collaboratively design a curriculum and facilitate learning (Collins, 2017: iv; Jones, 2009:76; Petri, 2010:73). This way, all learn interdependently about, from and with each other, transcending disciplinary boundaries to improve outcomes (Davies & Delvin, 2010:31; World Health Organisation [WHO], 2010:7).

Related subjects are presented together to resolve a lack of knowledge of others (Collins, 2017:10). In other words, subjects cover up for each other's shortfalls in the production of a unified body of teacher knowledge. In terms of this strategy, students mutually rely on each other in raising and sharing ideas creatively and reflectively with tolerance and appreciation of diversity and collaboration (Boyer & Bishop, 2004:1; Kidron & Kali, 2015:7). They are offered a chance to take a cluster of courses that are developed and taught by a faculty team (Carmichael & LaPierre, 2014:54). This is pertinent in Zimbabwe teacher education because the disciplines are organised into clusters that are further grouped into departments. For example, in some colleges, TOE is made up of a cluster of psychology of education, sociology of education and philosophy of education. In this arrangement, lecturers may easily team up during lectures to promote the integration of related concepts. This kind of collaboration helps to orient newcomers to the journey, provide tools needed along the way and help them to navigate unfamiliar territory (Hibbert et al. 2014:98) in teaching and learning.

Nonetheless, collaborative teaching activity has problems. Hayes (2002:16, 18) identifies failure by some members in the instructional teams to understand the common concerns, insufficient time for teamwork, a lack of training in group

dynamics, overlapping roles, territorial and status conflicts and insufficient funding. Despite these challenges, Boyer and Bishop (2004:6) maintains that the experience is beneficial as it creates long-term relationships and democratic learning settings that nurture students' integration skills. In the process of developing interdisciplinarity, it nurtures collegiality, boosts confidence in participants and encourages them to express divergent views.

3.4.4 Introduction of Specific Learning Goals

Inculcating interdisciplinarity in student-teachers in Zimbabwe requires introducing them to categorically specified learning goals. On this note, Carmichael and LaPierre (2014:60) suggested that students can be introduced to specific learning goals to guide them through integration. The techniques for this include comparing ideas to consider alternatives, synthesising and making connections between ideas and topics to advance new ideas, analysing topics in-depth and using the findings to formulate new concepts or reach new conclusions, and connecting and integrating ideas across disciplines for the creation of new or alternative ideas or offer explanations (Carmichael & LaPierre, 2014:60).

These processes dovetail with the demands of most teacher training assignments and practices that require comparing, analysing, explaining, discussing, examining, evaluating and assessing issues. Other techniques include readings, discussions and the use of primary and secondary sources for critical and creative thinking enhancement (Carmichael & LaPierre, 2014:61). These activities ask student-teachers to bring disciplinary information together to improve each other's understanding reflectively or come up with new perceptions that remain open to challenge and improvement.

3.4.5 Involving Students to Teach

Davies and Fung (2018:15) stressed that the best way to learn something is to teach it. Those at lower levels get help from those at upper levels tasked to present lectures, showing the juniors how to use knowledge from different disciplines for various goals. This method promotes independence, confidence, ability to learn how to learn and develops permanent learning skills (Duerr, 2008:177). Through this method, students become aware of disciplines' cultures and histories as a first step

towards the development of a capacity to successfully understand and work with others from other disciplines. This awareness may focus on the fringes of a field, and with time, student presenters can develop confidence and delve deeper into their teaching subjects and pedagogy (Jones, 2009:79). In teacher colleges, this is feasible as student-teachers can engage in group tasks and the representatives can then report back to the whole class with room for interrogation by the audience. Alternatively, senior student-teachers who may have become conversant with interdisciplinarity may be tasked, as mini-lecturers, to demonstrate the approach.

3.4.6 Integration of Knowledge Perspectives

In a study on the influence of knowledge integration on student-teachers' professional competence, Kozlovsky and Ortnskyy (2019:127) report that the results indicated that studying each of the subjects in isolation has a minimal effect on students' motivation and competency levels. It is better to integrate disciplinary perspectives.

According to Golding (2009:8), integration of perspectives entails presenting a given subject in a way that allows students to integrate the perspectives into a new whole of unexpected but illuminating connections and syntheses. It is not presented as a smoothed over version of knowledge integration but allows conflict to emerge. The focus is on how each disciplinary perspective adds something to an integrative structure, for example, decision, product or explanation (Golding, 2009:8).

Tutorials and interactions in small groups provide opportunities for students to integrate the disciplinary perspectives. The tutors have to be excellent interdisciplinarians comfortable to roam outside their disciplinary comfort zones to help students to move towards integration of multiple perspectives (Golding, 2009:9). This presents a social challenge that may reside in the lecturers and students themselves. For example, student-teachers often move between disciplines on their educational pathways and the teacher education disciplines are often differently organised from primary and secondary school subjects (Arneback & Blåsjö, 2017:299). This may cause resistance due to polar groups, for instance, between literary intellectuals and scientists, resulting in scientists knowing a lot of scientific knowledge but little of anything else (McManus, 2006:225). Such polar groups may exist in teacher education with lecturers on the one hand and students on another.

Bias towards either side may make students resist or develop phobias and lecturers may not be open to interdisciplinary dispositions (McCalman, Muir & Soeterboek, 2008:17). Nobody comes to an interdisciplinary context with disciplinary neutrality due to divergence in expectations about high quality performance, ideal responses to questions, the best order to present content, how best material can be learned and so on. To this end, educators should make expectations about teaching and learning explicit, create consistent approaches to teaching and learning subjects, explain disciplinary jargon or skills and clarify expectations (Golding, 2009:10) to address discomfort and pave the way for merging perspectives.

3.4.7 Development of Conceptions About the Nature of Interdisciplinarity

Another method of promoting interdisciplinarity in student-teachers is the development of conceptions about the character of interdisciplinarity. Golding (2009:18) supports the view that for effective interdisciplinary teaching-learning to occur, students have to develop conceptions about the nature of interdisciplinarity. Student-teachers need sophisticated conceptions of knowledge and truth to make sense of multiple and often contrary disciplinary perspectives confronting them. They may take simplistic epistemic positions and fail to deal with the complex pluralism of multiple disciplinary perspectives. If they take a sophisticated epistemic position, they may see multiple perspectives confronting them as an opportunity to engage in dialogical, reflective thinking to come up with reasonable judgements or warranted assertions about issues of concern (Letseka & Zireva, 2013:59; Rogers, 2002:845). Their competence is sharpened and creativity stimulated as they transfer and apply knowledge.

3.4.8 Nurturing Student Development Towards Tolerance to Multiplicity

Perry (1999:64) believed that college students' mental and moral development is enhanced through dualism, multiplicity/pluralism, relativism and commitment. He noted that the dualists assume that knowledge is objective, certain and absolute, and categorises knowledge as right-wrong, true-false, correct-incorrect or good-bad. Believing that every problem is solvable, some try to learn the right answers and obey authorities, but others, as multiplicity/pluralists, view knowledge as subjective and uncertain (Golding, 2009:19). They may apply reflective, critical and inter-subjective thinking to judge a range of alternative concepts as better or worse, which

is a necessary foundation for interdisciplinarity. Students may develop relativism where they do not consider objective knowledge because they realise that beliefs, theories and values are relative, contingent and contextual (Herron, 2010:99; Perry, 1999:121). They may become tolerant to multiplicity, aware that all solutions to problems must be seen from different angles.

Tolerance to multiplicity is a situation where one experiences several plausible, yet contradictory explanations of the same phenomenon as opposed to one, clear-cut, unambiguous explanation (Booth 1979 as cited in Repko et al., 2016:142). This is a key feature of interdisciplinarity where there are solvable and unsolvable problems. The challenge is that epistemic positions tend to be very robust and difficult to abandon because they are one's perception of the nature of knowledge and how one determines the truth (Repko et al., 2016:142). As such, lecturers should challenge student-teachers to move from dualism to multiplicity, contextual relativism and beyond. They should support students to leave the comfort zone of one approach and try the strangeness of another approach by probing, questioning, quizzing and asking for clarification, justification and reflections.

3.4.9 Using Cross-cutting Themes or Issues

Essel, Nunoo, Tachie-Menson and Amankwa (2018:5) defined cross-cutting issues as those that intertwine with all course disciplines and are necessary for providing student-teachers with critical skills required for a holistic teacher education and development. They are central curriculum concepts not exclusive to one subject. The issues are best taught and learned in a number of subjects such as peace education, human rights and citizenship, gender equality, intercultural understanding, sustainable development, entrepreneurship, life skills and communication (Georgescu, 2013:37). UNESCO (2018:9) identifies these as environmental, economic, social and cultural issues that include climate change, gender equality, poverty and general principles like democracy. These help to connect programme content across disciplinary boundaries which enriches the curriculum without overloading it with additional subjects.

According to Kidron and Kali (2015:6-7), cross-cutting themes serve as a spine through which knowledge from diverse disciplines is integrated through integrative artefacts (essays, examinations, discussions and other tasks) where students are

required to integrate ideas from more than one disciplinary domain and theme lenses. The method requires a set of generic questions that are derived from the cross-cutting themes and activities infused in each disciplinary domain to promote the development of interdisciplinary connections. Kidron and Kali also suggested a disciplinary resource whereby students are exposed to disciplinary experts and the state-of-the-art knowledge artefacts (articles and video-recorded lectures uploaded, for example, on Google classroom). Involving an interdisciplinary moderator is yet another technique where the moderator does not need expertise in any disciplinary domains, but has interdisciplinary thinking, systematic capabilities and moderating skills (Kidron & Kali, 2015:6-7). Peer-review articles in which learners provide constructive and critical feedback to each other concerning course artefacts is the sixth feature of the cross-cutting issues method of promoting interdisciplinarity.

3.4.10 Vertical and Horizontal Articulation

According to Acquah and Owusu (2021:170) vertical articulation of the curriculum refers to a set competency taught to students in one lesson, course, or grade level that readies them for the next level of study with higher competencies. The learning is purposefully structured and logically ordered so that students can learn the knowledge and skills that would progressively prepare them for more challenging, higher-level tasks. Correlation and integration of knowledge demand promotion of horizontal articulation, that is, the scope and integration of curricular contents from different knowledge provinces within a certain level (UNESCO, 2019:14) This may require lecturers in the same programme and level to plan and scheme together for a logical flow of subject matter. This requires facilitators who have a broad base of knowledge of how to integrate a wide variety of subjects (Siyakwazi, 2014:195). Articulation exerts pressure on the lecturers to be competent vertically and horizontally, with wide knowledge of the target subjects. Lecturers also need to be prepared to work together genuinely otherwise they may contribute to the social forces that discourage interdisciplinarity by pre-service teachers.

3.5 THEORY AND PRACTICE: 'UNDISCIPLINING' THE DISCIPLINES

The literature reviewed so far shows that knowledge compartmentalisation has led to the creation of separate disciplines. However, these subjects have content that can be used across their borders for various reasons and in different contexts.

Interdisciplinary look at the bigger picture by critically examining multiple disciplinary and potentially conflicting insights, integrating them to produce a comprehensive understanding of workable solutions (Repko et al., 2016:143). Workability of solutions through the usage of ideas across subjects is a form of linking theoretical ideas to practical contexts. It means connecting theory to practice to euphemistically 'undiscipline' the disciplines and allow them to cross-pollinate. It entails removing the artificial borders between the disciplines so that knowledge can be integrated and then translate into practice in studying, discussing, teaching and learning.

The theory-practice nexus debate in teacher education dates back to the days of Dewey (1933) and studies have been conducted to establish how student-teachers can integrate the two (Oonk, 2009:15). Although this area has been oversubscribed, research seems to have skipped the place of interdisciplinarity in the theory-practice debate. The failure to link theory to practice is largely due to compartmentalisation of knowledge as a result of social factors. The best strategy is to permit theory and practice to inform each other without losing their distinctive functional individuality. Aristotle's classification of disciplines into theoretical science is relevant to this as it pursues knowledge for its own sake, practical science concerning conduct and goodness in action, and productive science for manufacture of objects (Carr & Kemmis, 1986:32; Shields, 2016:55; Smith, 1999:64). Before looking at the process of connecting theory to practice, it is important to look at the concepts, theory and practice critically.

3.5.1 The Concept Theory

The term theory is traceable to the Greek philosopher, Aristotle, based on knowledge forms. He proposed that theory exists in philosophical-contemplative knowledge (*nous*), knowledge about the surrounding world (*episteme*), knowledge of practical-ethical action (*phronesis*) and 'practical' knowledge and skills (*techne*) (Oonk, 2009:18). The *nous* and *episteme* are limited to mental processes (theory) because they originate from considering occurrences from a distance to reflect on phenomena while the *phronesis* and *techne* require physical action (practice). In this regard, Laluddin (2016:7) indicated that social theories are a means of envisioning the social

world to obtain practical knowledge about it. This leads to translation of theoretical knowledge into practice to resolve social issues.

A theory explains the facts through the construction of abstract ideas based on a series of logically related statements explaining and covering empirical (factual) situations (Giddens & Suttons, 2013:9; Santrock, 2005:40). Such abstract knowledge can be learned and linked to practical experience (Allan & Daynes, 2017:15; Korthagen & Kessels, 1999:10). Theories, therefore, are designed to answer questions or explain phenomena in different ways, to pave the way for action such as explanation, change, development and production of ideas, goods and services (Mooney, Knox & Schacht, 2007:1).

People do not just look at the phenomena to gain knowledge for its own sake (theory) but do so in order to be informed on how to execute action (practice). This is the expectation even in teacher education where prospective teachers are exposed to theory in various subjects that they can use integratively and practically

3.5.2 The Concept Practice

Oonk (2000:20) describes practice as a situation whereby one acts efficiently based on knowledge obtained theoretically. According to Berger (2002:107), practice entails marrying theory to action, and each half is useless without the other because theories die if disconnected from practice, and practice uninspired by theory is lifeless. Haralambos et al. (2013:899) maintains that praxis is a practical reflective activity that changes the world but excludes instinctive or mindless activities such as sleeping, breathing or walking. After theorising in lecture rooms, students execute the ideas during TP. The action influences theory, resulting in the theory-praxis nexus.

3.5.3 Theory-Practice Nexus

Whatmanand MacDonald's (2017:5, 10) contention is that the theory-practice union is inseparable in the sense that the former informs the latter and vice versa because theory-practice divide is unhelpful. Their relationship should be viewed as a nexus (Velle, 2019:369). In view of this, there is a great need for reconceptualisation of learning in teacher education to help overcome barriers toward theory-praxis nexus to promote integrative learning. It is important for student-teachers to learn to teach

(theory) and to become teachers (practice) (Whatman & MacDonald, 2017:5). The theory-practice divide influences some student-teachers to consider their practical experience more useful than their tertiary-based course (theory) in terms of learning how to teach (Whatman & MacDonald, 2017:5). Others may view their theoretical knowledge as more important than the practicum. Such misguided positions could be a consequence of social drivers. Both cases need counsel to holistically integrate theory and practice informed by interdisciplinarity because GPK combined with CK is deployed in action in various contexts.

In exploring the beliefs and practices of first year teachers of Literacy in New Zealand primary schools, Carss (2019: iii) found that a balance between theory and practice positively influences performance. The theory-practice connection balance is achievable if IKI is practised in teacher training. Thus, theories provide predictions, explanations and guidelines for actions and behaviour (Klette, 2011:4) usable in executing practice through interdisciplinarity.

3.5.4 Utilisation of the Union Between Theory and Practice

Interdisciplinarity promotes the union between theory and practice to unlock doors to the connection between subjects that have been artificially separated (Siyakwazi, 2014:138). Interdisciplinarity is the foundation of the theory-praxis nexus. According to Langeveld (1979:1, 17), practice without theory is blind, and theory without practice is sterile. Thus, educators find the intimate and unbreakable union of both is necessary (Morrison & van der Werf, 2012:399). Clearly, the teacher education theory should integrate first, through interdisciplinarity, fertilise practice and then be guided also by practice.

Darling-Hammond et al. (2005:441) concluded that finding the balance between theory and practice, providing student-teachers with the necessary theoretical background as well as practical knowledge are needed to prepare them for the challenges of teaching is a global ideal. Korthagen et al. (2006:1026) blame theory-practice disconnect on old-fashioned methods of teacher education for their limited relevance to student-teacher's needs. Since education, training, academic and practical work are hallmarks of holism that produce total beings, Singh and Mishra (2017:229) advocate new and operative pedagogy of teacher education that effectively interrelates theory and practice. The pedagogy may take the form of

interdisciplinarity that has the potential to marry theory to practice in ways that meet individual student-teacher tastes, contexts and purposes in the fashion of traditional African education.

3.5.5 Overview of the African Traditional Education on Linking Theory to Practice

African traditional education is regarded as holistic because it offers multiple, contextual teaching and learning opportunities where learners acquire multiple skills to meet individual and societal needs. In contrast, classroom and book learning teach certain kinds of thinking whose link to real life is difficult to see (Nsamenang, 2005:327). This could account for the tendency by pre-service teachers to fragment knowledge and divorce theory from practice. In contrast, an African worldview rests on systematic socialisation through participatory curricula that assign stage-appropriate developmental tasks where knowledge is not split into discrete disciplines (Nsamenang, 2006:293). According to Nsamenang, all knowledge strands are interwoven into a common tapestry and are actively learned according to developmental stages contextually linking theory to practice. It constitutes the core of indigenous education in integrating the social, cultural, political, occupational, artistic, religious and recreational life of the people, connecting theory to practice (Omolewa, 2007:593).

In African traditions, education is embraced in culture built on the daily routines and activities of the family and community (Nsamenang, 2005:329). For instance, if a learner is being taken through the steps on how to prepare a meal, the learner actually cooks food that is eatable. As learners acquire theoretical knowledge, they put it into practice in daily activities. The daily routines and activities cover a wide range just like the diverse formal disciplines.

In Boix-Mansilla's (2016:1) view, African education resembles life because individuals combine different forms of expertise to produce new works of art, explain complex phenomenon, fashion new technology or resolve social problems. Thus, individuals learn expert knowledge (theory) and apply it contextually (practice) to address emerging social needs. In the same way African education resembles life, so, teacher education should resemble teaching and learning by translating theory into practice through interdisciplinarity.

3.5.6 Teacher Education and Theory-Practice Gap

Disciplinarity in teacher education may fight against the theory-praxis nexus as it fails to resemble teaching-learning reality. Consequently, teacher educators may face the challenge of answering the concerns of teacher candidates about the theory-practice disconnect in education. The concerns of these candidates are that learned theories have little to do with the problems that they come across in the complex and messy world of the classroom (Gordon & O'Brien, 2007: xi). Theories provide teachers with a reference framework and language with which to name and critically analyse a myriad of the problems they face daily (Gordon & O'Brien, 2007: xi). They can define the problem that teachers face, clarify their confusion and suggest conceivable solutions to the problems but await action. The process involves the orderly inspection of truths that one already possesses (contemplation) while the productive element involves taking action to make things happen (Smith, 1999:68). The process begins with plans, designs or ideas for production that must be regrouped through interdisciplinarity.

Possibly, student-teachers may fail to discern the link between theory and practice due to social influences that promote knowledge compartmentalisation. Mhlolo (2014:34) blames traditional practices in teacher education for sustaining dichotomous gaps in the relationship between theory and practice. The practices in teacher education are increasingly criticised for their irrelevance to student-teachers' needs that make little practical impact (Korthagen et al., 2006:1020). For instance, compartmentalisation may mislead student-teachers to assume that the separation of course subjects means that they stand alone because "the connections between the disciplinary knowledge is not always easy to establish" (Boix-Mansilla, 2010:92, 118).

There are varying explanations regarding the theory-practice divorce. The gap has been framed by the knowledge transfer problem as the two were taken to represent two distinct kinds of knowledge and incorporate a strategy of arbitrage that leads to the view that the gap is a knowledge production problem (Van De Ven & Johnson, 2006:802-803). From the position of IKI, these cease to be problems but provide cues for the resolution of the theory-practice divorce for pre-service teachers. Theory and practice present two distinct kinds of knowledge, which is an advantage as IKI

seeks to merge the disparate knowledge forms to create comprehensively pragmatic knowledge. Knowledge production is also exploitable as IKI promotes the trading of ideas between disciplines, and arbitrage ensures that new, hybrid and practical knowledge that is valuable for the trainee-teacher process of nurturing human capital is generated. This is critical because society expects schools to deliver practicable knowledge because of the growing importance of commercialisation of knowledge economy (Mahrman & Lawler, 2010:10). Knowledge creation today takes place at contextual venues, which makes IKI in teacher education more amenable to integration in academic and practical coursework, TP and examinations.

From another angle, the theory-practice gap seems to stem from differences in communication systems, ways of knowing, impetus and criteria for making decisions in the communities of practice between knowledge producers (academics) and users (practitioners). The producers develop and publish generalisable theoretical knowledge which organisational practitioners develop and refine as they solve problems and challenges (Mahrman & Lawler, 2010:15). Theory and practice mirror the disciplinary characteristics in terms of development of theories, generalisation and how practitioners subscribing to the respective disciplines use theory contextually (Vashishtha, 2014:78). Even though the academic and organisational communities have different approaches to knowledge generation and communication, academics believe that the view of each is partial and incomplete in addressing complex social problems (Mahrman & Lawler, 2010:16). Hence, discussion should focus on how theoretical knowledge can contribute to practice (Van de Ven & Johnson, 2006:820). In this regard, Washington (1895), in his famous address at The Atlanta Exposition, September 18, 1895, advised that in all things that are purely social, people (and in this case disciplines) can be as separate as the fingers on one hand but can only be used together to achieve a purpose (Scott & Stowe, 1917:20). His emphasis was that even if people appear to be separate and individual, in the final analysis they form one whole, hence, the “separate yet one” perception. Based on Rodney’s (1973:15) observation, this ideal vision may fail because of hegemonic capitalist publishers and bourgeois scholars that dominate the scene as they mould world opinions. These opinions may discourage interdisciplinarity and the theory-praxis nexus in teacher training because they wield power to determine what counts as worthwhile knowledge, who should access it,

how it is accessed and used. They deploy what Gramsci terms cultural hegemony to police common-sense views regarding knowledge and disciplinarity in education, particularly in teacher education as observed in Zimbabwe. This prevents the academic and practical grand coalition that Booker T Washington envisaged in his grand trinity.

3.5.7 Booker T. Washington's Grand Trinity and interdisciplinarity

The Grand Trinity indicates that complete and thorough education engages the head (intellect), heart (emotions) and hand (action) in order to serve society fully (Siyakwazi, 2014:188). Similarly, John Dewey sought to unite the intellectual and moral development with practical instruction and experiential learning (Pinson, 2012:28). Pinson noted that both Dewey and Washington were against the acquisition of knowledge divorced from life experiences as they advocated the integration of thoughts, feelings and action. They both supported the union of theory and practice through integration so that academic work could lead to action culminating in the production of ideas, services and artefacts.

3.5.8 Integration: Breathing Life into Disciplinary Bones

Integration (correlation/dovetailing) occurs when students are given different tasks in various academic disciplines that demand that they use relevant relationships among the subjects. Dovetailing integration and academic work enables educationists to breathe new life and interest into the dry bones of mathematics, grammar, composition, chemistry and so on (Washington, 1904 as cited in Siyakwazi, 2014:188). For example, through correlation, students practise mathematics in a carpentry shop and write essays on ploughing in the fields in an English class. The argument, as expressed by Fisher (2015:710-711), is that disciplinary knowledge should be 'useful' so that books and reading are tethered to the essential of educating "real people [with] actual needs". According to Fisher, this is intended to concretely represent an instrumental relationship to literary practice or vocational realism – Washington himself argued that application is more important than abstraction. However, this is contentious because theory informs practice and vice versa. Both have a symbiotic existence because theorists form abstractions during practice and the resultant theories are applied to practice, for example, by student-

teachers on internship. Consequently, there is a need to educate the head, heart and hand together so that what is learned can be used practically.

Concerning the above scenario, Dani (2009) posits that science literacy is more about applying science concepts to explain and create more knowledge and cultural tools but less about knowing facts off-the-cuff. In light of this, it is vital that what the student-teachers study in their programmes must be integrated right through from the ideas to practice. It must go beyond abstraction towards worthwhile application. Critically, student-teachers must be taught to know, think and apply knowledge. They must be exposed to ideas first and then guided to apply the ideas to theory and practice contextually, mediated by interdisciplinarity.

3.5.9 Theory and Practice in the Process of Education

Despite some challenges, uniting theory and practice in education is of strategic importance because of the recognised gulf the two in education and in life (Fisher, 2015:711; Siyakwazi, 2014:191). The 'gulf' can be overcome by interdisciplinarity if the theory from different disciplines is used to migrate, integrate and wed across disciplines. Only when the hurdle of knowledge compartmentalisation in teacher education is surpassed can the theory-practice gulf be bridged. In the current state where knowledge is dealt with as disparate disciplines, it is difficult to relate the disciplinary theoretical knowledge to practical contexts. The way to resolve this is by going back to theory to close the rifts created between theoretical disciplinary knowledge first so that it integrates itself first and then links with practice to produce knowledge compounds (theory) that can be engaged in the critical process of driving practice and further informing theory.

Siyakwazi (2014:194) indicated that integration of theory with practice is consistent with pedagogical concepts and reality in meeting true needs. Among the scholars of interdisciplinarity, integration stands as the philosophers' foothold of interdisciplinary efforts, capable of turning diffuse disciplinary insights into pragmatic knowledge (Boix-Mansilla, 2016:3). Thus, students carry out productive work in addition to intellectual work through integration of theory with practice. The resultant marriage dismantles the boundaries between subjects (Whitehead, 1972, as cited in Siyakwazi, 2014:195). This shows that intellectual study (theory) should be combined systematically through the methods of interdisciplinarity with physical work

(practice) so that students can carry out intellectually and manually productive work. The argument is that things that should be done, should be learned by doing (Comenius, cited in Siyakwazi, 2014:195). If integrated, all theoretical disciplinary knowledge has the potential to serve practical purposes and yield much more. This should begin during teacher training as Washington impressed upon teachers that they should train learners to study, analyse, compare actual things and use knowledge obtained from classrooms and textbooks to observe, think about and deal with actual life (Croom & Alston, 2009:6).

3.6 THE PLACE OF INDIVIDUAL CHOICE IN THE WAY STUDENTS USE COURSE KNOWLEDGE

Social situations, such as academic interactions, are characterised by mixed motives with cooperative and competitive tendencies existing concurrently. Thus, although the existence of knowledge fragmentation by pre-service teachers seems to suggest the influence of various shades of conflict as possible sources, it is possible that there could be other push factors. Lovett (2006:266) cautions that it is extremely unlikely that there is one and only one best form of explanation for all possible social phenomena. One such explanation is the rational choice theory (RCT)/ choice theory/ rational action theory that was popularised by Gary Becker, (Ogu, 2013:90). According to Wittek (2013:668), it is an umbrella term for models explaining social phenomena as outcomes of individual action construed as rational and individual preferences, beliefs and constraints. Similarly, Lovett (2006:240) avers that the rational choice theory assumes the existence of a discrete purposeful actor who seeks the utility use of a choice to address a given situation in a rational way. The theory argues that, in the face of several courses of action, people usually do what they believe is likely to have the best overall outcome following steps to reach that chosen decision. In this sense, individual choice is possible concerning how student-teachers use disciplinary knowledge and find the theory-praxis nexus.

3.7 CHAPTER SUMMARY

This chapter explored literature related to compartmentalisation and disciplines. This was linked to humanity's insatiable desire to comprehend the world in greater detail. The compartmentalisation of subjects was traced to the Greek philosophers, Prussia and the social institution called school/education. interdisciplinarity that synthesises

several disciplinary knowledge to enrich the overall educational experience (Jones, 2009:76) was also looked at. This led to the review of literature related to IKI and ways of practising it to create the theory-practice nexus.

Overall, the literature reviewed showed traces of cultural hegemony as cases of disagreement, disquiet, friction, attitudes and fear were noted between different disciplines and, inadvertently, those subscribing to these areas. However, a word of caution was also considered from the rational choice theory because it could be that the student-teachers opt for disciplinarity, interdisciplinarity or theory-praxis combinations purely to meet their individual choices. The next chapter deals with research methodology and techniques used in the generation of data at the three sites.

CHAPTER 4

RESEARCH METHODOLOGY AND DESIGN

4.1 INTRODUCTION

The two preceding chapters, Chapters 2 and 3, reviewed literature focusing on the theoretical framework, disciplinarity and interdisciplinarity in Zimbabwe and internationally. This fourth chapter considers the philosophical assumptions, research paradigm, research design and methods selected to address the research questions. The rationale for both the study and chosen research design are covered, together with data generation and analysis procedures. Issues regarding selection of participants, data processing, trustworthiness and ethical principles that were observed also form part of this chapter.

The research engaged a qualitative approach and a case study design to study participants in their natural institutional settings. This design enabled the research to probe participants' views on social factors that lead to fragmented use of courses through semi-structured interviews, document analysis and observation to generate data. The approach is exploratory and seeks to explain 'how' and 'why' a certain phenomenon or behaviour occurs as it does in a particular context (Kura, 2012:9), which is the fulcrum of this research. Qualitative research involves an interpretive, naturalistic approach to the world in an attempt to understand or interpret phenomena based on meanings that participants bring to them (Creswell, 2009:175; Denzin & Lincoln, 2000:3).

From the foregoing, this work is important as it used sociological lenses to explore the social dynamics that discourage interdisciplinarity in teacher education. The results may help to establish the sociological explanations regarding compartmentalisation of what Mhlolo (2014:35) calls "campus taught courses" and ways of assisting student-teachers to embrace interdisciplinarity in pursuit of construction of teacher knowledge for practical use.

4.2 PHILOSOPHICAL ASSUMPTIONS

Creswell (2013:15) explained that the research design process in qualitative research starts with philosophical assumptions that an inquirer makes in planning to

undertake a study. Philosophical assumptions are a set of beliefs or positions an inquirer brings into a study that guide action (Al-Saadi, 2014:1; Creswell, 2009:6). For this study, the inquirer subscribed to the ontological and epistemological stances.

4.2.1 Ontological Assumptions

The ontological stance assumes that reality is subjective with multiple voices from different participants in its creation (Cohen et al., 2011:3-4; Creswell, 2013:18). As such, ontological assumptions concern the nature or crux of the social phenomena being investigated by asking whether social reality is external to individuals and imposes itself on individuals' awareness from outside or if it is the product of individual consciousness (Al-Ababneh, 2020:26; Creswell, 2013:17). It seeks to ask if reality is a given "out there" in the world or it is created by people. In carrying out this study, the researcher assumed that knowledge compartmentalisation in teacher education, as observed at some institutions in Zimbabwe's Midlands Province, has social roots but has been imperceptibly imposed and naturalised by means of what Gramsci terms cultural hegemony.

When enrolling for training, the assumption is that teacher candidates are neutral, and one wonders why they end up practising knowledge fragmentation. If the purpose of training is to develop teacher knowledge by integrating GPK and CK, it is surprising that some student-teachers fragment the subjects. If all disciplines shape one reality, IKI in teacher education should be the norm. However, political interests shape multiple beliefs and values that are socially constructed to privilege some views of reality but not others (Cohen, et al., 2011:33). This is reflected in Antonio Gramsci's cultural hegemony.

In terms of education, ontology is the study of the nature of educational reality and how there may be different insights into what is known. From this perspective, a researcher thinks about whether the world exists independently of the knower's discernments of it (Greener, 2011:6). The researcher's ontological position shapes the methodological decisions, dependent on whether the researcher believes in an external, independent reality or an experienced, constructed reality based on social or individual human perceptions (Jackson, 2013:52). In undertaking this study, the researcher was guided by the conflict and neo-Marxist views that see an external

reality, dependent on social conceptions of reality shaped by the dominant group and imposed as normal. With regard to knowledge segmentation, the researcher believed that it is a social product.

Moon and Blackman (2017:1170) observe that ontology is concerned with what actually exists in the world that is knowable. Ontology helps researchers to determine their certainty about the nature and existence of objects they are studying, for instance, who decides the legitimacy of what is real, which means that reality is relative. Relativist ontology is based on the philosophy that reality is mentally constructed, and so there is no one 'true' reality because it is 'relative', depending on individual experiences at specific time and place (Moon & Blackman, 2017:1170). Such a scenario is fertile ground for conflict due to competing realities between individuals and disciplines.

Berryman (2019:272) viewed ontology as the philosophical study of existence that describes the knowable and believable existence that is considered vital or basic. Kivunja and Kuyini (2017:27) described it as the philosophical study of the nature of existence or reality, of being or becoming, as well as the rudimentary categories of things that exist and their relations that comprise one's underlying belief system as a researcher, about the nature of being and existence. It is about the assumptions that people make to believe sensibility or reality of things. It helps the researcher to conceive the nature of reality and what can be known about that reality. Such assumptions are crucial to understanding how the researcher makes meaning of the data generated. This work questioned the existence of disciplinarity as a given in order to promote interdisciplinarity in teacher education.

Ontologically, reality is initially apprehensible as plastic and pliable but is shaped by social, political, cultural, economic, ethnic and gender factors over time. It is crystallised (reified) into a series of structures that become taken as "real", natural and irreversible (Guba & Lincoln, 1994:110). This belief connects well with Gramsci's cultural hegemony theory that posits that ideas are propagated by the dominant class and mythically presented as a taken-for-granted reality, common sense for acceptance and consent by lower subaltern classes (Nieto-Galan, 2011:457). Informed by the critical theory paradigm, the researcher brought into this study the position that disciplinarity in teacher education in Zimbabwe is a result of cultural

hegemony by social forces and presented as common sense by the dominant groups.

4.2.2 Epistemological Assumptions

Epistemology is a way of understanding and explaining how people know what they know (Crotty, 2003:3). Moroi (2020:129) explained it as being concerned with how people end up knowing something and the truth to answer such questions as: What counts as knowledge? How are knowledge claims justified? For critical theory, the epistemological assumption is transactional/subjectivist; value-mediated findings (Matta, 2021:3), but for constructivism it is transactional/subjectivist; co-created findings. For this study, the researcher chose the subjective, value-mediated findings on the assumption that the world and knowledge are subjective, value-laden and dependent on the knower.

Al-Ababneh (2020:78) showed that epistemologies are objectivism, constructionism and subjectivism where objectivism says meaning and meaningful reality exist out there. Objectivism argues that social entities exist in reality external to people (Saunders, Lewis & Thornhill, 2009:110). Constructionism sees meaning existing due to human engagement with the social realities because there is no truth waiting to be discovered and no meaning without a mind. This view supports a claim that subject and object are partners in generating meaning. Subjectivism is regarded by Saunders et al. (2009:111) as social phenomena that are created from the perceptions and actions of humans. This study leaned towards the subjectivist view on the basis that the phenomenon to be investigated is created from the perceptions and resultant actions of student-teachers as the social actors.

Al-Saadi (2014:4) stated that interpretivism and constructionism approaches specify that knowledge is produced through exploration and understanding (note: not discovering) the social world of participants' meaning and interpretations. The argument is that meanings are socially constructed by people in a particular context. As such, ways of knowing about disciplinarity/interdisciplinarity are perceptions and interpretations the student-teachers' environments. They perceptibly interpret what their senses tell them. This is supported by Ormston et al. (2014:28) who saw knowledge of the world as 'understanding' arising from human reflection on events and lived experiences. The researcher is convinced that to know the social factors

behind knowledge fragmentation by students, requires interpreting and constructing the causes of disciplinarity.

Aliyu, Singhry and Adamu (2015:6) observed that based on the epistemological questions, critical theory reveals the dispersal and distribution of knowledge as a source of power. This is constituted by the lived experiences and the social relations structuring the experiences of participants where events are understood within social and economic contexts. In light of this, the researcher assumed that knowledge fragmentation by student-teachers was a result of their lived experiences in their institutions and was understandable by getting closer to the students to determine and interpret the social roots of knowledge fragmentation.

Understood as a way of looking at the world and making sense of it, epistemology is about the assumptions which one makes about the bases of knowledge, its nature, form, acquisition and communication (Al-Saadi, 2014:2; Cohen, Manion & Morrison, 2007:7). These kinds of epistemological assumptions intensely affect how researchers study social behaviour, for example, decisions about methods. For this study, the researcher viewed knowledge as personal, subjective and unique, which necessitated greater involvement with student-teachers, lecturers through interviews, document analysis and observation.

4.3 RESEARCH PARADIGMS

Denzin and Lincoln (2000) define paradigms as human constructions showing where the researcher is coming from in the construction of meaning embedded in data. In educational research, the term paradigm describes a researcher's 'worldview' (Mackenzie & Knipe, 2006). Kivunja and Kuyini (2017:26) explained it as a perspective, thinking, school of thought, or a set of shared beliefs that inform the interpretation of research data. It is a basic belief system and theoretical framework with ontological, epistemological, methodological and methodical assumptions (Rehman & Alharthi, 2016:51). Put differently, it is a researcher's way of understanding reality. The beliefs inform and guide inquiry, methodology, methods, literature, research design choices and the interpretation of findings (Patton, 2015:89). Thus, a paradigm guides the conduct of an investigation and the investigator's definition and route to truth and reality. According to Mittwede (2012:25), four major paradigms that seem to compete in qualitative inquiry are

positivism, post-positivism, critical theory and constructivism with the latter being more strictly qualitative (subjectivist). This research adopted the critical theory paradigm.

4.3.1 Critical Theory Paradigm

Critical theory shines a diagnostic light on the operations of society and regards them as subjugated to the interests of the elite who have successfully convinced most people that those elite interests are the interests of society (Sumner, 2003:3). It is one of the first forms of interdisciplinarity that started with the Frankfurt School intellectuals. Traceable to Marxism, it is credited to Karl Korsch, Georg Lukács, Antonio Gramsci, Wilhelm Reich, Max Horkheimer, Theodor Adorno, Herbert Marcuse and Jürgen Habermas (Brian, 2012:1; Thompson, 2017:3). The paradigm contests the status quo and puts great effort into creating a balanced and democratic society by addressing power relations obtaining in social institutions' interactions (Asghar, 2013:3123). It aims to emancipate people towards an egalitarian society (Cohen et al., 2007:26). Pozzebon (2004:298) viewed critical theory and interpretivism as linked because of their interest in hermeneutics (interpretations of human understanding), and so, research may be interpretive and critical without any inherent inconsistency. According to Plack (2005:233), critical theorists seek to understand how power dynamics shape individual and social consciousness. The theorists believe that one's interpretation of a situation is influenced by numerous external forces and struggles including norms, race, gender, class, political, social, historical and ideologies (McLaren & Kinchelow, 2002:288). They view ideology as the principal obstacle to human liberation (Plack, 2005:233-234).

The theory was chosen to critique and transform, recompense and emancipate the disciplinarity mantra blindfolding student-teachers. As Plack (2005:239) argued, "human nature cannot be fragmented into a few distinct variables for study" unless there are social forces at play. The paradigm matches the purpose of this study of freeing academic work from the power of cultural hegemony (Dammak, 2019:6) leading to the case study design that was chosen and the attendant interview, observation and document analysis methods.

A comparatively young paradigm which has not yet gained due consideration, critical theory is associated with the analysis of culture and society (Asghar, 2013:3121;

Thompson, 2017:2). A paradigm aims to fight oppression, raise consciousness and take action towards emancipation (Alvesson & Willmott, 2016:435; Creswell, 2013:27). It is oriented towards critiquing and changing society by digging beneath the surface of social life to uncover assumptions that stop humans from understanding the world (Bolanos, 2013:6). This dovetails well with this study that takes a critical perspective towards disciplinarity in teacher education to promote interdisciplinarity.

Following in Marx's critical footsteps, Hungarian Gyorgy Lukács and Italian Antonio Gramsci developed critical theories that explored the cultural and ideological aspects of power and domination (Corradetti, 2013:1; Crossman, 2019:28; Kellner, 2005:7). They focused on critiquing social forces that prevent people from comprehending how power affects their lives (Crehan, 2006:6). Critical theory explains the social problems of power and justice and offers practical solutions to them through rational activity (Bolanos, 2013:9; Bronner, 2017:19; McLaren & Kinchelow, 2002:288). In Wearne's (2016:5) view, the argument is that freedom in society is inseparable from enlightenment thinking. Sadly, Thompson (2017:2-3) argued that for the Frankfurt School theorists, modernity has corrupted reason and tarnished it by using reason as a means of pursuing domination. As such, it is imperative to relate everyday perceptions to a deeper, more rational knowledge and peer under the apparent forms of human behaviour and the underlying rational structures of unconsciousness that produce the behaviour (Thompson, 2017:2). Peering beneath knowledge fragmentation common sense underpinned the study.

Fuchs' (2016:10) observation is that critical theory is connected to struggles for social justice and fairness. Through it, the intellectual dimension of strife can help to explain the causes, conditions, potentials and limits of the contests by rejecting the argument that academia and science should and can be value-free. Unlike other theoretical approaches, critical theory seeks praxis (combination of theory and action), as its overarching goal is to understand power structures and act to change them in positive ways (Gramsci, 1971:404). It opens doors to new possibilities by looking at unexamined assumptions and comparing these with the resonance of lived experiences (Zanetti & Carr, 1997:2208). The approach challenges the dominant social, economic and political assumptions and structures in various social sectors including education. In Corentin, Bichler and Nitzan's (2018:45) words, "the

old theoretical scriptures no longer offer unequivocal instructions, which necessitates their deconstruction for reinterpretation and readjustment to the ever-changing reality". This work is similarly persuaded to believe that cultural hegemony and ideologies are part of the social genesis of disciplinarity in teacher training that is presented as neutral and value-free. The arrangement must be subjected to scrutiny and readjusted to the new reality of interdisciplinarity.

For Thompson (2017:2), critical theory is a conglomeration of alternative paradigms including feminism, neo-Marxism, materialism, social theories, sociolinguistics, participatory inquiry, racialised discourses, cultural studies, queer theory, deconstruction and postcolonialism. In embarking on this study, the researcher adopted the neo-Marxist viewpoint because of the belief that knowledge fragmentation could be traceable to external social forces and struggles between disciplinary groups as well as social classes but shaped by ideology and cultural hegemony into common sense.

From this paradigmatic standpoint, Steinberg and Kincheloe (2010:140) warned that the so-called democratic societies are not as democratic as believed because citizens are controlled by the forces of power operating in a universal climate of deceit that acculturate school individuals to feel comfortable in situations of domination or subordination. All thought and theories are shaped by political worldviews because value-free knowledge is a myth (Fuchs, 2016:10). Fuchs explained that the reasons a person is interested in a certain topic that aligns with a certain school of thought, develops a particular theory but not another, and refers to certain authors but not others, are deeply political because society of today is shaped by conflicts of interest. As a result, the argument by Fuchs (2016:11) is that for scholars to survive and assert themselves, they have to make choices, enter strategic alliances, and defend chosen positions against *others*.

In the final analysis, Stehr (2004:643) categorically averred that knowledge is a social construct with social forces and processes affecting knowing and knowledge claims. Thus, knowledge production is negotiated, socially controlled and intensely political because it is a productive force in the knowledge-based economy (Stehr, 2004:643). Knowledge is a historical reality shaped by social forces and reified or

crystallised over time into a common sense, natural and indisputable form through cultural hegemony (Crehean, 2006:x; Kincheloe & McLaren, 2000:288).

The paradigm is particularly relevant for the study that sought to challenge disciplinarity by exploring the causes of its prevalence in teacher education. The study problematised the taken-for-granted disciplinarity culture in the interests of rational integration of knowledge to continue the intellectual revolution of the enlightenment (Nichols & Allen-Brown, 1966:226; Sherer, 2008:2), which blends well with the Gramscianism ideas adopted. The philosophical assumptions and research paradigm influenced how the researcher set out to conduct the study. The next part covers the research methodology and design.

4.4 RESEARCH METHODOLOGY

Hathcoat, Cara and Mark (2019:102) contend that ontology, epistemology and the theoretical perspective reach deeply into the research process to influence what questions a researcher asks and the process of finding “answers” to them. They influence the research methodology, that is the path that the researcher adopts to conduct research (Sileyew, 2019:2) from problem formulation to methods and data presentation. It is the overall plan for carrying out research congruent with the researcher’s epistemological and ontological position and is driven by the nature of the research question (Berryman, 2019:273). According to Antwi and Hamza (2015:219), it refers to how the researcher goes about practically finding out that which they believe is knowable. It is a strategy for translates ontological and epistemological principles into guidelines that show the way the research is to be conducted.

In settling for a research methodology, Noor (2008:1602) advised that this is informed by the type and features of the research problem. It is based on whether the research problem and research questions are quantitative or qualitative (Creswell, 2012:11). For this study, the researcher chose the qualitative track.

4.4.1 Research Design

The research design ensures effective address of the research problem. Asenahabi (2019:31) and Thakur (2021:54) asserted that it is a plan referring to the overall strategy constituting the blueprint for data collection, measurement and analysis

chosen to integrate different components of the research coherently and logically. According to Creswell (2012:11), it involves designing and writing up the research as either quantitative or qualitative. Creswell (2009:16) explains that the worldviews, the strategies and the methods all contribute to a research design that is quantitative, qualitative or mixed. In turn, this determines the methodology, methods and techniques chosen by a researcher so that the research problem is efficiently handled by answering research questions. Akhtar (2016:68) maintains that the design shapes decisions about the kind of data to be generated, the site, time, participants, sources, methods and analysis of data. All these views point to the notion that the research design is an overall strategy chosen by a researcher to coherently integrate different components of a study to effectively address the research problem (Akhtar, 2016:70). For this study, the problem and research questions steered the researcher toward the qualitative research track to explore the social reasons behind knowledge fragmentation by student-teachers in Zimbabwe.

4.4.2 Qualitative research methodology

Aspers and Corte (2019:155) define qualitative research as an iterative process in which researchers gain greater understanding by making differences resulting by getting closer to the phenomenon studied. The approach aims to understand a phenomenon from the standpoint of the participants with the researcher as an instrument who personally collects data from multiple sources (Kaplan & Maxwell, 2005:50; Patton, 2015:294). When using this approach, data are inductively interpreted (patterns and themes are built from the bottom up) for a holistic account and complex picture of the research problem, tinged by the background of the researcher, context and theoretical persuasion (Creswell, 2014:175-176). Kaplan and Maxwell (2005:52) add that it involves a systematically detailed study of participants in natural settings to generate their meanings of the occurrence. Through the chosen theoretical lenses, the approach helps the researcher to explore and understand people, their views, actions, social and cultural contexts and the meanings they ascribe to these social phenomena (Creswell, 2014:4; Myers, 2013:5; Nyawaranda, 2010:170). These characteristics of qualitative approach made it appealing for the exploration of the social reasons behind knowledge fragmentation by the pre-service teachers so as to promote holism based on interdisciplinarity guided by Antonio Gramsci's cultural hegemony.

The qualitative inquiry was chosen because it generates words as data for interpretive analysis (Brikci & Green, 2007:2) from natural settings (TTIs) by looking closely at people's words, actions (of students and lecturers) and records (assignments, timetables, examination scripts, syllabi) (Denzin & Lincoln, 1994:1; Marvasti, 2004:7). The emphasis on naturalistic and interpretive understanding of non-statistical data and conclusions (Kura, 2012:9) made this approach relevant for the current qualitative study of the social origins of knowledge compartmentalisation.

The qualitative methodology used to generate data and understand and explain social phenomena include interviews, document analysis and observations (Tomaszewski, Zarestky & Gonzalez, 2020:2, 4) which were appropriately used for this study. Through these methods, words are the coin of the realm and the object of the researcher's fascination in investigating phenomena (Patton, 2015:294). It means the researcher was interested in the words as the source of individuals' perceptions and meanings of social reality of knowledge fragmentation. The researcher's understanding of the causes of fragmented use of course knowledge was deepened by inquiring into documents and interpreting the meaning-making process in a personal way with the researcher as the instrument (Lloyd-Jones, 2003:33; Patton, 2015:294). In Denzin and Lincoln's (2000:3) words, the approach's set of revelatory and material practices make the world visible by turning it into a succession of representations through field notes, interviews, conversations, photographs, recordings and memos.

The qualitative research methodology assisted the inquirer to conclude "why" fragmentation exists from "what" participants had to say about it. Underpinned by the interpretivist epistemology and constructionist ontology that assume that meaning is entrenched in the participants' experiences and is arbitrated through the researcher's own discernments (Merriman, 1998 as cited in Antwi & Hamza, 2015:220), the methodology permitted the researcher to get insight into the causes of knowledge fragmentation by student-teachers. It allowed the inquirer to be immersed in the practice of fragmentation by interviewing, analysing existing documents and observing to obtain an insider's view of interdisciplinarity in natural settings. Methodologically, constructivists accept that reality is multi-faceted with varied and multiple meanings that can only be studied as a whole in their natural context (Antwi & Hamza, 2015:220; Creswell & Creswell, 2018:46).

This part looked at the qualitative research approach chosen for its compelling strengths. The approach stresses a naturalistic setting, multiple data sources, inductive data analysis and participant meanings, and is interpretive in nature. The methodology gives space to construct and interpret qualitative data generated from various sources through theoretical eyes. The next part deals with the case study, the qualitative research design chosen for this research.

4.4.3 Case study

This is a research strategy or design for studying a specific or single instance to illustrate a more general principle (Cohen et al., 2011:289; Crowe, Creswell, Robertson, Huby, Avery & Sheikh, 2011:1; Yin, 2017:18). According to Brundrett and Rhodes (2014:57), a case study design is used to generate an in-depth understanding within a defined boundary of space and time pertaining to phenomena of interest. It offers a unique example of real people in physical situations for better understanding (Cohen et al., 2011:289). Therefore, it is a detailed and rich story about a phenomenon, such as a person, organisation, event, programme, a concept, practice or process (Patton, 2015:259; Van Wynsberghe & Khan, 2007:2). This design was preferred as the study focused on one case in the Midlands Province for an in-depth study of knowledge fragmentation by student-teachers.

As a transparadigmatic and transdisciplinary exploration that involves cautious definition of the phenomena for data collection (Van Wynsberghe & Khan, 2007:2), the strategy was selected because it is relevant to critical theory and has no particular disciplinary orientation as it can be used in social sciences. It is suitable for the current sociological exploration of social factors regarding the disciplinarity-interdisciplinarity dichotomy.

The design was also adopted here since this is an educational inquiry, a field of knowledge that frequently employs case studies (Montes-Rodríguez, Martínez-Rodríguez & Ocana-Fernandez, 2019:59). With its roots in sociology, the strategy focuses on the intensive study of a specific instance called a case (one or more cases within a bounded setting) that is conducted according to rigorous rules of evidence to investigate a problem by collecting unstructured data for qualitative analysis (Haradhan, 2018:11-12; Patton, 2015:259) which is in sync with the amorphous data and their analysis for this research.

4.4.3.1 Case Study and Generalisation

A thorny issue surrounding the case study concerns generalisability of research findings. Gomm, Hammersley and Foster (2011:2-4) addressed this issue by postulating an intrinsic case study which involves the study of particular cases for their own sake though it is possible to avoid the problem of generalisation if the case studied has sufficient intrinsic relevance. Gomm and others argued that a case such as teacher education in this context, is often so large that it is impossible to collect data about it as a whole, but parts of it, as samples, are investigated and the findings generalised to the whole case. In the current study, the case is one province in Zimbabwe with selected participants from three sites representing the whole case. Consequently, the findings may be generalisable to the case and beyond.

The argumentation by Yin (2009:15) is that case study findings are only generalisable to theoretical propositions but not to populations or universes because case studies analytically generalise to expand theory but not statistical. Stake (2000:21) submitted that researchers employing case studies make “naturalistic generalisations” which are different from deductive generalisations based on statistical analysis. Naturalistic generalisations develop by recognising similarities of participants contextually by sensing the natural covariations of events (Stake, 2000:22). Similarly, this study may generalise theoretical propositions related to cultural hegemony by relating similarities in issues regarding disciplinary practices in TTIs to the facets of social life and problem-solving. After looking at the character of the case study design and its potential for generalisability, the next part presents the justification for the choice of the design.

4.4.3.2 Justification for Choice of Case Study

A research design accompanies a specific strategy and provides specific direction for procedures. It is chosen based on certain considerations unique to the researcher and the problem under investigation; for instance, the case study works with the qualitative approach (Creswell, 2014:12; van Rensburg, 2010:125). Therefore, a case study strategy was used because it fitted the qualitative approach adopted for this sociological research. The researcher planned to study the student-teachers in their natural settings (institutions) to collect rich data regarding disciplinary in order to promote interdisciplinarity. The choice was influenced by the inquirer’s desire to

understand the causes of knowledge compartmentalisation in situ and possible theoretical generalisation (Cohen et al., 2011:289) with the case providing a unique instance of real people (student-teachers) in naturalistic contexts (TTIs).

The case study was selected for allowing in-depth, multi-faceted exploration of complex issues in real-life environments (Crowel et al., 2011:1). In other words, it is useful to obtain an appreciation of a phenomenon of focus in its normal setting as is the case with this study. The case study was deemed suitable as it focused on a purposively sampled province for in-depth study.

The fact that the case study is usable across paradigms and disciplines aligns well with the thrust of study to promote interdisciplinarity. The design is useful in data collection and analysis about a large number of features of the case from interviews, documents and social interaction in uncontrived, real-life contexts for the researcher to understand the influence of the context on the case. The use of multiple sources of data, both primary and secondary, (interviews, observations and documents) permits triangulation that helps to understand the case (Rose, Spinks & Canhoto, 2015:1; Stake, 2006:436). The study triangulated methods of generating data that is vital for trustworthiness as presented in the next section.

4.5 DATA-GENERATION METHODS

Research methods are various procedures or specific tools or sets of instruction used to collect data and find a solution to a problem (Berryman, 2019:274; Goundar, 2013:9-10). In any form of research, one would be required to either count things or talk to people, which leads to a broad classification of research into quantitative and qualitative methodologies (MacDonald & Headlam, 2011:9; Madziwa, 2016). In tandem with the selected qualitative research approach, qualitative research methods/tools were chosen.

The qualitative research methods interviews, focus group discussions (FGDs) and observations are useful in exploring how individuals see, think, experience and interpret phenomena to answer 'why' questions through rich and thickly detailed data (Given, 2008: xxix; MacDonald & Headlam, 2011:34; Walliman, 2011:92). They are effective in qualitatively recording people's judgements, emotions, ideas and beliefs, and describing these in words to produce qualitative data because words cannot be

manipulated mathematically (Walliman, 2011:71). This fitted the current study that explores the causes of knowledge fragmentation by student-teachers through interviews, document analysis and observation as presented next.

4.5.1 Interview

An interview is a popular method of gathering information from people (MacDonald & Headlam, 2011:34; Walliman, 2011:92). It is a highly regarded method for exploring the construction and negotiation of meanings in an ordinary setting (Cohen, Manion & Morison, 2007:29) because that helps to build a holistic snapshot from views of informants by enabling interviewees to “speak in their own voice and express their own thoughts and feelings” (Berg, 2007:96). The method provides a direct window and inner view to the minds of interviewees (Block, 2000:758). It requires identification of interviewees currently in the situation and the type of interview to use (Griffie, 2005:2). For this study, student-teachers and lecturers were identified as the rightful informants on the causes of knowledge fragmentation. Because of the COVID-19 pandemic, telephonic interviews were used in place of face-to-face. Another decision that the researcher had to make concerned the interview style to be used, which is covered in the next section.

4.5.1.1 Semi-structured interview style

Walliman (2011:99) commented that an interview is a very flexible tool applicable in a wide range of situations to question samples of people. The flexibility begins from the fact that the interview types range from standardised, structured, semi-structured to unstructured (Cohen et al., 2007:352; Stuckey, 2013:56). The semi-structured interview (SSI) was selected in this study, which, according to Adams (2015:493), is a dialogue conducted conversationally with one participant at a time, blending closed and open-ended questions with follow-up *why* or *how* questions. Initially, it was planned to be face-to-face with student teachers and lecturers but due to the COVID-19 lockdown restrictions, the telephonic form was used.

The SSI is used to gather focused, qualitative textual data during the empirical research phase to uncover rich descriptive data on the personal experiences of participants using an instrument called an interview guide (Jamshed, 2014:87). Adams (2015:493) credited this style for its flexibility as it has the components of

structured and unstructured interviews, meandering around the topic of interest to avoid slavish adherence to verbatim questions while delving into totally unforeseen issues in relaxed and engaging ways though this is time-consuming and demanding. To ameliorate the time challenge, only a few selected student teacher and lecturer participants were interviewed telephonically using an interview guide (Appendices D & E).

Jamshed (2014:87) defined an SSI guide as a plan of questions that need to be explored by the interviewer. This means it is a set of pre-prepared similar questions to be answered by all interviewees with additional questions for probing. The guide provides clear instructions for interviewers on collecting reliable, comparable qualitative data (Stuckey, 2013:57). This helps to explore many participants' perspectives systematically and comprehensively while keeping the interview focused on the desired direction. Cohen et al. (2007:375-376) explained the interview schedule/guide as translating the research objectives into the questions that make up the main body of the guide with items prepared as open-ended questions dealing with facts and opinions. This schedule was used telephonically in order to abide by the global and local COVID-19 guidelines that prevailed in 2021. The interviews were used along with document analysis that is covered below.

4.5.2 Document Analysis

Document analysis is a systematic procedure for reviewing or evaluating documents – both printed and electronic (computer-based and internet-transmitted) material.

Bowen (2009:28) described document analysis as a systematic qualitative research procedure for reviewing and interpreting printed and electronic documents to give voice and meaning to a phenomenon by coding content into themes. Documents that are analysable were identified by Morse (2008:10) as official records, personal diaries, journals, photographs and video recordings, which are valuable sources from which data are collected by extracting major themes, keywords or features. One of its advantages is that it is unobtrusive as it depends on official and personal documents unintentionally produced for the current research and the subjects are not aware that they are being studied (Cohen, 2007:475). The documents analysed included lecture programmes, timetables, syllabi, lecture notes, assignment and examination scripts, vacancy advertisements and their application forms. In order to

systematically analyse these sources, a document analysis guide was used (Appendix F). To triangulate the findings, another method that was used in the research to generate data was an observation guide (Appendix G), which is covered in the next part.

4.5.3 Observation

Walliman's (2011:100) explanation of observation is that it is a method of generating data by watching people or events where the researcher takes a detached view of the phenomena by being 'invisible' even if the subjects are aware that they are being watched. It offers a researcher the opportunity to generate 'live' data from naturally occurring social situations as an overt (direct) or covert participant (indirect), allowing the investigator to look at what events take place in situ (Cohen et al., 2007:396). This was relevant for this study as there was a need to observe subtle social determinants of knowledge fragmentation on the ground to yield authentic data from formal and informal social interaction, for example, during lectures and casual talk. The method is attractive in exploring underlying realities of situations as discrepancies between what participants say and believe, and what actually happens are discovered (MacDonald & Headlam, 2011:50-51). This method provides a reality check by recording people's reactions to questions which can illustrate their views better than their verbal responses (Robson, 2002:310; Walliman, 2011:100).

Cohen et al. (2007:397) and Walliman (2011:101) shared the position that observation appeals to all but is not restricted to the range of perceptible human senses as the researcher's roles range from complete participant to complete observer. For this study, covert observation with participant-as-observer was used during institutional activities by means of structured observation of critical incidents portraying social factors suggestive of cultural hegemony and inhibiting disciplinary collaboration. This allowed the researcher to capture natural patterns of interaction revealing the nature of relationships in line with ideological hegemony. To capture the patterns, the researcher used instruments related to the above methods which are looked at in the next section.

4.6 DATA-GENERATION TOOLS

According to Pandey and Pandey (2015:56) and Creswell (2012:157), a researcher requires methods and matching data-gathering tools (techniques) to guide data generation and evaluation. Developing instruments involves identifying their purpose, reviewing the literature, writing the items and pilot testing with individuals similar to those planned to be studied (Creswell, 2012:157). Haralambos and Holborn (2002:821) explained a pilot study as a small-scale initial study carried out before the actual research for the purposes of checking the feasibility or improving the design of the research. The interview, observation and document analysis methods (Lune, Pumar & Koppel, 2010:80; Punch, 2014:201) were selected in tandem with the qualitative research methodology that uses a case study design. In this regard, the researcher developed interview schedules, documentary analysis and observation guides as data collection instruments. A pilot study was conducted with the first-year students and lecturers from one of the sites. The instruments were administered on identified dates over a period of two months. All participants were informed of the focus of the study and all the relevant ethical considerations were observed in the process. The next part concerns the population from which the participants were drawn.

4.7 POPULATION AND SAMPLING

This part looks at the procedure taken to select both the population and participants for the study of knowledge fragmentation by student-teachers along subject lines in one Zimbabwean province. The province's three TTIs provided the study population.

4.7.1 Population

Giddens (2009:1128) defined population as "the people who are the focus of a study or survey". It refers to all the cases, people or objects and events the researcher wants to study (van Rensburg, Alpaslan, Du Plooy, Geldeblom, van Eeden & Wingston, 2010:150). It is the target group that the researcher wants to study which will affect sampling (Fairbairn & Kessler, 2015:1). For this research, 800 student-teachers in their final year and 100 lecturers from the three TTIs in Zimbabwe constituted the target population. The province was chosen as a particular case because of the prevalence of knowledge compartmentalisation noted at one of its

teacher colleges. A case represents a population of cases that is bigger than the case itself to elucidate the features of a larger population (Seawright & Gerring, 2008:294).

4.7.2 Sampling

Sharma (2017:749) viewed sampling as a procedure used by an inquirer to select a few representative participants from a population to serve as the data source for a study. The smaller number of people or elements from the larger, defined population that is statistically representative of that population is a sample which is studied as a subset to understand the population of interest (Schaefer, 2010:30; van Rensburg et al., 2010:151). Purposive sampling (judgement sampling) was used in this study to choose the three institutions based on the researcher's judgement that they were information-rich (Guest, Namey & Mitchel, 2013:48, 52; Patton, 2002:230; Sharma, 2017:752; Walliman, 2014:169; van Rensburg et al., 2010:162). The indication by Etikan, Musa and Alkassim (2016:2) is that the method helps the researcher to decide on what needs to be known and to look for willing, knowledgeable or experienced participants.

Of the various purposive sampling techniques, typical case sampling (TCS) was used to settle first for the province and then the three institutions. This is useful where large programmes are involved by helping to determine the "typical" by choosing participants based on their likelihood of behaving like the rest (Benoot, Hannes & Bilsen, 2016:3; Etikan et al., 2016:3). Due to the lockdowns and movement restrictions imposed in the country because of COVID-19, critical case sampling (CCS) was used to select one of the three sites for document analysis and observation. CCS is a procedure selecting a number of important (critical) cases for study by asking: "If it happens there, will it happen anywhere?" or "if that group is having problems, then can we be sure all the groups are having problems?" (Etikan et al., 2016:3; Patton, 2001:236). The selected institution was deemed likely to yield the information required on knowledge fragmentation that could happen in the other two and beyond. Patton (2002:237) considered the technique useful in exploratory qualitative research with limited resources because a single case (or a small number of cases) can decisively explain the phenomenon of interest. It also allows logical generalisation and application of findings to other cases (Benoot et al., 2016:3). The

researcher considered the case as decisive on the grounds that if fragmentation obtains in the selected province and institutions, it might be happening elsewhere. Although critical cases are not useful to make statistical generalisations, they can assist to make theoretical, analytical and logical generalisations (Patton, 2002:236). Altogether, 16 students and 10 lecturers were purposively selected as the critical case. From the critical case, distinctive students and very good students were purposively sampled as interviewees (based on their academic performance). Their coursework and examination essays from the Professional Foundations' TOE section were purposively sampled for document analysis on the basis that they had very good (70-79) marks to excellent (80 and above) marks.

The institutions and participants were chosen as critical cases characteristically situated in the contexts where knowledge fragmentation occurred. Thus, 10% of each category was selected based on critical-case purposive sampling. Senior lecturers were sampled as vanguards of the colleges' traditions. The participants are shown in Table 4.1 followed by a discussion of data-generation process.

Table 4.1: Participant groups and study samples

Participant Group	Target Population	Actual Sample	Female	Male
Student-teachers	100	80	58	22
Lecturers	100	10	2	8
Total		90	60	30

4.8 DATA GENERATION AND PROCESSING

When the informants have been identified, the researcher needs to establish how data will be generated and processed. Goldkuhl (2019:577) posits that data generation denotes a situation that the researcher arranges in order to produce authentic and helpful data for analysis relevant to the research interest. This part looks at the procedures followed by the researcher in generating data. The steps identified by Creswell (2012:205) include identification of participants, gaining access to the participants, determining the kind of data to be collected, instrument development and administration and observation of ethical considerations.

Qualitative data emanates from researchers actively creating data-generation situations as data researchers' sources so as to get data that are close to the everyday life reality being studied (Goldkuhl, 2019:577). The data sources in this case were pre-service teachers, lecturers from three sites, one purposively chosen site and its documents in Zimbabwe's Midlands Province. Documents such as assignments, examination scripts, lecture programmes, vacancy advertisements and application forms were analysed after completing observation protocols.

4.9 OBSERVATION PROTOCOLS

The researcher should get admission to the research sites and participants by obtaining permission from various levels (Creswell, 2012:210). Observation of protocol is necessary in order to get permission from the gatekeepers to gain entry into the research sites and participants. The researcher applied for ethical clearance from the College of Education at the University of South Africa (Appendix A) and sought permission from the teacher education parent ministry (MHTEISTD) (Appendices B & C) by applying for leave to conduct research at the target colleges. Initial familiarisation and preliminary meetings with the local gatekeepers and participants followed when COVID-19 first lockdown restrictions were partially lifted. This helped to initiate and maintain good working relationships, map the way forward and address eventualities (Englander, 2012:25). From these preliminaries, the researcher was able to get population figures and details of contact persons for future calls and assistance.

4.10 DATA PROCESSING

Bazeley (2013:3) explained Qualitative Data Analysis (QDA) as the range of intense, engaging, challenging, non-linear, contextualised processes and procedures of moving generated qualitative data into some form of explanation and interpretation of the people and situations that are being studied. This included organising data into categories and themes through the manual transcription and identifying a framework (coding plan) to structure and label the data based on the research questions (Walliman, 2014:185).

For data expressed in words as descriptions, accounts, opinions and feelings have to be organised and thought about, focusing on meaning that helps to answer the

research questions (Kabir, 2016:185; O'Connor & Gibson, 2003:64; Patton (2002:236). Data for this research was generated using interview, observation and document analysis.

After data were generated, it was analysed. Brundrett and Rhodes (2014:148) and O'Connor and Gibson (2003:64) indicated that analysis starts by getting to know the data by listening to recorded information, transcribing interviews from recordings to paper and reading over the written transcripts, assigning codes to the material and sorting the coded text, analysing the patterns that emerge and condensing textual data to reach conclusions. Dismissing sequential analysis in the analysis journey, Bazeley (2013:15) stated that the researcher should read and reflect, explore and play, code and connect, review and refine the data.

The journey includes finding and organising ideas and concepts, building overarching themes in the data, ensuring reliability and validity in the data and finding possible and plausible explanations for findings (O'Connor & Gibson, 2003:650). Patton (2015:553) reported that this first step of data analysis involves developing a manageable classification or coding scheme. For this research, analysis started with transcribing interviews, document analysis and observation data. Brundrett and Rhodes (2014:142) likened it to data reduction which involves familiarising oneself with the data through reading, re-reading, making notes, underlining and highlighting important sections.

Data reduction was followed by manual coding which Brundrett and Rhodes (2014:145) describe as a process of looking for patterns within the data to identify themes that participants indicated as important. Data were categorised by words or short phrases that represented themes or ideas which were assigned meaningful titles. The concurrence by Patton (2015:530) and Walliman (2014:186-7) is that qualitative data, represented in words and pictures are 'soft', bound by human feelings, attitudes and judgements. Patterns and themes were sought from an insider view of the social world after documenting using an inductive (emergent) approach as advised by Bazeley (2013:27) and Burnard et al. (2008:1).

The coding process was done manually, using highlighters to create themes and naming them on paper and soft copy repeatedly, in a "recursive process, moving between analysis, data collection and sense-making" (Archer, 2018:10). In this way,

the researcher highlighted large quantities and sections of important soft data. The quotations to be reproduced were identified and marginal notes were written as reminders. Bazeley (2013:125) indicated that coding provides a means of purposefully managing, locating, identifying, sifting, sorting and querying data designed to stimulate and facilitate analysis. The process, in Archer's (2018:6) view, breaks a large volume of data into meaningful sections and then recombines it into groups of concepts and ideas fitting together to create themes. This means grouping the codes and naming the groups.

Themes capture the meaning that is relevant to the research question and help to make links between such themes and identify patterns in the data (Willig, 2014:147). The connections within and between categories and cases are identified and followed by interpreting data as the final stage (Brundrett & Rhodes, 2014:148-149). At this stage, analysis helps to make decisions about what is important and what has been found out from the research. Brundrett and Rhodes further argued that data are synthesised and summarised so that decisions are made about which quotations or pieces of data to include in the report to elucidate findings and recommendations.

The manual process of working with data for this study followed the process suggested by Green et al. (2007:548) in that it started from data immersion to coding, creating categories and identifying themes. This involved identification of common themes, patterns and relationships within the responses of sample group members in relation to the codes specified in the previous stage as suggested by Dudovskiy (2019:28). The interpretation included looking out for word and phrase repetitions that were used most by participants including words and phrases used with unusual emotions. Dudovskiy noted that the last step is to link research findings to the research aim and objectives by selecting unique noteworthy quotations from the transcript in order to highlight major themes within the findings and possible contradictions.

Data processing has shown how data from interviews, observation and document analysis were processed systematically based on themes and research questions. The analysis started with the transcription of data intended to know it through listening, transcribing and reading it repeatedly as advised by O'Connor and Gibson (2003:64). The qualitative data were processed manually through coding to

represent themes or ideas and explained, interpreted and condensed, guided by the critical theory paradigm and cultural hegemony theory.

4.11 TRUSTWORTHINESS

Hadi (2016:2) advanced that trustworthiness refers to rigour that defines quality in qualitative research. Schaefer (2010:30) pointed out that issues of trustworthiness, validity, narrative truth, verisimilitude and reliability need to be attended to for any narrative study to ensure its quality. All this can be done by establishing credibility, dependability, transferability and confirmability (Korstjens & Moser, 2018:120).

Anney (2014:276) defined credibility as the confidence that can be put in the reality of the research findings as representing plausible information drawn from the participants' original data and correctly interpreted. The stability of findings over time, supported by data as received from participants is dependability (Shenton, 2004:65). Transferability is the degree to which the study findings are applicable to other contexts or future research with other participants, but, in this study, confirmability was disregarded since reality is multiple and individually constructed (Gunawan, 2015:4; Moon, Brewer, Januchowski-Hartley, Adams & Blackman 2016:3). As Gunawan (2015:5) advised, in this study, the rigour and trustworthiness of enquiry were ensured through peer examination, member checking, triangulation, detailed transcriptions, systematic planning and coding. The work was supervised throughout the study and interview, document analysis and observation were combined/triangulated, which Noble and Heale (2019:67) call methodological triangulation. A pilot study, a small-scale preliminary study conducted before the main research (Haralambos & Holborn, 2008:821), with a group of first year student-teachers and some lecturers helped to ensure the dependability and credibility of the findings.

Candela (2019:619) regarded member checking as commonly used in qualitative research as a way to maintain validity by continuously testing data and interpretations through sharing with the research participants. The researcher included the voices of participants in the analysis and interpretation of data, which Anney (2014:277) said is vital as member checks to deal with researcher bias during data analysis and interpretation. Member checks here included verbatim capturing of responses or excerpts and asking participants for evaluation. The study findings and

conclusions were checked by the participants interviewed and observed by providing the draft to them. Trustworthiness was also promoted through peer debriefing. Delve (2021:4) defined the process of working together with peers and even unbiased and independent people without personal interest in the project to enhance validity. A disinterested peer is someone knowledgeable on the topic but is not an immediate stakeholder in the outcome of a project (Hail, Hurst & Camp, 2011:74). In the process, qualified, impartial colleagues reviewed and assessed the transcripts, methodology, and findings. During the research process, the researcher sought the opinions of peers (researchers, experts, professionals and colleagues) from different disciplines in the spirit of interdisciplinarity. In addition, the researcher regularly sent the work to the supervisor, received feedback and actioned it.

4.12 RESEARCH ETHICS

Punch (2014:36) defined research ethics as standards or code of ethics in conducting research that deals with morality concerning respect for human rights. Ethical codes and guidelines are a means of establishing and articulating research values and the obligations that researchers must abide by (European Commission, 2010:16). It is a code of conduct or accepted conduct appreciated by society seen as the norm of behaviour while undertaking research such as informed consent, anonymity, confidentiality, beneficence and social protocol (Haralambos & Holborn, 2008:815; Haralambos et al., 2013:882). The following standards were observed during the research to uphold trust and integrity.

4.12.1 Informed Consent

Informed consent means participants knowingly, voluntarily and intelligently give their consent to participate in research when provided with sufficient information to make an informed decision about participation (Shahnazarian, Hagemann, Aburto & Rose, 2017:3). It involves full disclosure of any anticipated risks to the subjects, compensation, research methodology, data treatment and other aspects about the research before one decides whether to participate (Dooly, Moore & Vallejo, 2017:353). In line with this, the researcher informed the participants that the research was driven by the need to establish the cause of disciplinarity by student-teachers in order to promote interdisciplinarity for holistic understanding and problem

resolution. Participants were also informed that there was no harm anticipated (Appendices H & I).

4.12.2 Anonymity and Confidentiality

Akaranga and Makau (2016:6) define anonymity as keeping secret the identity of the participants. Anonymity is upheld by ensuring that participants' identity is untraceable to their identity by giving the participants pseudonyms (Fouka & Mantzourou, 2011:6). Fouka and Mantzourou advised that if the researcher is unable to promise anonymity, then confidentiality must be addressed which means the management of private information by the researcher in order to protect the subject's identity. For example, the researcher has to ensure confidential treatment of all research subjects and data (Dooly et al., 2017:353-354). For this study, the researcher used pseudonyms and removed identifying details of interviews during transcription. For instance, the three sites were named A, B and C, the student names combined 'S' and a digit and lecturers were named by combining 'L' and a number. In addition, data were kept in a password-locked computer.

4.12.3 Beneficence and Non-maleficence

Beneficence relates to maximising the benefits of the research and non-maleficence is an obligation to minimise or avoid potential risks, harm or wrong of participation (Fouka & Mantzourou, 2011:5; Gakuu et al., 2016:319). The researcher must provide the participants with possible risks and benefits involved and address these risks (Halai, 2006:2). In this study, the researcher explained to the participants that the research findings would provide useful insights to student-teachers and teacher education on how to combine GPK and CK needed for teacher knowledge by revealing the causes of disciplinarity so as to embrace interdisciplinarity and realise theory-praxis nexus.

4.12.4 Social Protocol

An important reminder is made by Okumus, Altinay and Roper (2007:7) that research depends on gaining access to data sources which necessitates the cooperation of gatekeepers and informants, yet it is problematic. Obtaining gatekeeper permission from the higher levels of the organisation means being granted access to an institution for research purposes by persuading the gatekeeper

of the study's social value (Singh & Wassenaar, 2016:43). This means a researcher needs to secure permission or approval from authorities before conducting research. After CEDU ethics clearance (Appendix A), the researcher applied to the MHTEISTD for permission (Appendix B & C). The approval was used to get access to participants at the purposively sampled institutions. At the sites, the gatekeepers granted the researcher unfettered access to participants and documents. The researcher was able to identify interviewees and get their contact cell phone numbers since telephonic interviews were used in response to the prevailing COVID-19 lockdown restrictions.

4.13 CHAPTER SUMMARY

This chapter covered the research design and methodology, enunciating the researcher's ontological assumptions that social reality is subjective as adduced from multiple voices (Cohen et al., 2011:3-4). The researcher believes that social reality regarding knowledge segmentation is created by people and imposed upon society as a given. The chapter further looked at the research paradigm, the world view that defines the nature of reality (Patton, 2015:89), which guided the research from setting of the research questions to the methodology. For that purpose, critical theory was chosen for its perception that social reality is historically constituted, produced and reproduced by people who need emancipation from alienation and domination (Gemma, 2018:10-11; Peca, 2000:3) propagates through disciplinarity. The methodology, design and qualitative research approach that translated the ontological principles into how the research was conducted were discussed, including the interviews, observation and document analysis as the methods of generating data to answer the 'what' and 'why' questions of knowledge fragmentation. The chapter also covered the purposive critical case sample and telephonic SSI, observation and documentary analysis guides. The sample was drawn from the final-year students and lecturers at the three TTIs in Midlands Province in Zimbabwe. Issues relating to trustworthiness and ethics were addressed in detail.

The next chapter is Chapter 5 which deals with data presentation and analysis.

CHAPTER 5

DATA PRESENTATION, ANALYSIS, INTERPRETATION AND DISCUSSION

5.1 INTRODUCTION

The previous chapter presented and discussed the qualitative methodology, its attendant methods and instruments used to explore the social nature of knowledge fragmentation in purposively sampled institutions. The qualitative track was chosen from other methodologies because it gives voice to the participants and unique depth of understanding through open methods that allow participants to freely disclose their experiences, thoughts and feelings. This chapter describes, presents, analyses, interprets and discusses the findings generated through semi-structured telephonic interviews, documentary analysis and observation to account for the social reasons behind knowledge fragmentation by pre-service teachers in Zimbabwe. It also proffers some workable ways of promoting interdisciplinarity. The chapter is organised into themes, sub-themes and sub-subthemes in order of the research questions using the description and presentation-analysis-synthesis model.

5.2 PRESENTATION OF RESEARCH FINDINGS

This section describes, presents, analyses, interprets and discusses the findings from the interviews conducted with 16 students and 10 lecturers, document analysis of 68 students, specifically 102 coursework essays and a similar number of examination essay answers from the TOE cluster of subjects presented here. The essays were purposively selected on the basis that they had marks in the very good (70-79) to excellent (80+) ranges (80 and above). Other findings described and presented here were obtained from the observation of activities at one of the sites that was purposively selected informed by the prevailing COVID-19 lockdown restrictions. The presentation of these findings is according to the research questions. The information of student participants is presented in Table 5.1.

5.2.1 Participant Information

To explore the causes of knowledge fragmentation by student-teachers, the researcher interviewed 16 purposively sampled students from three research sites.

The student interviewees were final-year students from three TTIs, code-named A, B & C as shown in Table 5.1.

Table 5.1: Student participant information

Pseudonym	Sex	Main Study (MS)	Site
SA	Male	Social Studies	A
SB	Female	English	A
SC	Male	Computer Science	A
SD	Female	Biology	A
SE	Female	Music	A
SF	Female	Art & Design Education	A
SG	Male	Physical Education & Sport	A
SH	Male	Transport & Logistics Management	B
SI	Female	Applied Science	B
SJ	Female	Accounting	B
SK	Male	Agriculture	B
SL	Female	Geography and History	C
SM	Female	History and Family & Religious Studies	C
SN	Female	History	C
SO	Male	Agriculture	C
SP	Male	History & Shona	C

Of these students, nine were female and seven were male, all specialising in different subjects and training to teach at primary and secondary school levels. Data generated from the student interviewees is thematically described below.

5.3 DATA FROM STUDENT INTERVIEWS

5.3.1 Origin of Knowledge Fragmentation

The first theme that emerged concerned the origin of knowledge fragmentation. It begins with a sub-theme on subject ranking.

5.3.1.1 Course disciplines rank-order undertones

The interviewees were asked to specify the disciplines they studied. It emerged that some subjects were predominantly named by all participants from the same site or

were the first to be mentioned. Others were forgotten, ignored or mentioned as afterthoughts. Participants SA, SC, SD, SE and SF included TOE, PSA and MS. Participants SA, SB, SD, SE and SG mentioned their MS areas first, then mentioned other subjects afterwards. Only participants SC and SF began by naming other disciplines. Several areas were infrequently mentioned, for example, research methods, TP, communication skills, curriculum depth study (CDS), national strategic studies (NSS) and HLSE. Some examples of similar responses included the following:

The subjects I study include TOE, PSA, PSB English, PSB ChiShona and PSB mathematics, PE, NSS, HELS and many others that give us knowledge from different subjects. Some are relevant, but others are not, for example, SPED because the coverage is too little (SA).

I study MS, PSA and TOE as the main (the most important) ones with PSA coming in to mould teachers' practice skills (SC).

All the participants (SH, SI, SJ and SK) from the same site named some of the disciplines they studied at their institution. TOE and EMT were mentioned by all four with TOE coming first (SI and SJ). SI's response listed several subjects in some kind of hierarchical order but left out her main study area (applied science) until she was probed. In her response, she said,

My course outline has TOE, and this has three subjects which are philosophy, psychology and sociology. Other subjects in my course include curriculum and teaching, EMT, development studies (DS), communication skills and research methods (SI).

Tied in the second position in popularity were research methods (SH, SI and SK), communication skills (SH, SI and SJ) and NSS (SH, SJ and SK). Only SH mentioned TP. At another site, those who mentioned MS first included SL, SN and SP. For example, SN just mentioned her MS, history, as if it was the only one that made up the Bachelor of Education (B.Ed.) programme. After probing, she named "Administration, Entrepreneurship and Communication Skills". Just like SL and SN, in his words, SP named his main study area first as follows:

For my B.Ed. programme, I'm studying various modules. History and Shona happen to be my areas of specialisation. There is also Heritage, Psychology, Sociology, Philosophy and Computer Education as common modules (SP).

Only two participants (SM and SO) began by mentioning the common modules of their course programme and then their areas of specialisation. This seemed to refute

the notion of rank-ordering if looked from the surface, but it could be because these two valued the common modules more than their MSs. The responses were:

The common modules in our B.Ed. programme are Gender Studies, Philosophy, Sociology, Psychology, Statistics and Computer Application. My main study areas are History and Family and Religious Studies (SM).

My programme is B.Ed. There are common modules for all the B.Ed. pre-service students such as Financial Appreciation, Educational Management, Gender Studies, Contemporary Issues in Education, among others. My main study is Agriculture (SO).

The participants' responses reveal indications of disciplinary hegemony where some subjects take prominence over others for various reasons. This could be the reason behind student-teachers treating course disciplines in a fragmented way. Further evidence of disciplinary hegemony was revealed in the way participants praised their areas of specialisation.

5.3.1.2 Students' disciplinary eulogies

The way students regard their MS has the potential to influence either fragmentation or interdisciplinarity. If they think of their areas of specialisation as unique and isolated, they may disdain integration but if they see it as part of the whole, they may be pro-integration. This stops the specialists from interdisciplinarity and instils the fear of gatekeepers in non-specialists. Either way, such treatment may be a kind of cultural hegemony that is taken for granted and consented to by all. As students named their MS, the tendency among all interviewees was to sing praises about these subjects. The ratings that emerged are captured in Table 5.2.

Table 5.2: Disciplinary rankings

Participant	The best	Compared to others	Important	Practical skills	Good	Neutral
SA	✓	✓	✓			
SB	✓	✓	✓			
SC	✓	✓	✓	✓		
SD	✓	✓	✓	✓		
SE	✓	✓		✓		
SF	✓	✓	✓	✓		

Participant	The best	Compared to others	Important	Practical skills	Good	Neutral
SG	✓	✓				
SH	✓		✓			
SI						✓
SJ	✓	✓				
SK			✓			
SL						✓
SM						✓
SN						✓
SO						✓
SP		✓			✓	

All the participants used some descriptors to celebrate their MSs. Only SI, SL, SM, SN and SO were a bit cautious to present rather neutral descriptions. The characterisation produced the following sub-subthemes: superlative descriptions, drawing comparisons, importance, and skilling contribution, positive description and neutral descriptions that follow.

5.3.1.2.1 Superlative descriptions

Most interviewees (SA, SB, SC, SD, SE, SF, SG, SH, S1 and SJ) used the superlative to describe their MS. SA said SS taught real, practical life and contemporary issues. SB said English was “*very important for communication, instruction and essay writing*”. SC named computer science as her MS: “*the best subject that provided a lot of benefits, taught a lot and conquers the world and all subjects*”. She went on to say, “*it plays a pivotal role, for example, in working and studying online from home during COVID-19 lockdown in all subjects*”.SD named biology as her MS and rated it as “*the best because its stuff was practically useful*”. SE’s MS was music and she boastfully claimed that it taught “*skills usable after college to earn a living by conducting choirs for a fee*”. She spoke at length in praise of her MS that taught practical skills and helped people to relieve stress, promoted creativity and encouraged social connections. SF’s MS was Art & Design which she

described as the “*most essential that provides useful pragmatic, artefact production skills for self-employment through graphics or textiles*”. Naming PE as his MS, SG claimed that it “*helped with fitness for holistic development and raising the country’s flag*”. SH specialised in transport and communication which he described as “*very important for business*”. SI said his MS, Applied Science “*offers vast opportunities covering biology, physics and chemistry*”. SJ, a female accounting student described it as “*all encompassing, for example, in agriculture, laboratory or transport or any other area*”. SK mentioned agriculture as his area of specialisation and said, “*without it, nations would starve.*”

These praises by student interviewees reveal divisive mentality based on valuing individual, standalone subjects. Descriptors used included “*very important*” (SB); “*the best subject ... conquers the world ... pivotal role*” (SC); “*A1 ... the best ... most important ... my first preference*” (SD); “*the best subject ...top subject ...more important than any other subject*” (SG); and “*it’s the best*” (SK). Other descriptions used included “*it provides useful skills*” (SF); “*it helps (with) fitness*” (SG); “*it offers vast opportunities*” (SI); and “*it is all encompassing*” (SJ). These views reveal egocentrism. The following sections represent some of the superlative descriptions.

5.3.1.2.2 Drawing comparisons

Another sub-sub-theme that emerged was that of drawing comparisons between MSs and other subjects. The participants always highlighted the superiority of their subjects of specialisation but belittled ‘others’. For example, SA identified his MS as Social Studies (SS) and “*unlike other subjects that are not applicable practically to life and community*”. The same pattern was noticed in the rest of the responses such as SD who named biology as her MS and declared that it was incomparable. SE’s comparison was that music was “*usable practically in industry unlike FAREME and Social Studies]*” and so it was more important than others.SG said Physical Education was “*better than FAREME that merely teaches about religions for no apparent practical use in life*”. SJ described Accounting as occupationally unrestricted. SP specialised in History and Shona but chose to focus on Shona only, his mother tongue embodying indigenous cultural identity as opposed to English.

The raging cultural hegemony war between disciplines was noticeable as these participants specified subjects that they considered inferior to their areas of specialisation. This is further shown in the following excerpt:

Some subjects have little use, for example, those studying mathematics and English cannot produce goods and services. Mine is better than other subjects because it gives skills. It's practical in nature whereas others such as SS and FAREME have nothing hands-on (SF).

While some interviewees focused on the superiority-inferiority dichotomy and favoured their own subjects, others highlighted the importance element as presented in the next sub-sub-theme.

5.3.1.2.3 Disciplinary importance

The importance of something depends on its quality of being significant, valued or necessary in a particular situation. By stressing the value of their disciplines, the participants were showing their disciplines' dominance in terms of their social statuses, whether ascribed or achieved. Based on that position, one group of participants (SA, SB, SC, SD, SF, SH and SK) focused on the significance of their subjects.

Specialising in Social Sciences, SA repeatedly stressed, "*It's important, in fact, it is very important to me ... it is very important*", while SB said English was very important. SC studied Computer Science, which he said played a pivotal role in all subjects. SD studied Biology as her MS, which she said was important. SF valued Art and Design and said it was "*most essential, useful and very important*". SG said PE was very important in life while SK emphasised the national importance of Agriculture.

Various shades of the importance placed on different course disciplines were portrayed overtly and covertly through such words as *important*, *benefits* and *pivotal role*. This tendency to hold one's own MS in high regard could account for the existence of rigid disciplinary boundaries that could hinder interdisciplinarity. Some of the verbatim highlights are as follows:

Transport and Logistics Management is the backbone of the economy which bridges the gap between the supplier and the end users.... It is the most important main study area (SH).

From the data, it seemed specialists had high regard for their subject areas. Such conviction may have influenced knowledge fragmentation along the lines of the 'important- unimportant' dichotomy. Evidence of the origin of knowledge fragmentation revealed in the course disciplines' rank-order was stressed again by the participants who credited their individual main study areas for developing skill in recipients as presented in the next segment.

5.3.1.2.4 Skilling contribution

Participants SC, SD, SE, SF, SI and SO stressed that their MSs equipped them with practical skills usable beyond the lecture rooms. For instance, SC claimed that Computer Science "*developed computer literacy skills that included word and formatting documents both useful for assignment writing*". SD explained that Biology was pertinent to life as it provided knowledge of human anatomy, for instance. SF stressed that art and design' empowered recipients for self-reliance. SI said Applied Science equipped her to fit into a wide range of workplaces as it encompassed all the hard sciences. SO claimed that Agriculture taught critical farming skills in animal and crop husbandry as well as financial and marketing skills. Skills development notions were reflected in the following narration by SF:

It teaches us skills usable after college. I will earn a living from it. It equips us with skills in various sub-disciplines which include visual and performing arts, music, theatre, dance, poetry, marimba, mbira (xylophone) and chorales. In the end, we become multi-skilled across these sub-areas, for example, by conducting choirs for a fee or joining the music industry for a singing career (SF).

The skilling attribute proffered by these participants suggests that it is only these subjects that develop skills in the recipients. All the other subjects seem to be regarded as deficient in skills development. This indicates the origin of knowledge fragmentation. It denotes disciplinary cultural hegemony as some subjects are assumed to be more functional than others. Apart from comparing and rank-ordering the subjects according to the importance and skills development, one attribute that emerged was that of 'goodness' as shown in the next section.

5.3.1.2.5 Positive description

A positive description avoids demeaning other subject areas but simply points at the inherent goodness of the focal subjects. SP used the positive descriptor for one of his dual specialisation areas (History & Shona), saying:

It's a good subject as it provides us with a chance to study our mother tongue, traditions and customs.

Although the student-teacher had two areas of specialisation, he chose to qualify only one. That move seems to further strengthen the view that, for some reason, some subjects have established domination to the point of being raised above all else. This position seems to have been accepted as normal and subscribed to by the majority, which matches Antonio Gramsci's notion of cultural hegemony.

While some were quick to highlight the strengths of their areas of specialisation, others preferred to be neutral or included neutrality as an afterthought as presented in the section that follows.

5.3.1.2.6 Neutral descriptions

Even though some participants highlighted the strengths of their MSs or included both strengths and comparisons, others seemed satisfied with neutrality, for example, SL, SM, SN and SO. SL simply said Geography and History were rich sources of knowledge, while SM said History and Family and Religious Studies were "good subjects". Although SN specialised in two areas, she mentioned History only which implies the hegemonic predominance of the named subject over the one left out. Without sounding ecstatic, SN just said she liked the subject. SO simply enjoyed Agriculture more than his other specialisation subject.

These neutral responses indicate the indifference of the participants when it comes to disciplinary hegemony. Such student-teachers may not be concerned about the raging disciplinary wars or may have been influenced by the presence of the researcher. Whatever the case, it is possible that such participants might be open to embracing interdisciplinarity if socialised into it.

This sub-section and its related sub-subsections presented data that revealed that the majority of student-teachers tended to rank-order their course disciplines

according to some criteria as informed by comparing, assumed value, skilling potential and positive perceptions. The next sub-theme deals with data on the place of interdisciplinarity in teacher education.

5.3.2 The Place of Interdisciplinarity

The literature reviewed shows that the teachers' ability to make connections among disparate elements of knowledge, synthesise concepts and make ideas mobile across disciplines is critical in education and the twenty-first century knowledge economy (Barber, 2012:590). TTIs are key players in preparing future generations to cope with emerging challenges by helping student-teachers to use theories and pedagogical approaches beyond borders. This is achievable if social hindrances are known and dealt with first. This part presents data concerning the place of interdisciplinarity in teacher education, beginning with evidence of commonalities among disciplines.

5.3.2.1 Existence of usable material across subject boundaries

To explore the social factors barring interdisciplinarity, students were asked if they thought their course disciplines had material that could be integrated for various purposes. Their responses produced three sub-subthemes summarised in Table 5.3.

Table 5.3: Existence of disciplinary connections

Connections exist	Undecided	No connections exist
SA, SB, SC, SD, SF, SG, SH, SI, SJ, SL, SN, SO, SP	SM	SE, SK

Thirteen responses confirmed that the subjects had knowledge that could be used beyond their individual boundaries through IKI. Only one respondent was uncertain about the existence of disciplinary connections and two interviewees denied the existence of knowledge that could be exploited for interdisciplinarity. These findings are looked at separately under the sub-subthemes that come next.

5.3.2.1.1 *Connections exist*

Most participants (SA, SB, SC, SD, SF, SG, SH, SI, SJ, SL, SN, SO and SP) confirmed the existence of diverse connections among the disparate disciplines. SB

observed that English had a strong link with NSS on the History of Zimbabwe found in poetry on Zimbabwe before independence. SC indicated that his course subjects had aspects that were transferrable, for example, PSA and TOE shared Piaget's theory of cognitive development, ICT bridged the gap between subjects, and PSA informed teaching and learning. SF saw links between subjects and cited Heritage and Sociology that she said dealt with society; FAREME and Psychology that she said dealt with morality; FAREME and Sociology dealing with culture, and FAREME and Philosophy with Ubuntu/Unhuism. She went on to say theories by Dewey, Plato, Freud and Marx were covered in Art, TOE, TECD and FAREME. SG confirmed the availability of material usable for interdisciplinarity as he indicated that Biology and PE shared the muscular system, the anatomy and physiology and biomechanics that were found in Physics and Biology. SH said subjects had aspects usable across their boundaries, especially technical-vocational, research and EMT. His argument was that there were no boundaries cast in iron, but boundaries were imaginary and porous. SI confirmed that there were ideas that could be cross-pollinated, for instance, Philosophy, Sociology and DS when studying the History of Education in Zimbabwe or societies in general. SJ explained that knowledge in her course subjects could be used across their borders and cited communication skills that could be used to deliver content in all subject areas because all the disciplines converged on the learners. SL simply acknowledged the existence of similarities without elaboration which could imply a lack of specific knowledge of shared ideas that could be transported across the course subjects' boundaries. Supporting the view, SO cited educational management, agriculture, financial appreciation and farm management as sharing 'a lot'. SP also confirmed existence of commonalities and gave an example of cross-cutting themes. Some of the narratives on this sub-sub-theme are depicted below.

All areas need each other as shown by such approaches as multi-faith and multiculturalism. Subjects have common areas that can be merged such as Heritage-SS [Heritage-Social Studies] and FAREME on topics like culture and ICT in writing assignments. In maths-science, for instance, you can teach and link topics on plants, living organisms and biology. Yeah, subjects have commonalities that students can borrow and apply in other subjects in different ways (SA).

Commenting further on the same issue, another participant shared:

Technology is common in all subjects. From music, you use songs for setting induction during TP. There is interdependence between subjects, for example, TECD has Montessori on age appropriateness, which is covered in PSA on the age appropriateness of content. All focus on the learner, so, there is a relationship. For example, TOE and PSA share theories that can be used across the two areas about teaching and how to handle learners (SD).

Another participant elaborated as follows:

These modules have areas that could be integrated to balance MS and education. Therefore, there is a need for appreciation of all areas. Educational Psychology and Sociology provide an understanding of factors affecting history learners. I am studying to become a teacher, so before I teach my MS, I have to know the learners' psychological aspects, and their developmental aspects so as to determine how to teach them (SN).

From the data presented above, the participants seemed aware that all the course subjects have content that can cross-pollinate. In particular, SA, SD and SN concurred that different course subjects have integrable knowledge. They cited specific examples of subjects, content, topics, concepts, theories and theorists that could promote interdisciplinarity for effective teaching and learning. The awareness of existence of connections should have translated to embrace IKI in the absence of social factors. Despite the fact that most participants exhibited this awareness, SM seemed indecisive as indicated below.

5.3.2.1.2 Indecisive view

Although the majority were convinced that their course subjects had interdisciplinarity material, one respondent (SM) was rather undecided as she presented a double-sided view on the issue. She said some subjects had knowledge that could be integrated but showed another perspective this way:

but others have nothing to do with my areas of specialisation, History and Family and Religious Studies (SM).

This response suggests a number of things. First, the respondent could have been unsure of the connections with other subjects. Second, it could mean little knowledge of other areas. Alternatively, the respondent might have been simply distancing herself from areas outside her specialisation in a polite way as opposed to the dismissive positions of two participants whose responses are presented in the next part.

5.3.2.1.3 Dismissive views

Although the majority indicated that their different course subjects had material that could be integrated, two denied this. They rejected or disregarded the possibility of aspects that could be used for interdisciplinarity.

The two interviewees (SE & SK) dismissed the notion that knowledge from their course subjects could be integrated. They did not see any material that was usable outside the disciplinary borders or connections between subjects. For instance, SK curtly said that he did not see any links between the subjects, especially his MS, Agriculture, to any of the other subjects such as NSS. In this respect, SE said:

I don't see a linkage between subjects. ... but music MS and music PSB have linkages, but not with other subjects.

All the data seemed to indicate the existence of disciplinary dominance because, even though the majority of participants acknowledged room for integration, they did not practise interdisciplinarity. It is possible that their acknowledgement could be due to the Hawthorne effect that says research participants may change their behaviour due to the attention they are given (Sedgwick, 2012:2). This assumption is confirmed by the responses of the few who were either uncertain or bluntly rejected any possibility of integrative concepts. To accurately determine the truth, data on the causes of knowledge fragmentation is presented in the section below.

5.3.3 Causes of Course Knowledge Fragmentation

The focus of this research was to establish the social causes of knowledge fragmentation by student-teachers. This began by exploring the use of knowledge from different subjects in the purposively selected TTIs. To establish the approach used at the three sites, the participants were asked how disciplinary knowledge was used. The pattern that emerged from this theme is represented in Table 5.4 below.

Table 5.4: Approaches practised

Interdisciplinarity Approach	Fragmented Approach	Uncertain
SB, SG, SH, SJ, SL, SM, SO	SA, SC, SD, SI	SA, SE, SF, SK, SN

The responses split the participants into three groups with one camp saying interdisciplinarity was practised, while another one said fragmentation was used and the other was unsure which led to three different sub-themes which are dealt with below.

5.3.3.1 Interdisciplinarity is practised

The largest group of students (SB, SG, SH, SJ, SL, SM & SO) indicated that the interdisciplinarity approach was practised at their colleges. For instance, SB said lecturers at her institution mentioned that some of the issues were prevalent in other subjects, and they tried to integrate by giving examples from other areas during lectures, which the students tried to imitate. Cautiously, SG said some lecturers and students borrowed ideas from other subjects although this happened accidentally. SL indicated that students used interdisciplinarity to support and critique issues and SO simply retorted that student rarely practised the approach. Some participants expressed similar sentiments as follows:

We learn how to communicate across all subjects from communication skills and how to scheme from curriculum. The areas are complementary, for example, in curriculum studies, the Socratic method is used together with other methods such as demonstration, so in that way, philosophy and curriculum studies complement each other. I'm creative, I see the connections and use them even if lecturers don't mention or encourage us to use them (SH).

Another participant clarified this as follows:

Assignments are not recall tasks but application ones. So, you can pick aspects from other subjects and integrate them to suit your intention, for example, EMT and communication skills. Lecturers try it, but creativity comes in handy, as one thinks outside the box (SJ).

Elaborating on the cross-pollination of knowledge, another participant said,

The lecturers and students use knowledge across borders, for example, they take examples from sociology that are related to FRS on religion. Cross-cutting themes are evidence of fusion, for example, ICT in education and research. The knowledge is used together because we discuss, agree and disagree based on knowledge from different modules. For example, when we study poetry, we use history knowledge to explore colonisation and examine globalisation as imperialism (SM).

The responses point to the existence of interdisciplinarity in the three institutions, but it seemed that not all embraced it. This implies that the approach is not the culture of

the institutions. The potential of incidental integration mentioned by SG seems to substantiate the small-scale practice of the approach or prevalence of fragmentation as claimed by SA, SC, SD and SI in the next sub-subsection.

5.3.3.2 Fragmented use

Interviewees SA, SC, SD and SI indicated that lecturers and students at the institutions tended to compartmentalise knowledge according to subjects. Interviewee SA said students and lecturers stuck to their own subjects as he had not witnessed instances where knowledge was used collaboratively. Similarly, SC indicated that they separated knowledge from subjects, especially when on TP, for instance, by not using media, not motivating learners, not using theories and ICT even though they had been taught about these. Some of the direct quotes from the participants are presented below.

Lecturers deal with course knowledge separately according to subjects. Some fail to use the subjects for various reasons, and those who do, seem to do so incidentally. Besides, some subjects like languages do not cross boundaries because they naturally differ (SD).

The truth is that they stick to their areas. You may be surprised to find useful material as you read on your own. It is a very tricky situation because sometimes those things are treated as different aspects and the usable material does not come out. It is up to students to search for commonalities, which they may fail to do or get (SI).

The responses emphasise the prevalence of disciplinarity in the institutions despite the small number of participants in this study. These sharply defined views are a clear contrast of the uncertain responses from SA, SE, SF, SK, SN and SP as presented below.

5.3.3.3 Indeterminate

A group of participants seemed unable to pinpoint the approach used in their institutions. The uncertainty may be due to several causes such as missing information, unreliable information, conflicting information and confusion, among other reasons.

Six participants (SA, SE, SF, SK, SN and SP) gave ambiguous and uncertain responses about the approaches in their institutions. For example, SA who at one point had acknowledged the embrace of integration, seemed to doubt that initial

position by saying that the integration of knowledge by students and lecturers seemed not to be intentional but accidental. Her argument was that even though disciplinary knowledge could be intertwined or related; the majority found the approach difficult. SE said interdisciplinarity was used here and there. She was quick to observe that there was a challenge as some did not link; even if lecturers tried linking ideas, students failed to do the same. SK said it was up to individuals as some integrated, but others did not. SN said sometimes lecturers and students used disciplinarity and integration separately or referred to cross-cutting themes. Insisting that she sometimes borrowed from other subjects such as Geography, Mathematics and Statistics, she spoke of the ideal situation where mathematics teacher teach statistics after it has been covered in geography and statistics, or indigenous languages (ChiShona & IsiNdebele) followed by religious studies. She expressed doubt saying integration was a tricky situation because the subjects were fragmented, and the commonalities were not obvious. SN felt that it was up to individuals to search for commonalities which the students failed to do. This uncertainty is reflected in the response quoted below.

Yes, sometimes, lecturers do, and students integrate when discussing, but when I am alone, I may fail to see and use connections (SF).

The indeterminate positions noted in the responses could be a pointer to the social cause of knowledge fragmentation. It is possible that these responses are a revelation of conflicts between disciplines and members or the participants' disinterest in the approach. Either way, they make one think that the approach may in fact not be systematically embraced. In that case, it was necessary to establish the possibility of embracing IKI in teacher education in the following segment.

5.3.4 The Place of Interdisciplinarity in Teacher Education: Benefits of Interdisciplinarity

The researcher asked student interviewees the benefits of the approach and their responses are summed up in Figure 5.1.

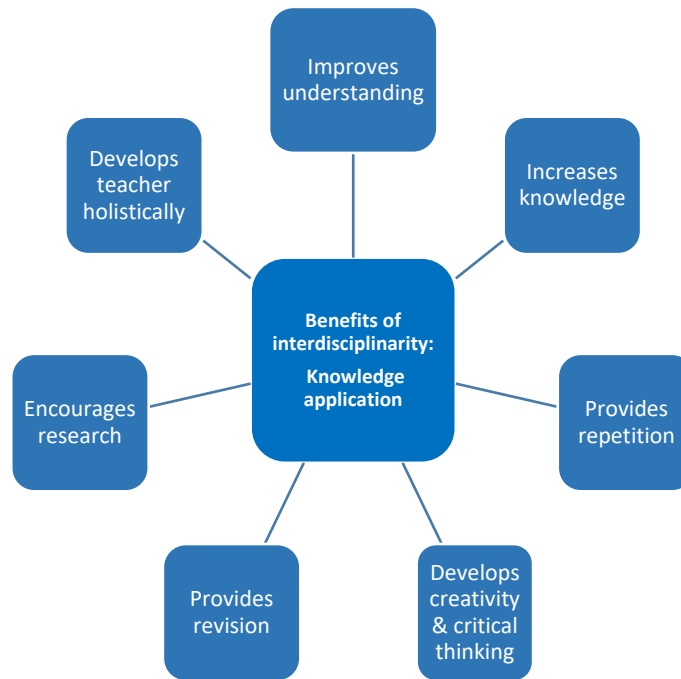


Figure 5.1: Benefits of interdisciplinarity

The participants stated that some of the benefits of the interdisciplinary approach were that it improved understanding, increased knowledge, provided valuable repetition, developed creativity and critical thinking, offered an opportunity for revision of concepts, encouraged research and holistic teacher development. These benefits produced eight sub-themes as presented below.

5.3.4.1 Improving understanding and mastery

The first benefit that emerged from the responses was that it improved understanding that led to mastery of concepts. In different ways, the student interviewees (SC, SD, SF, SI, SJ, SL, SM, SN, SM & SP) subscribed to the view that interdisciplinarity improves comprehension and retention. For example, SC said it made lessons or ideas understandable and facilitated recall, while both SF and SL said interdisciplinarity developed understanding through a recurrence of knowledge. SJ noted that theories become memorable, and SN praised it for promoting comprehension. SI indicated that it helped to improve content mastery. Others elaborated their benefits as follows:

An interdisciplinarity thematic approach helps with the mastery of content from several subjects in one instance. This is in tandem with Thorndike's law of

exercise that says the more we practise, the better we master information, which shows the greatest impact of integration (SD).

Another participant added the following:

It provides an opportunity for repetition that is useful in information processing. For example, when we cover Maslow in TOE, communication skills and entrepreneurial studies, the theory becomes memorable (SJ).

It helps students to grasp different modules. Some theories may be explained differently and applied differently for the benefit of student-teachers. It opens the mind so that one can think broadly ... and think outside the box (SP).

These responses point to the value of IKI in promoting content comprehension by student-teachers. The other sub-theme that surfaced was that of value addition to what students know.

5.3.4.2 Knowledge enrichment

The responses showed that integration helped to intensify existing knowledge towards creation of new insights. Participants SA, SD, SF and SI highlighted the potential of interdisciplinarity to add value to knowledge. They stated that it encourages students to be creative in the generation of new ideas and insights (SA); makes students and lecturers knowledgeable (SE); adds value to knowledge (SF); provides lecturers and students with a chance to acquaint themselves with what others learn in their areas (SG & SH); combines different knowledges to advance viewpoints (SM); and helps in the acquisition of wider knowledge (SO). A verbatim response connected to this sub-theme is presented below.

It helps because disciplines are like limbs of the body where each has a role to play for the efficient functioning of the whole person, which enhances one's knowledge base. It broadens one's horizon of thinking to avoid being confined or 'boxed'. One gets a broad view of things, not a myopic one (SN).

The sub-theme justified interdisciplinarity by showing that the student-teachers' disciplinary knowledge was insufficient to address academic, professional and social demands. The next part captures responses indicating the fact that interdisciplinarity provides repetition and practice.

5.3.4.3 Repetition and practice

Through repetition, a skill is practised, and the information is processed into the long-term memory. This shows that repetition is vital for student-teachers to effectively learn. This repetition is provided by interdisciplinarity.

Four participants (SA, SD, SG & SJ) reported that interdisciplinarity requires one to revisit disciplines already covered to look for relevant knowledge to be merged for different purposes. Revisiting provides an essential opportunity for repetition (SA & SG). SD viewed it as essential for practice since the more people practise, the better they master information, which is the greatest impact of integration. When learning through repetition has taken place, the assumption is that mental faculties are stirred for use in different ways that lead to critical thinking and creativity (SJ) as presented next.

5.3.4.4 Development of critical thinking and creative thinking

Critical thinking tends to produce logical ideas, views and perspectives for solving problems. Participants SA, SH, SL and SM identified development of critical thought and creativity as the benefit of interdisciplinarity. Some of their responses indicated that interdisciplinarity helped to develop critical thinking as they thought about what concepts, views and theories from other learning areas and how to use them to address issues at hand (SA). They noted that interdisciplinarity allowed for different types of knowledge to be combined to come up with a convincing position in essays through reflection, arguments, analysis, evaluation, examination and compare and contrast. They indicated that the approach provided them with words, ideas and theories to use to explain, critique and argue issues. This, they stressed, promoted creativity and innovation (SM & SH). The approach was said to provide words, ideas and theories that could be used to critique and argue issues with (SL).

In the process of sharpening critical thinking and creativity through use of words, ideas and theories from diverse subjects, interdisciplinarity gives student-teachers a chance to revise concepts covered. Responses related to this benefit are presented next.

5.3.4.5 Opportunity for revision

In education, revision involves studying facts again in order to learn them thoroughly. It entails re-studying work that has been covered in order to enhance understanding of the words, concepts and theories in preparation for their use in relevant situations.

Participants SA, SD, SF and SI mentioned the opportunity for revision. SD indicated that knowledge integration provided student-teachers with a chance for revision as they looked into the different subjects for relevant knowledge that was usable across disciplinary borders. SI also noted that interdisciplinarity was good practice as it helped to improve content mastery through revisiting subjects for relevant knowledge that could be merged. Other participants' contributions that expressed similar views were the following:

New ideas are generated, new insights emerge, and an opportunity for revision of coursework covered as it is revisited, inspected and used (SA).

It helps to revise and make issues clear. Issues covered in one area may be met again in others through integration, which helps students to revisit and understand better. The first lecturer may fail to elaborate, but during integration, the second one may clarify. Moreover, attention spans of students may differ in various circumstances from introduction to subsequent integration cases. I end up using the same methods, theory and text to answer questions (SF).

Apart from giving student-teachers a chance to revisit the different course subjects to inspect them for integrable knowledge, interviewees also noted that interdisciplinarity encouraged student-teachers to embark on a search for relevant knowledge to merge and address a task at hand. This information is presented next.

5.3.4.6 Research

While research may be a systematic scientific search for information, from the interviewees' point of view, it was taken to mean a detailed study the different subject areas with the intention of discovering new information or reaching a new understanding that would help to integrate such information. To them, it was reading around 'hunting' for relevant words, ideas, information and theories for integration. The following are the participants' views:

Participants SD, SE and SH credited the approach for the promotion of research for integrative knowledge. One participant explained that "*the approach paved the way*

for diverse search for connections” (SD), while SH said it “enabled research”. A more detailed contribution to the benefits of interdisciplinarity from one of the participants was that:

Lecturers learn a lot through research as they search for knowledge that can be integrated. Besides, lecturers cannot cover everything during lectures or tutorials but when we read other subjects searching for information to use for integration, these areas are covered (SE).

This benefit was buttressed by the advantage of applying knowledge to relevant situations. The data on this strength of the approach are presented next.

5.3.4.7 Application of knowledge

In the radial diagram, this is at the centre together with the central them because it is the ultimate goal of IKI. Knowledge application involves using available knowledge to make decisions and execute theoretical and practical tasks, for example, to explain, analyse, research and innovate to produce goods and services. In talking about practical application of knowledge transfer, Wells and Le (2017:59) said it fosters students’ ability to transfer learning to novel problems. This strength was subscribed to by SA and SJ.

Furthermore, SA explained that in applying ideas across subjects, interdisciplinarity encouraged creativity that led to the generation of new ideas and emergence of new insights. When probed, using his MS, Social Studies, he explained several times how the approach promoted knowledge transfer towards creative ideas. He stressed that through applying knowledge from different subjects, new ideas were generated, and new insights emerged. SJ concurred with SA by indicating that interdisciplinarity provided a framework like that applied in real life where accrued theoretical knowledge is put to practical use. She gave an example of knowledge on motivation that could be applied to inspire learners to want to learn during teaching and learning periods. Another example was knowledge of communication skills exploited in social and academic interactions to achieve desired intentions.

If interdisciplinarity encourages student-teachers to apply disciplinary knowledge to various real-life situations, it means it links theory to practice. When student-teachers reach a level where they can see disciplinary knowledge connections for hybridisation and appropriate application, the teacher-preparation programme would

have succeeded in moulding versatile facilitators. It would have achieved its teacher development mandate which was raised by two participants as presented in the next part.

5.3.4.8 Teacher development

Evans (2010:130) defined teacher development as a process that seeks to promote teachers' professionalism (elements of their job that constituted the knowledge, skills and procedures that teachers use at their work) and /or professionalism. The process is designed to help student-teachers to grow and enhance their knowledge, skills and expertise by freeing the students from restrictions so that they can be aware of the relevance of educational theory to academic writing and classroom practices. This sub-theme was raised by SC and SN.

In different words, SC and SN indicated that interdisciplinarity promoted teacher development. SC stressed that it was a good strategy to bring ideas together to produce quality teachers who can teach effectively. He added that it helped teachers to express their thoughts and justify their facts which is a sign of effective teachers. SN explained that the approach provided an opportunity for knowledge fusion because all disciplines are supposed to collaboratively develop a whole teacher by enhancing their knowledge base. In her view, knowledge integration improved student-teachers academically and professionally. She thought that the approach was a very good tactic that exposed student-teachers to varied information that developed their understanding of educational issues through hybrid knowledge. She strongly believed that it expanded the students' knowledge base and broadened their horizons. Apart from these specific contributions, several participants raised other strengths of interdisciplinarity that are grouped together under the following sub-theme.

5.3.4.9 Other benefits

This sub-theme comprises a variety of contributions on the benefits of knowledge integration raised by individual participants (SA, SC, SD, SE, SF & SK). The six participants raised six different benefits of knowledge integration. SA said the approach helped with the emergence of new insights, and SC indicated that it helped one to express and justify thoughts in detail. SD pointed out that merging subject

knowledge helped to equip students with the main ideas from different disciplines, topics and concepts. SE noted that the practice of integrating knowledge from different subjects helped cover areas that could have been left out during lectures as students researched knowledge to integrate across subjects. SF stated that some points that might have been misunderstood in one subject area might be understood during integration. According to SK, the approach allowed one to relate one's existing knowledge to the new incoming information from other subjects and made reference to Jean Piaget's theory of cognitive development components of assimilation and accommodation saying:

This act of relating previous and incoming knowledge reminds me of Piaget. He talks about the integration of new knowledge into the existing schema as assimilation. This means the new knowledge is inserted into the existing schema. There is also accommodation where the existing schema is made to adapt to fit the new knowledge (SK).

The data presented under the benefits theme revealed different responses indicating the subtlety with which interdisciplinarity influences student-teacher development to make them efficient academics and practitioners. The responses ranged from helping the pre-service teachers to grow academically and professionally to the promotion of assimilation and accommodation. The next theme that emerged was that on the causes of knowledge fragmentation by the trainee teachers.

5.3.5 Causes of Knowledge Fragmentation by Students

The law of causality posits that reality has causes because of the existence of a logical link between two events (cause and effect) in which the cause always precedes the effect (Goodman, Ullman & Tenenbaum, 2010:2). In line with this law, the researcher believed there were factors behind the tendency by pre-service teachers to fragment course knowledge according to disciplines.

The causes of strict disciplinarity at the expense of interdisciplinarity that the student participants raised are summarised in Table 5.5 below.

Table 5.5: Social causes of disciplinary knowledge fragmentation

	Sub-themes	Proponents
1	Looking down upon some disciplines	SA, SF, SG, SN
2	Valuing some disciplines	SB, SG, SH, SE

	Sub-themes	Proponents
3	Negativity	SA, SD, SE, SF, SG, SI, SL, SN, SO
4	Specialisation	SD, SE, SH, SI, SL, SM, SN
5	Orientation Campaigns	SD, SN
6	Fear to across the disciplinary borders	SH
7	Favourite disciplines	SN

From the different responses, seven sub-themes emerged, which are covered in the following sections.

5.3.5.1 Conflict

The informants' responses to why they tended to compartmentalise knowledge along disciplinary lines produced causes bordering on conflict. These responses produced sub-subthemes such as looking down upon some disciplines, valuing some disciplines, negativity, specialisation, orientation, fear to work across the disciplines and favourite disciplines. The nature of conflict was reflected by the biased perceptions of stakeholders, including scornful ones.

5.3.5.1.1 Looking down upon some disciplines

To 'look down upon' is to consider, think or treat someone or something as unimportant or inferior. This understanding indicates an acrimonious relationship between disciplines.

Participants SA, SF, SG and SN identified looking down upon some disciplines as the main cause of knowledge fragmentation. Both SA and SF blamed looking down upon other subjects for knowledge fragmentation arguing that such a culture could discourage the lecturers and students from integrating knowledge from various subjects. Other contributions to the same effect came from SG and SN as depicted below.

There is a tendency to look down upon subjects such as ChiShona, for example, saying it's a mother language, and therefore, there are no benefits in studying it. Subjects such as computer science, physical education (PE) and music that have been included in the updated Zimbabwean curriculum have become valued. So, there is this perception that some subjects are less important than others (SG).

Students studying certain programmes are looked down upon at university as insignificant. Moreover, some students may distance themselves from other programmes such law, media and society studies, development studies or engineering among others, and not borrow from them (SN).

The recurrence of the term 'look down upon' emphasised the problem of sub-dividing knowledge into subjects. Examples of specific 'less' important subjects were provided, for example, indigenous languages. Another sub-theme related to the less importance placed on some subjects entailed high regard for certain subjects.

5.3.5.1.2 Valuing some disciplines

A flipside of the denigration of "less important" subjects was the culture of veneration of other subjects. Valuing certain subjects seemed to be based on their perceived or real efficacy in addressing needs or ideology. Whatever the case, it ultimately leads to cultural hegemony as suggested by the following views from some of the interviewees.

Participants SB, SG, SH and SE raised views that somehow blamed the culture of placing more value on some subjects. For example, SB said the worst offender was an over-zealousness for the main subject areas (MS), and SH said competition between students fighting for recognition and prestige was to blame. In his words, SH said this was due to "*competition, prestige and corrosive friction*" between students. Other views related to this position included the following:

The belief that some subjects are more important than others affects teaching badly. For example, students ask those studying PE as an MS disparaging questions like: You spend the day jogging instead of coming to mathematics for what benefit? (SG).

I squarely blame lecturers who tend to put more importance on certain subjects like TOE as most important at college but not FAREME. Everyone has a negative attitude towards the PSB but the MSs that are examined are the core subjects. Practical subject lecturers and students boast that practicals are more valuable and practical. Some rate their subjects as superior to others and they want to stand on their own. There are also dominant subjects such as the main subjects that discourage the practice of integration. Academic subjects such as mathematics and English are more valued (SE).

This sub-theme revealed the influence of cultural hegemony through valuing some subjects over others. This had seen some students boasting about their MS and engaging in unhealthy competition with each other. Unhealthy competition reveals

the existence of disciplinary tribal wars. For example, there is evidence of mocking each other and making derogatory comments designed to denigrate some subjects and promote negativity, which is the next sub-theme.

5.3.5.1.3 Negativity

Negativity is a tendency to be downbeat, disagreeable and sceptical, all marked by hostility, withdrawal and pessimism. This characterisation matches the views raised by some of the participants.

The responses inclined towards negativity causing knowledge fragmentation included those of SA, SD, SE, SF, SG, SI, SL, SN and SO who mentioned antagonism, contrariness and uncooperativeness reflected in negative views, comments, perceptions and attitudes. The blame for fragmentation was raised in different ways such as negative perceptions, attitudes and bad comments (SA, SE, SF, SG and SI), speaking badly about other subjects (SN), other agendas (SO) and demonising certain programmes (SP). Similar sentiments were expressed as follows:

It may be due to individual negative dispositions towards some disciplines but not others. For example, lecturers and students think science subjects are more important than others. The same perception has gone viral nationally and globally with the STEM subjects. My TP experience revealed that some schools turned away student-teachers looking for attachment (practicum) saying they wanted science teachers only as they did not offer many places for arts. For sure, the schools enrolled more science students than arts (SL).

Negativity is revealed in the positive-negative perceptions divide regarding some subjects but not others. These perceptions centre on the desire by some participants studying certain subjects to dominate the academic sphere. One of these reasons was identified as specialisation.

5.3.5.2 Specialisation

Although the culture of specialisation has its merits in society, the data generated from participants suggests that it propagates cultural hegemony. Those who subscribed to it included SD, SE, SI, SL, SM and SN. The grouping of subjects into areas of specialisation was identified by SD as a misleading arrangement that created fertile ground for chaotic fragmentation. She blamed partitioning of knowledge into subjects for forcing lecturers to stick to their areas of specialisation.

SE saw separate subjects as influencing knowledge fragmentation, for example, PSB ideas that could be useful in PSA were often treated separately.

According to SI, lecturers stuck to their areas of specialisation to avoid confusing students or to over-emphasise their specialisation because it was their strength. She went on to note that there were points in areas of specialisation that did not promote borrowing ideas from other subject areas. SL weighed in on specialisation saying that it triggered emotional attachments in the lecturer and students who ended up being irritated and provoked by the inclusion of knowledge from other subjects to the point of shunning it. Similar responses are presented below:

Specialisation promotes unhealthy competition between subjects and subject members. The result is that some members dominate others and the dominated may distance themselves from certain dominant subjects leading to knowledge fragmentation (SM).

Commenting further on the matter, another participant revealed,

It's a fact that the majority do not integrate knowledge across borders. I think it's this thing called specialisation. We want to just stick to our personal areas. We don't want to move knowledge from one compartment to another. It's a matter of opinion. We want to keep knowledge areas separate. We don't want our special knowledge to be diluted or polluted by weaker knowledge from other subjects (SN).

While specialisation promotes in-depth study of a specific discipline, the participants' views seem to blame this for promoting knowledge fragmentation. It became an impediment in attempts to integrate disciplinary knowledge, especially as student-teachers are intentionally oriented towards disciplinarity as revealed by some interviewees.

5.3.5.3 Orientation campaigns

Orientation is a chance for students to learn how things work at their new institutions. It helps the students to get acquainted with institutional life. However, evidence from interviewees revealed that that orientation sent implicit messages about unofficial norms, behaviours and values of the dominant disciplinarity culture that ended up perpetuating cultural hegemony.

Some interviewees (SD & SN) accused first-year student orientation practices for encouraging knowledge fragmentation. For example, SD blamed first year

orientation campaigns that sought to 'colonise' students into different disciplines. The campaigns ended up with lecturers emphasising the "selling points" of their subject areas leading to denigration of other subjects. This, she argued, resulted in stereotyping and biases against other subjects. This became a culture perpetuated in the institutions. SN observed that orientation played a role in promoting subject knowledge fragmentation by students. Her argument was that as new students in an institution, they were unaware of the inherent disciplinary wars but were socialised into the conflict and forced to take sides in the raging battles for supremacy and dominance. The process of taking sides in the disciplinary wars seemed to scare students from practising interdisciplinarity as expressed in the sub-sub-theme below.

5.3.5.4 Fear of other subjects

Fear is a powerful feeling that arises from the threat of physical, emotional, psychological, real or imagined harm. The feeling has the power to literally kill someone's potential academically as revealed by SH. He raised fear of specialist areas as a possible reason behind the fragmented use of knowledge by student-teachers. He thought it was due to fear of the unknown as both lecturers and students may not be well-versed in the 'foreign' subjects. The fear resided in the possibility of making embarrassing mistakes.

Despite this fear, there was evidence that some student-teachers had developed preferred subjects from among the disparate subjects of their courses as presented in the next sub-sub-theme.

5.3.5.5 Favourite disciplines

People settle for preferences informed by personal, general criteria, and the resultant decision may be the biased disciplinary labels of supremacy or subservience.

Only SN raised the "favourite subject reason" that side-lined certain subjects. She indicated that students avoided certain subjects such as mathematics because of the stereotyped notion that it was difficult. The students preferred some subjects either because they were 'easy' or had currency in the institutions. Probed on hatred (or avoidance), she explained thus:

Maybe due to many reasons, including incompetent lecturers or students. Generally, students' attitude is cram, pass and go. It may also depend on

individuals' choices influenced by society, for example, employability, currency or mere pride to be associated with prestigious subjects (SN).

This last sub-sub-theme showed that the practice of preferring some subjects over others depended on several variables that were influenced by individual student-teachers themselves and institutional practices, for example, how course content is delivered as revealed below.

5.3.6 Teaching Approaches

The data on the causes of strict disciplinarity produced a teaching approaches sub-theme that in turn produced sub-subthemes related to approaches, ignorance of approach, complex nature of interdisciplinarity, a lack of models, socialisation into disciplinarity, personal attributes, uniqueness of subjects and plenitude amid paucities. These sub-subthemes are presented below.

5.3.6.1 Approaches

For students to successfully develop into competent teachers, lecturers should choose teaching approaches that best address the needs of student-teachers. Failure to do so would mean that students would miss critical learning points as revealed by the responses from SA, SH, SP and SN. Submissions included “*differences in teaching approaches*” (SA) and “*the instructor’s approach if it is a strictly disciplinary approach*” (SH). SN flatly blamed the disciplinary approach. The following excerpt is from another respondent who said the approach had a part to play in knowledge fragmentation:

The module approach fuels knowledge fragmentation as it seems to promote learning for exams instead of solving problems. Once we are through with a module, we literally throw away the knowledge and may never make reference to it in future work. Yaaa, it promotes fragmentation, for sure (SP).

This sub-sub-theme identified inconsistencies in disciplinary and module approaches as the causes of knowledge fragmentation. If this is the case, it may be necessary to establish stakeholders’ knowledge of interdisciplinarity.

5.3.6.2 Ignorance of approach

Although there is an increasing trend toward transitioning from traditional teaching to student-centred methodologies that actively engage students, this may be hindered

by a lack of knowledge of the trending methodologies. Ignorance of newer methods is likely to stop lecturers and student-teachers from practising the methods as evident in data regarding knowledge levels.

Ignorance of interdisciplinarity was singled out as a cause of standalone subjects by SB, SC, SD, SE, SF, SG and SH. SB said lecturers and students were not aware of the approach and she termed this '*ignorance of integration*' on the part of those involved. SC and SF said it was due to lecturer ignorance of the practice of borrowing or a total lack of knowledge on the part of student-teachers, such as ICT incompetence. A lack of adequate relevant knowledge to integrate was expressed by SD. SE blamed inadequate knowledge or a complete lack of knowledge of integration of ideas. Other verbatim examples in this category are the following:

There is also the issue of lack of knowledge to be integrated and confidence to do it practically. The other issue is that students are unaware of the combined effect of subjects because they plan to leave teaching once they qualify because it is no longer a noble profession (SG).

I think lecturers and students have a low level of other disciplines' knowledge. Lack of experience and exposure to the international educational practices also causes stakeholders to compartmentalise knowledge (SH).

Under this sub-sub-theme, using different expressions, these interviewees emphasised that knowledge fragmentation centred on ignorance of interdisciplinarity. These expressions included being unaware, ignorance, a lack of knowledge or inadequate knowledge. Another sub-sub-theme raised was the complexity of the interdisciplinary approach.

5.3.6.3 Complex nature of the approach

There are pervasive obstacles that hinder the embrace of interdisciplinarity. These hindrances are institutional practices, disciplinary culture and the approach's demand for the use of a range of skills. Because of these obstacles, the practice was viewed as complicated as emerged from responses by SC, SD, SI and SN that pointed to the complex nature of interdisciplinarity as one of the causes of knowledge fragmentation. In their views, the practice of integrating is demanding and boring (SD) and most students fail to identify cross-cutting concepts that could fit different contexts due to the complex nature of the approach (SC). In addition, the following were raised regarding the complexity of interdisciplinarity:

Integration is a challenging approach as some disciplinary topics are difficult for the uninitiated to visit and borrow. In some cases, there are points that specifically refer to an area of specialisation that do not require borrowing (SI).

Integration is demanding because one has to research and critically think before applying ideas, concepts and theories across subjects (SN).

The responses stressed the issue that interdisciplinarity is a complex cognitive skill that demands harnessing many skills. This may discourage interdisciplinary work as students may be unwilling to exert such effort. This may be exacerbated by the absence of role models as expressed in the next sub-sub-theme.

5.3.6.4 Lack of models to emulate

Modelling is a useful teaching tool where a less knowledgeable one learns from a more knowledgeable other by being shown how something is done which the former then imitates. In the absence of suitable models, learning may be stunted as expressed by SC and SG.

SG complained about the absence of interdisciplinarity role models to emulate because no one practised the approach systematically; for example, lecturers rarely used knowledge across subjects. This was also reflected in the verbatim response from SC below.

Lecturers do not give us the links between subjects and ways of using them. How these areas mediate TP is not emphasised, so we face challenges on TP. Lecturers don't emphasise the integration of disciplinary knowledge, so we don't practise the approach because we don't see the sense (SC).

It means if lecturers do not model knowledge integration, they practise disciplinarity. As such, student-teachers adhere to the same practice as lecturers are the students' agents of socialisation. In other words, lecturers socialise student-teachers into disciplinarity as the discussion below suggests.

5.3.6.5 Socialisation into disciplinarity

The concept socialisation refers to the lifelong process whereby society's culture is transmitted from one generation to the other (Giddens, 2016:335; Haralambos et al., 2013:758). This means that institutions have their own cultures, such as disciplinarity or interdisciplinarity, that would be passed on from one group of student-teachers to another as revealed by SI and SJ. SI said that knowledge fragmentation was

unconsciously ingrained in students because the education system emphasised boxed knowledge that many students misinterpreted to mean dealing with subjects as islands. SJ's voice added that:

Disciplinarity has been in existence from time immemorial. All lecturers and students have been exposed to it. That makes it difficult for them to suddenly move over to interdisciplinarity (SJ).

The data from the participants under the approaches sub-theme have shown factors external to student-teachers. There are also personal factors that are located within student-teachers themselves as presented in the next section.

5.3.6.6 Personal attributes

Personal attributes are natural character traits, talents and habits that uniquely describe a person. These can determine one's effectiveness or ineffectiveness, for example, in integrating disciplinary knowledge.

It was noted that some of the causes were influenced by different personality traits. SA, SB, SC, SF, SL, SN and SP laid the blame for disciplinarity on a range of individual distinguishing qualities. These included knowledge levels and adamant behaviour (SA), inattentiveness (SB), a lack of commitment (SC), and unpreparedness by lecturers who may simply mention links in passing (SD), incompetence (SF), fatigue due to multi-tasking by lecturers (SH), cultural beliefs about subjects (SL) and inability to interpret (SP). This is reflected in the statement below:

But I think some lecturers and students are lazy to read beyond disciplines as they copy or reproduce notes and answers year in and year out. Imagine someone lecturing dictating notes from tattered pages in this age of technology (SN).

These views indicate that there are weaknesses on the part of lecturers and student-teachers as personalities when it comes to dealing with interdisciplinarity. However, there are also causes coming from the heterogeneous disciplines themselves as shown next.

5.3.6.7 Uniqueness of subjects

Viewing the subjects through a novice's lenses, one may be tempted to conclude that the subjects' fundamental differences mean that their elements are incongruous.

Arguably, it is those differences that are critical for interdisciplinarity that thrives on using both similarities and differences to make a point. From the interviewees' position, the differences were a source of knowledge fragmentation.

Disciplines themselves were not spared as contributions from SC, SE and SH indicated that the uniqueness of the areas barred interdisciplinarity. For example, each area has its goal which could promote separation of subjects (SC), subject matter differs, and so, not everything is conducive to integration (SE) and some special areas do not require integration (SH).

Disciplinary uniqueness reflected in responses was presented along the lines of abundance of a variety of disciplinary aspects vis-à-vis scarcities as presented in the next sub-sub-theme.

5.3.6.8 Plenitude amid paucities

The participants' responses also revealed diametrically opposed reasons for the fragmented use of course subject knowledge. This revealed a mismatch between abundance and shortage in various areas as represented in Table 5.6.

Table 5.6: Abundance-scarcity dichotomy

Abundance of:	Participants	Scarcity of:	Participants
Concepts	SF	Time	SE, SF, SH
Content	SF, SH	Knowledge	SF
Differences	SH, SK	Manpower	SH
Tasks/Modules	SH	Detail	SK
Areas	SK	Resources	SH
Subjects	SP	-	-

The views presented in Table 5.6 reveal a dichotomy between a “plenty versus little” scenario with interviewees SF, SH, SK and SP mentioning the abundance of concepts, content, difference, tasks/modules, areas and subjects. The other participants: SE, SF, SH and SK pointed to the scarcity of time, knowledge, manpower, detail and resources. These views are looked at separately below.

5.3.6.8.1 Too much to deal with

Once there is too much of something, it means it has exceeded the normal mark and is problematic. Participants pointed to aspects that were excessive to the point of hindering interdisciplinarity. For example, SF indicated that there was too much pressure of work and too many disciplinary concepts to deal with on their own. SH pointed to too much content that resulted in lecturers experiencing overload. SK complained that there were too many areas to combine, while SP raised the issue of too many subjects that were covered in the teacher education curriculum.

5.3.6.8.2 Scarcities

Unlike the excesses noted above, the participants blamed various factors for fuelling knowledge fragmentation in different ways. The responses included time shortages (SE & SH), shortage of time to search for ideas to integrate and limited knowledge (SF). Time and knowledge deficits appeared to be a formidable combination especially with new subjects coming on board in teacher education. The next theme deals with the origin of fragmentation based on Becher's 'academic tribes and territories' thesis.

5.3.7 Origin of Fragmentation: Subjects as 'Academic Tribes'

Becher's (1989) thesis argued that the knowledge structures of disciplines (the academic territories) strongly condition or even determine the behaviour and values of academics (Trowler, 2014:17). As a result, academics live in disciplinary tribes with common sets of practices enclosed in disciplinary boundaries blocking interdisciplinarity. This argument has been extended to other areas, for example, in the current study, it has been included to understand the origin of knowledge fragmentation.

Participants' views regarding Becher's thesis of 'academic tribes and territories' produced the pattern in Table 5.7.

Table 5.7: Views for and against the notion of 'academic tribes'

Interviewee	Supporting the view	Opposing the view
SA	✓	
SB		✓
SC	✓	

Interviewee	Supporting the view	Opposing the view
SD	✓	
SE	✓	
SF	✓	
SG	✓	
SH		✓
SI		✓
SJ	NONE	NONE
SK	✓	
SL	✓	
SM	✓	
SN	✓	
SO	✓	
SP	✓	

The responses produced three camps of views: one supporting the notion of academic tribes, another opposing which produced two sub-subthemes. and a single abstention by SJ who, despite prodding, just laughed and kept quiet. The two major camps culminated in two sub-themes.

5.3.7.1 Disciplines are like 'academic tribes'

This position was supported by the majority of participants (SA, SC, SD, SE, SF, SG, SJ, SK, SL, SM, SN, SO and SP). The ideas they raised included that some lecturers made provocative comments about other areas; conflict due different expectations; taking some subjects lightly and students absconding from some 'less important' lectures to complete assignments but attending others that they regarded as more important (SC);students mocking each other; developing personal relationships based on subject specialisations; devaluing and laughing at some subjects; regarding those studying certain subjects as more intelligent than others; and competing for recognition and influence(SD). It was noted that the way one was taught to articulate issues in assignments in certain subjects differed as students from different subject areas fought for time, recognition, spaces (rooms and slots on timetables) and resources with some subjects and students being labelled and rejected based on their subject choices (SE). Further information provided by SF was on negative attitudes, public denunciation of some subjects by staff members, unhealthy personalisation and attachment to subjects, looking down upon other subjects and open hostility as members fought for dominance. SG raised the biased views that people had of the different subjects, negative comments made by some

students from other subject areas (also raised by SH & SO) and many contradictions from one research supervisor to another as characteristic of academic tribes. The views on resemblance raised by SK, SM and SO concerned inherent disciplinary differences and scorning others. SL stressed the natural, different and distinct disciplinary ways of looking at issues. SN validated the argument as announcements about vacant lecturer posts included requirements that specified certain subjects were preferred. Further supporting evidence of the tribalistic nature of subjects emanating from the participants is reproduced as follows:

Yes, in the end, we have academic tribes as subject members fight for the number one position. Subject areas and lecturers in particular areas stand alone. Lecturers and students say some subjects are better than others. They look down upon certain subjects and members who belong to those subjects. There is favouritism and tension between subjects (SA).

It's true because people tend to isolate themselves based on areas of study. They think that their subject areas are more marketable than the others. As a result, some subjects are looked down upon or regarded as too easy to study just like how tribes treat each other. Most lecturers and students underrate indigenous languages because they think they should not be studied. They display stereotyped and biased perceptions which influence attitudes towards some subjects. For example, on the timetable, Shona is placed after break or even in the afternoon when lecturers and students are tired, but maths, English, science and others come in the morning when lecturers and students are still fresh. Some students and lecturers attack certain subjects saying those who want to become Shona or PE teachers are useless, but they praise others like Accounts saying they are relevant today (SP).

The participants concurred that course disciplines represented academic tribes. Their arguments centred on the overall impression of tension as a result of efforts to wield power over the different knowledge areas. However, others refuted the thesis as shown in the next sub-theme.

5.3.7.2 Disciplines are not like 'academic tribes'

Three participants (SB, SH and SI) refuted Becher's conception of 'academic tribes and territories'. SB argued that there was no conflict between subjects or members. SI insisted that the subjects were like a family made up of individual members contributing in their different ways. SH argued against the thesis on the grounds that:

a programme's subjects produced one complete result; a product called student-teacher although people (belonging to different subjects) may rub against each other.

While these views are germane, there are semblances of limited knowledge and appreciation of Becher's thesis argument of academic tribes and territories. This is especially so as participants confessed that subjects contributed in their unique ways which is in fact similar to human tribes. Even family feuds are a common feature and conflicts are not necessarily loud and easily noticeable. Apart from these contrary perceptions of the thesis, other ideas that were raised sought to dismantle the compartmentalisation of knowledge and to encourage knowledge integration. These ideas are captured next under the theme that covers a conglomeration of other views.

5.3.7.3 Other contributions

When invited to proffer personal views on knowledge fragmentation by student-teachers, some responded (SA, SB, SD, SE, SF, SG, SH & SM) but others did not (SC, SI, SJ, SK, SL, SO and SP). SA called for the removal of the culture of categorising disciplines and the issue of MS, and SB expressed the need for lecturers to emphasise the common (positive and negative) areas usable for interdisciplinarity. SE, SF, SG and SM suggested intentionally including interdisciplinarity early in the teacher-training course before the culture of knowledge fragmentation could take root. This sentiment was shared by SG who proposed making students aware of integration by addressing it overtly and vigorously. SF stressed the need to value all course subjects. Another unique contribution demanded scrapping entry requirements that demanded specific subjects before someone could enter a programme (SH). Additional personal views were expressed by SD and SF as represented in their words below:

Institutions should develop a culture of valuing all subjects, for example, time allocation should be equal because subjects cannot do without each other as agriculture needs mathematics and Physical Education. Lecturers should provide students with guidance on the knowledge integration and interdisciplinarity should be promoted overtly (SD).

Except for a few participants, the majority of the student interviewees saw the relevance of IKI. The different views raised revealed various social reasons causing knowledge fragmentation, for example, the disciplinary approach and specialisation

among others. After the student-teacher interviewees, lecturers were interviewed, and the data generated is presented next.

5.4 DATA FROM LECTURER INTERVIEWS

This part describes and presents data generated from interviewing lecturers as important sources of data regarding causes of knowledge fragmentation by students and ways of embracing interdisciplinarity to find a theory-praxis nexus. Lecturers are responsible for implementing the teacher education curriculum by socialising students into either disciplinarity or interdisciplinarity. As such, 10 lecturers were purposively selected and interviewed as shown in Table 5.8.

Table 5.8: Biographical information of lecturer interviewees

Pseudonym	Sex	SITE
L1	Male	C
L2	Male	A
L3	Male	A
L4	Male	A
L5	Male	A
L6	Male	A
L7	Female	A
L8	Male	A
L9	Female	A
L10	Male	B

A total of 10 lecturers were purposively selected from the three sites. Two females and eight males made the sample. Their responses produced the following themes and sub-themes.

5.4.1 Causes of Course Knowledge Fragmentation

The theme that emerged from lecturer interview data centred on the causes of knowledge fragmentation by student-teachers. This theme had its sub-themes with the conception of the term academic discipline coming first.

5.4.1.1 Definition of academic discipline

The first port of call with all lecturer interviewees was their conception of academic disciplines. They explained the term academic discipline in various ways as illustrated in Table 5.9.

Table 5.9: Common descriptors in definitions

Descriptors	Participants
Areas of specialisation	L1
Areas of study	L2, L5, L7, L8
Subject areas	L3, L8, L9, L10
Fields of study	L4, L6
Branches of knowledge	L6
Components of curriculum	L8
Learning areas	L9
Modules	L9
Departments	L9

From their responses, nine common descriptors emerged with L1 using areas of specialisation. L2, L5, L7 and L8 used areas of study, L4 and L6 subject areas, L6 branches of knowledge and L8 components of a curriculum. L9 used learning areas, modules and departments. Some examples of the definitions as presented by some participants included the following:

My understanding is that academic disciplines relate to fields of study, branches of knowledge that may be coordinated in order to finally come up with a curriculum or programme to enhance the development of a teacher (L6).

Subjects, or areas of study. In fact, it relates to components of a curriculum. We divide the curriculum into areas, for example, Sociology, Psychology etc. (L8).

The different responses clearly revealed relevant conceptions of academic disciplines. Their understanding emphasised the separation of knowledge into distinct areas called subjects. The subjects led to specialisation which could have given birth to the desire for cultural domination by some subject specialists. The question then is whether interdisciplinarity is relevant in teacher education which is covered under the next theme.

5.4.2 The Place of Interdisciplinarity

This emerged from the data generated on the relevance of integration of teacher education disciplines. It produced three sub-themes that presented lecturers' personal views of interdisciplinarity and its sub-subthemes. These sub-subthemes captured pro-integration views, scepticism and the importance of integration which are presented next.

5.4.2.1 Personal views of interdisciplinarity (integration)

People's personal opinions reveal what they think or believe about something. Their perspectives influence how they deal with critical issues. As such, participants were asked for their personal views of interdisciplinarity, and their responses raised pro disciplinarity and sceptical opinions which are presented below.

5.4.2.1.1 Pro-interdisciplinarity views

Among the participants, some (L1, L2, L3, L4, L5, L6, L7 & L8) supported or approved interdisciplinary approach. L1 said it was good for holistic education, professional development and content mastery. In support of knowledge integration, L3 said subjects were interdependent because of the origin of knowledge, so they could borrow from each other for enrichment, reflection and argumentation among other academic exploits. Emphasising the relevance of IKI, L4 argued that the knowledge from the different disciplines should be integrated for students to quickly grasp and handle the course content. L5 noted that knowledge had no boundaries and was better when used across subjects to understand social issues and L6 explained that branches of knowledge needed to be coordinated to successfully develop a teacher holistically. L7 showed the relevance of the approach by saying integration should be practised for deeper understanding. Apart from these summaries, some detailed responses are captured below:

Knowledge is not compartmentalised. There is no site-specific knowledge. All knowledge sheds into other forms of knowledge. There is a lot of exchange between disciplines. There is no standalone discipline in academia. All knowledge leads to one endpoint, one conclusion, so all subjects can be integrated, for example, putting on clothes you consider the weather, ethics, aesthetics (presentability) (L2).

Yes, it is relevant, so that at the end of the day learning becomes more meaningful. If subjects are treated separately, existing in isolation, we'd lose

sight of the fact that they build one another. Nowadays, they talk of cross-cutting themes so as to show subject-matter relatedness. If you're to look at Heritage-Social Studies and NSS, there are certain topics which have the same concepts (L8).

The opinions raised acknowledged the value of interdisciplinarity, but it seemed participants were more inclined towards the merger of similar knowledge. Such inclination distorts the whole purpose of knowledge integration which advocates borrowing in unlimited ways, from positive and negative, for reference, reflection, support, argument and so forth to create new, comprehensive and useful insights. Apart from these pro-integration views, some of the interviewees had sceptical notions of the approach.

5.4.2.1.2 Sceptical views

While some lecturer participants saw vast benefits in interdisciplinarity, others were rather sceptical. Responses from participants L9 and L10 expressed incredulous views characterised by reservations to take a side. For example, L10 was of the view that interdisciplinarity was difficult to practise at college because the course demanded rigid specialisation. Similar sentiments were expressed by L9 who reasoned, thus:

It depends on the inclination of each discipline. Let's take for example, PSA and TOE, if you talk of integration, there always remains a certain level of specialty that should be handled by each discipline, for example, while Maslow's theory of motivation, is very much relevant and taught within TOE, it's more of theoretical part of it but when it comes to PSA, we're now looking at Maslow on the ground, in the classroom like how teachers handle learners who have different needs. There's a lot of pedagogics coming within PSA which may not be catered for in TOE. So, the issue of integration there should be handled cautiously (L9).

The cautious stance expressed by these participants is plausible, but they may show a lack of understanding of the approach. For instance, specialisation does not mean strict disciplinarity because in specialising, the specialist can still integrate knowledge. Moreover, theories merge smoothly in practice. Thus, largely, interdisciplinarity stands to be beneficial in teacher education. The next part explores these benefits.

5.4.2.3 Benefits of interdisciplinarity

In order to determine evidence supporting the viability of interdisciplinarity, the potential benefits of the approach were explored. All participants confirmed the benefits of interdisciplinarity. Their responses painted various shades of benefits as illustrated below.

Table 5.10: Benefits of interdisciplinarity

Interviewee	Benefits
L1	<ul style="list-style-type: none"> • promotes broadmindedness • helps look at issues from different dimensions • develops the critical learner exit skills • promotes application of knowledge • helps in giving flesh to dry bones of information
L2	<ul style="list-style-type: none"> • it's functional • moves both students and lectures away from the jug-mug approach • combines thinking and doing • avails time by integrating several subjects
L3	<ul style="list-style-type: none"> • enhances the topic of interest • enriches knowledge • helps to show the students that all knowledge is important
L4	<ul style="list-style-type: none"> • makes it easier for learners to grasp and handle content • helps stragglers catch up
L5	<ul style="list-style-type: none"> • makes students understand better • helps present knowledge as one whole • provides opportunity for repetition
L6	<ul style="list-style-type: none"> • helps to avoid overlap • reduces repetition
L7	<ul style="list-style-type: none"> • promotes deeper understanding or deeper knowledge • ensures correct information is imparted • assists lecturers to learn other teaching skills from other disciplines
L8	<ul style="list-style-type: none"> • makes learning become more meaningful • it helps avoid duplication • it frees the timetable
L9	<ul style="list-style-type: none"> • makes the student understand better • provides opportunity for repeating
L10	<ul style="list-style-type: none"> • brings a kind of hybridisation of knowledge where there is a mixture of knowledge

All 10 participants concurred that interdisciplinarity was beneficial in various ways. For example, it made students think and seek situations where to apply knowledge functionally as it combined thinking and doing, i.e., theory-praxis (L2); and it enhanced the topic of interest, enriched knowledge and proved to the students that all knowledge was important (L3). Additional views indicated that reference to a particular area helped those who may have been left behind to fill in the gaps by realising facts that would not have been clear to them when that particular subject was taught (L4 and L9), due to repetition, students understood and retained information holistically (L5, L6 and L7). Some verbatim views are presented below:

It promotes broadmindedness and develops the important learner exit skills of critical thinking, problem-solving, values (patriotism, humility/Unhu and leadership, communication and teamwork). There is also application of knowledge for problem-solving, conflict resolution and production of goods and services. This approach gives flesh to dry bones of information, ideas, knowledge, views and arguments (L1).

Learning becomes more meaningful. Just as in real life, our concept of a house is not isolated materials (bricks, rafters, window frames, etc.) but a combination of all these into a structure. Education has to do with venturing into new territories, exploring virgin concepts and areas as opposed to being tied down to redundant teaching-learning of fragmented concept (L8).

You know what, the interdisciplinary approach is good as it brings hybridisation of knowledge that is multidimensional and comprehensive. I think knowledge from various areas is actually credible in the sense that it is blended, reliable and divergent knowledge. The theoretical understanding can translate into practice. Lecturers use the theory to explain how practice is executed using theoretical knowledge within disciplines. Remember with interdisciplinary knowledge integration we are saying one is presenting information in order to clarify a point, one integrates ideas from various subjects like the multi-sectoral approach to teaching. You are taking various disciplines in order to succeed in the teaching of a subject (L10).

The data described above showed that interdisciplinarity is relevant to student-teachers. The question that begs answering then is whether the approach was practised at the sites.

5.4.3 Institutional Approaches to Teaching-learning

Although the interviewees unanimously supported the interdisciplinary approach to knowledge use by student-teachers, the question on how course disciplines were taught-learned revealed a mixed bag of institutional practices. Sub-themes that

emerged from the responses noted disciplinary approach, interdisciplinary approach and both approaches.

5.4.3.1 Disciplinary approach

The majority's responses showed dominance of the traditional disciplinary approaches summarised in tabular form below.

Table 5.11: Disciplinarity as the norm

Interviewee	Site	Approach to use of disciplinary knowledge
L1	C	Disciplinary
L2	A	Disciplinary
L4	A	Disciplinary
L5	A	Disciplinary
L6	A	Disciplinary
L8	A	Disciplinary

Participants L1, L2, L4, L5, L6 and L8 confirmed that they used the disciplinary approach, giving various reasons. L1 indicated disintegrated, mystified, compartmentalised and demarcated presentation and use of disciplines. L2 and L4 claimed that traditional compartmentalisation was the norm as they stuck to disciplinarity although they often talked about integration. According to L5, each discipline had its specialist lecturers who focused on their areas. This was explained by L6 and L8 as follows:

From my experience, there is no deliberate will to coordinate integration of areas to do with theoretical issues and the practical part. So, those who are taking theoretical part are just covering their part without due recognition of what the other part is doing, or they take it as obvious. Personally, the furthest I go, is when I draw implications (L6).

In our lecture rooms, the subjects are treated separately. Each subject's matter is treated in a silo approach such that students and lecturers do not to know how disciplinary concepts, or their content can be infused (L8).

The data show interviewee concurrence on the disciplinary approach that suggests hegemonic domination as members did not collaborate. It means that the student-teachers exposed to disciplinarity, practise what they live. Although these data showed the prevalence of disciplinarity, other data suggested interdisciplinarity.

5.4.3.2 Interdisciplinary approach

Two participants suggested that they used the interdisciplinary approach at their institution. Their responses are summarised in Table 5.12 below.

Table 5.12: Interdisciplinarity as the norm

Interviewee	Site	Approach
L3	A	Interdisciplinary
L9	A	Interdisciplinary

Both L3 and L9, from the same institution, claimed that lecturers and students practised interdisciplinarity. Their position contradicted the majority views from L2, L4, L5, L6 & L8 from the same college. For example, L3 indicated that

Lecturers practised interdisciplinarity to support, exemplify, illustrate, evaluate or critique issues for students' benefit. (L3)

This was also reflected in L9's answer below:

Yes, we integrate, for example, from my area PSA, we integrate with TOE and MS and PSBs. We integrate a lot, for example, the teaching of FAREME, when we're teaching scheming in PSA's principles of scheming, we can also augment our principles of teaching with some topics within TOE (L9).

Although their contributions appear to be genuine, the fact that the majority of lecturers from their institutions claimed otherwise could be due to the Hawthorne effect again, just like the other pair that claimed the use of both approaches reflected in the next sub-theme.

5.4.3.3 Both approaches embraced

Data from two participants claimed disciplinary and interdisciplinarity manifested at their different institutions. The summary of their answers is presented in Table 5.13 below.

Table 5.13: Both approaches practised

Interviewee	Site	Approach
L7	A	Disciplinary and Interdisciplinary
L10	B	To a very limited interdisciplinary

L7 and L10 from sites A and B claimed that both approaches were embraced. This claim saw L7 contradicting all the other participants from the same institution as hers, as she thought that

both approaches were practised.

Similarly, L10 said both co-existed but with disciplinarity dominating in TVET due to his:

institution's thrust towards specialisation while interdisciplinarity featured in education (NSS, Entrepreneur Skills, Psychology, Sociology and Philosophy).

The fact that the two contradicted the majority from their institutions makes interesting observation. It could mean uncoordinated practices. From the three sub-themes, disciplinarity dominated. The next theme presents data on possible ways of embracing IKI by pre-service teachers.

5.4.4 Embracing Interdisciplinarity Towards Theory-Praxis

The major focus of study being to establish social causes of knowledge fragmentation by student-teachers so as to encourage interdisciplinarity targeting theory-practice connection. Thus, having noted that largely, disciplinarity was the norm in the three institutions, exploration of possible ways towards embracing interdisciplinarity in teacher education institutions was next. A summary of the related data is presented in the table below.

Table 5.14: Proposed ways of embracing interdisciplinarity

Interviewee	Ways towards embracing interdisciplinarity
L1	<ul style="list-style-type: none"> • Shun isolation of knowledge • Encourage knowledge overlap • Use of ICT tools • Use of novels for teaching history • Lecturers to operate beyond boundaries by reading other disciplines
L2	<ul style="list-style-type: none"> • Sharing topics depending on one's flair • Team-teaching
L3	<ul style="list-style-type: none"> • Buttressing disciplinary knowledge with topics from other subjects
L4	<ul style="list-style-type: none"> • Deconstructing in order to reconstruct new things involving everyone

Interviewee	Ways towards embracing interdisciplinarity
L5	<ul style="list-style-type: none"> • Workshopping lecturers to encourage (advocacy) them to avoid strictly focusing on their specialisation but look at how our area links with other areas • Capacity building lecturers. • Relate every topic to others • Team-teaching where members come from different subjects
L6	<ul style="list-style-type: none"> • Put in place collaborative processes in planning and creating syllabuses
L7	<ul style="list-style-type: none"> • Use syllabuses or sources of information of those other disciplines to complement the ones we have. • Invite resources persons
L8	<ul style="list-style-type: none"> • Create an open system for teamwork e.g., designing syllabuses • Disciplines co-opting members from other areas in meetings and workshops • Open innovation approach to teaching-learning • Do away with the big brother mentality held by some areas and their members
L9	<ul style="list-style-type: none"> • Consultation and interaction with members from other disciplines • Resource persons
L10	<ul style="list-style-type: none"> • Team-teaching, thematic approach

All the participants proposed strategies that institutions could adopt to promote interdisciplinarity. These suggestions produced three sub-themes of collaboration, cultivation of interdisciplinarity and specialisation that are described below. The first sub-theme is the collaboration.

5.4.4.1 Collaboration

This sub-theme was subscribed to by L2, L5, L6, L7, L9 and L10 that had two sub-themes, team-teaching and resource persons, as presented below.

5.4.4.1.1 Team-teaching

Team-teaching or team lecturing is a situation whereby two or more lecturers work together, planning, conducting and evaluating the learning activities for a class. The strategy was proposed by L2, L5, L6, L9 and L10. Their suggestions had various

permutations that included team-teaching where members from different subjects work together to address a concept, theme or topic (L2, L8 & L10) and consulting people within disciplines of interest (L9). These proposals are reflected in the excerpt from L6 who suggested the following variant of team-teaching:

I would put collaborative processes first. This involves the engagement of various subject specialists planning collaboratively rather than separately whereby disciplines create their own work and syllabi separately. Everybody should be involved through teamwork, from planning to delivery (L6).

The other strategy suggested concerned engagement of more knowledgeable persons from outside the sites as resource persons which is the next sub-sub-theme.

5.4.4.1.2 Resource persons

Resource persons are disciplinary experts who are invited to contribute information and opinions to a topic in learning situations in ways that cover knowledge better than the regular lecturer. This was another collaborative way of promoting IKI across boundaries that was proposed by both participants L7 and L9. For example, L7 explained that in their HLSE mass lectures, they invited resource persons from other subjects and she gave an example of a PE lecturer who would teach on health, wellness and well-being and the benefits of exercise. Although the idea of resource persons is germane to knowledge integration as it ropes in experts from diverse fields, the participants did not elaborate how these experts are supposed to operate or at what stage they come into the scene. Another sub-theme addressed the need for lecturers and students to operate beyond subject boundaries.

5.4.4.2 Operating beyond disciplinary borders

Operating beyond subject borders is termed “boundary-breaking for interdisciplinarity” by Kidron and Kali (2015:2). The call for students and lecturers to operate beyond disciplinary borders was proposed by L1, L2, L3, L7, L8, L9 and L10. L3 suggested that students and lecturers should break down subject borders in their operations. Advocacy for boundary-breaking through workshops was the best way to embrace interdisciplinarity to capacitate lecturers (L4). At the individual level, L5 urged individual lecturers and students to relate every topic to others for continuity. L8 proposed creating an open system during syllabus design, subject workshops or meetings and embracing an open approach to teaching-learning that allowed

innovation, creativity and vibrancy. L9 identified the thematic approach in lecturing to facilitate integration whereby a focal theme would be used like a magnet to attract relevant information across subject borders. This was elaborated in the words reproduced here:

As lecturers, we should also shun isolation of knowledge and make sure there is no monopoly of knowledge but encourage overlap where the subjects feed into each other in the use of ICT tools across subjects for different purposes. I've personally found use of novels for teaching history quite effective where I cite fiction to understand history. Lecturers have to operate beyond boundaries by reading other disciplines so as to rope them in when need arises. Thus, while teaching history, I can use sociological knowledge to look at a people's culture and economics to understand their economic activities (L1).

Commenting on the same issue, L2 said:

Borrow and marry knowledge across subjects, do away with rigid compartmentalisation into subjects, demystify knowledge by decompartmentalising knowledge, for example, sharing topics depending on one's flair, not subjects (L2).

L7 added:

In our discipline, there is a concept called PSB, that is the methodology that deals with how to teach the subject when students go on TP. This provides a chance to use syllabuses or sources of information of those other disciplines to complement the ones we have (L7).

If breaking disciplinary boundaries is practised regularly, an interdisciplinary culture may be nurtured,

5.4.4.3 Cultivating interdisciplinary culture

Like any other practice, interdisciplinarity has to be inculcated and nurtured in the student-teachers. This view of cultivation of a culture of integration was raised from responses by L5, L7 and L8. This is represented by such contributions as workshopping lecturers to encourage the interdisciplinarity culture so that they would avoid strictly focusing on areas of specialisation(L5), the use of various sources to teach PSBs and Main Study areas and so on, to promote a culture of integrating disciplines (L7). This resonates well with the contribution from L8 who said:

I strongly believe there's a need to do away with the big brother mentality and culture held by some areas and their members in order to promote an all-embracing culture of integration (L8).

The data described here showed that there are ways that can be engaged by lecturers and student-teachers to promote knowledge integration. These methods included team-teaching, resource persons, disciplinary boundary-breaking and interdisciplinarity culture nurturing. The next theme focused on factors impeding knowledge integration.

5.4.5 Social Causes Impeding Interdisciplinarity

To appreciate the view that student-teachers fragment knowledge, there was need to uncover the social roots of the practice. Consequently, participants were asked what, in their views, were the social factors impeding interdisciplinarity. This was critical in this research that sought to establish why student-teachers, after being exposed to an array of disciplines, tended to treat such knowledge along disciplinary lines. A diverse range of the social roots of compartmentalisation that emerged were suggestive of cultural hegemony as summarised in Table 5.15.

Table 5.15: Social roots of knowledge fragmentation

Interviewee	Social causes of compartmentalisation
L1	specialisation, negative attitude, staff conflict
L2	Specialisation, negative attitudes
L3	Ignorance
L4	Specialisation
L5	Specialisation
L6	Specialisation
L7	Ignorance, time constraints, specialisation, negative attitudes
L8	Specialisation, ignorance, fight again each other
L9	Time constraints, pride
L10	Ignorance, specialisation

The different social causes impeding interdisciplinarity raised by the interviewees crystallised into five sub-themes, viz: specialisation, nescience, negative attitudes, time constraints and staff conflict.

5.4.5.1 Specialisation

The specialisation sub-sub-theme emerged from the various shades of views on social causes of knowledge fragmentation by student-teachers raised by eight interviewees (L1, L2, L4, L5, L6, L7, L8 & L10). Expression of this position blamed bracketing knowledge areas as separate entities that led to artificial zones and ranking of knowledge hierarchically (L2). The lecturers perceived the approach as a gradual threat to their jobs because they wanted to maintain their status as experts in particular subject areas (L4). The problem of disciplines and specialisation was breeding antagonism. L7 and L10 identified specialisation for leading to teaching along disciplinary lines. Similar views were contained in the verbatim excerpts presented, thus:

Mystifying knowledge, compartmentalisation and channelling students into closed areas is the problem. This is exacerbated by the education system that emphasises specialisation. Moreover, the manner in which textbooks are published presents dry facts of fragmented knowledge (L1).

I think challenges start right from the beginning when people are taken on board in institutions. They come with the feeling that they're going to do what they know best rather than coming in to engage different views. For example, language people may assume they know all about it without relating to theoretical views or other segments of the course. So, the problem is people are developed within specific areas as experts and may not be willing to move away from that kind of feeling so that they take on board the relevance of their own expertise within the frame of developing a particular programme (L6).

Perhaps it has to do with the manner both lecturers and students were taught. They tend to perpetuate that old, fragmented way of using knowledge and they find no temptation to venture into the new norm of integration. Some challenges have to do with the isolated way syllabuses are designed. Keeping disciplines closed from others does not keep them abreast with subject developments for them to feel at home to cross disciplinary borders. Specialisation is a big culprit here that disrupts the development of an innovation culture (L8).

The data show how specialisation has been ingrained into both lecturers and students to the point specialism and expertise. These provide fertile ground for cultural hegemony as each specialist area fights to overshadow all others. Not only specialisation was blamed for knowledge fragmentation but also a lack of knowledge or awareness of interdisciplinarity.

5.4.5.2 Nescience of approach

The Latin aphorism “scientia protest est” meaning “knowledge is power”, attributed to Sir Francis Bacon (Azamfirei, 2016:65), is relevant here because a lack of knowledge is a lack of control and empowerment. Nescience means ignorance.

Those whose ideas converged on the view regarding a lack of knowledge or unfamiliarity with interdisciplinary approach included L3, L7, L8 and L10. Crudely put, these participants blamed ignorance of the approach for causing fragmented knowledge by lecturers and students. For example, L3 categorically argued that lecturers and students were suffering from a dearth of knowledge or information of other contributing subjects and integrating methods. This was confirmed by L7 who said that lecturers and students were not well-versed in the approach. L8 weighed in saying that the lecturers and students were unknowledgeable of what was happening in other disciplines or areas while L10 blamed general ignorance of integration.

If lecturers and students lack knowledge of the approach, it may be understandable. However, if they suffered a lack of disciplinary knowledge to use for integration that would suggest disciplinary hegemony or, as another category of participants noted, negativity.

5.4.5.3 Negative attitudes

People’s attitudes generally influence the way they behave. This means if they have negative perceptions of interdisciplinarity or catchment area subjects, it would influence resistance to both. This is reflected in data from L1, L2 and L7 who blamed negative attitudes for knowledge fragmentation. Thus, attitudes based on a superior-inferior divide caused some to shun borrowing from what they regarded as inferior areas or fear of trespassing into what might be considered as superior subjects (L1). Negativity, according to L2, emanated from fear of subject area or disciplines of specialisation being neutralised, being over-diluted or even distorted (L2). These ideas were elaborated by the following full response by L7:

Maybe people who don't use that approach have attitude. It's because of negative perceptions, for example, you may hear some lecturers saying 'Shona haina aiyo. Itai serious pane izvizvi' (Shona is useless. Be serious on these) or 'HLSE hainabasa iyi because the examination is done on

coursework basis (HLSE is unimportant because the examination is based on coursework) (L7).

Once negativity towards certain subjects is implanted in student-teachers, especially coming from lecturers whom the students perceive as the more knowledgeable others, the chances of valuing such subjects' knowledge are slim. It may fuel disciplinaryity just as time constraints do.

5.4.5.4 Time constraints

Time is a critical element in education generally. Arguably, there is a positive relationship between time on-task and academic achievement. Inversely, time off-task hampers learning by limiting learning opportunities. Inadequate time may deny students the opportunity to search for knowledge from more than one subject to address the focal task. This is the argument reflected by responses from L7 and L9.

These participants indicated that time constraints caused lecturers and students to forego interdisciplinarity in preference for disciplinaryity. In their responses, they indicated that the cause was limited time because the disciplines themselves had a lot of content of their own to be covered. This caused them to forego interdisciplinarity as a waste of time since it was not the thrust of college examinations (L7). Knowledge fragmentation was driven by time constraints because lecturers had loads of work to mark and many other personal issues to attend to, to make ends meet due to economic hardships in Zimbabwe (L9).

With the increase in newer, contemporary subjects introduced into college curricula, time may be inadequate to cater for interdisciplinarity in a single lecture. The curriculum is expanding but the college day is stuck at eight hours. Timetables may be fully packed, and duration of lessons reduced. Shortage of time has the potential to cause conflict in various ways, such as staff conflict.

5.4.5.5 Staff conflict

The Marxist perspective argues that there are inequalities in society based on social class differences (Haralambos et al., 2013:844). Inequalities between the ruling and subject classes leads to class conflict. Based on this view, such classes may have been created in the subjects (powerful and less powerful) that are now exercising cultural hegemony over each other. This scenario emerged in the data from

responses by L1, L8 and L9. They believed disharmony between staff members was caused by ‘fighting’ and pride emanating from disciplinary allegiance. In L10’s view, someone without specialisation feels awkward to cross subject borders for fear of misinterpreting knowledge and causing conflict and animosity (L10). Other full views on the conflict effect included these:

It is caused by personnel conflict and staff resistance to ‘visitors’ to what they believe to be their disciplinary areas. Academics thrive on controversy; crushing issues breathes life into academics for them to remain worthy (L7).

If we’re closed, then we remain with those silos ... those compartmentalised subject areas in which we end up becoming gatekeepers fighting against each other for dominance and relevance (L8).

The nature of conflict engraved in these data is typical of cultural hegemony as the conflict seemed shrouded in staff members’ fights, pride, fear, resistance, controversy and gatekeeping. The conflicts have great potential to perpetuate knowledge silos that create Becher’s academic tribes and territories.

5.4.6 Disciplines as ‘Academic Tribes and Territories’

The researcher sought to establish lecturers’ perceptions of themselves, their own disciplines and their ratings of those in other subjects by probing their take on Becher’s notion of subjects as representing ‘academic tribes and territories’. An overview of the interviewees’ responses is presented in Table 5.16.

Table 5.16: Disciplines as academic tribes and territories

Supporting the view	Undecided
L1	
L2	L3
L4	L5
L6	L9
L7	L10
L8	

The data split the 10 participants into two groups. Six participants supported the view and four seemed undecided. None of them refuted Becher’s thesis on the tribalistic and territorial culture of the disciplines. The two groups produced two sub-themes.

5.4.6.1 The tribalistic and territorial nature of disciplines

Taken from Becher's (1968) thesis, the categorisation and naming of knowledge into subjects gave birth to his metaphorical reference to tribes and their territories. It seemed that the sole purpose of the grouping and labelling of knowledge was to gain control over some knowledge and those subscribing to it.

The view that academic disciplines represent 'academic tribes and territories' was supported by L1, L2, L4, L6, L7 and L8. L1 confirmed that subjects were like tribes in terms of conflict or antagonism with regard to purity of their knowledge and specialisation. L4 saw the tribalistic nature in that there were areas that dominated or took the largest amount of time on timetable. He added that when people had expertise, they were very segregatory and jealous of their own area so that they may not want to engage other people or issues from other disciplines. From L6's point of view, teaching was an overarching discipline which is made up of different disciplines but if people who were going to provide the knowledge bases came from a segmented situation, they affected the whole discipline of teacher development. L8 observed that the old approach resulted in disciplines fighting against each other, each functional area or each discipline trying to be the best. He explained that lecturers who taught such subjects tended to have a 'Big Brother' mentality, believing that they were the people who made the programmes tick (L8). Other views supporting Becher's thesis in the participants' own words included:

Yes, for example, lecturers lie to students and each other that they are better than each other which undermines integration as students end up demotivated to use knowledge from castigated areas. Use of subject propaganda makes subjects represent academic tribes. You know what tribal groups do? They disagree. They hate each other and are always in conflict. They soil each other in battles for supremacy. They jealously guarded their territories from intruders. They use dirty tricks to maintain a superior position in the same way members who belong to specific subjects do. In the process, all hope for collaboration is lost both by the national tribes and academic tribes as the focus will be on unproductive battles. All hope for productive human knowledge advancement is lost in the murky tribal fights (L2).

May be people who don't use that approach have attitudes that lead to categorising disciplines into academic tribes as they create knowledge camps based on names of disciplines such as Shona, HLSE, NSS and so on that have nothing in common but hateful differences. They negatively regard some subjects along tribalistic and territorial views of inferiority with less developed theories, arguments, culture, vocabulary and language. Yes, negative

perceptions of some disciplines lead to academic tribes and territories as subjects are labelled or stigmatised just like tribes, national, races or ethnic groups (L7).

These responses clearly support Becher's claim because of the inherent conflict manifesting in various ways. The evidence included conflict/antagonism, domineering, segregation and jealousy, segmented knowledge and methods, superiority-inferiority complexes and negative attitudes. Although the majority confessed that disciplinary bigotry was akin to tribalism, others seemed uncertain as reflected in the next sub-theme.

5.4.6.2 On the fence

Psychologically, indecision is caused by several factors that include fear of failure and a lack of confidence or information among others. Thus, although none of the participants was absolutely against Becher's academic tribes view, some participants (L3, L5, L9 and L10) neither supported the analogy nor dispute it categorically but opted to sit on the fence as they just could not decide. For example, L5 reasoned that all subjects were important, but people believed some were more important than others and cited the championing of STEM subjects as tribalistic since science without humanity was useless to society. L9 thought the idea could be concurrently correct and incorrect because knowledge in one area related to other knowledges no matter how separated they were. Her argument was that even the tribes themselves had cousins in other clans, yet some subjects displayed tribalistic airs as they sounded like they had all the knowledge there was to know to solve life's problems. Similar sentiments were echoed by L3 and L10 as reproduced here.

Isolation of knowledge into compartments allows specialisation and depth unlike tribal relations. Of course, some may dislike knowledge from other subjects due to various reasons such as incompetence in the other areas leading to some kind of tribalism. If someone failed mathematics at 'O' Level, that person, student or lecturer, may shun or disdain integrating mathematical knowledge for fear of messing up and being shamed (L3).

Yes, it could be that there are some disciplines or modules that are regarded as more important. But at my institution, for course assessment, one has to pass all the subjects to be awarded a certificate which shows that all the subjects are equal with equal weighting. In that sense, they may not be like tribes. Of course, based on some people's perceptions, that is true. But from my point of view, they are given equal weighting and equal hours (L10).

The fence sitters vacillated between confirming the thesis and disputing it. Either way, they expressed some relevant supporting ideas as they tried to present balanced responses reflected in their efforts to be neutral. The next theme considered the lecturers' personal views regarding disciplinarity and interdisciplinarity.

5.4.7 Personal Views on Fragmentation or Interdisciplinarity

In a move to give the participants a louder voice than given by the structured questions, the researcher invited participants to offer their own views concerning how knowledge was used by students along the fragmentation-integration divide. Half of the participants (L2, L3, L8, L9 & L10) declined the invitation while the other half (L1, L4, L5, L6 & L7) took it.

Among those who expressed their views, L4 noted that some areas that dominated or took the largest amount of time on the timetable frightened the members from the other subservient subjects. L7 proposed using resource persons, allowing students to research and present on some topics and conducting small-scale research on some issues to marry theoretical knowledge to practice. L5 called for teacher educators to work together towards the esteemed product rather than each doing their own thing. Similar views are captured in some detail below:

There has been fragmentation in the history of teacher education in the academic and social spheres of the institutions with members from known departments dominating the corridors of power. That scenario perpetuates compartmentalisation (L1).

Teacher development programmes must really focus on teacher's knowledge and, therefore, all other disciplines must come within the framework of teacher's knowledge rather than provide different disciplines in order to then develop a teacher. People must come down and ask themselves what is the GPK a teacher must have from different disciplines rather than developing each discipline so that the student-teacher would then select, may be by coincidence, what is integrable. The shortest way is to identify the general pedagogical content, pedagogical CK and the CK that the teacher must have within each discipline so that it is taught in an interdisciplinary approach rather than the secluded, compartmentalised, disciplinary approach (L6).

These are critical issues that pointed to the relevance of interdisciplinarity in teacher education towards the holistic development of pre-service teachers who are capacitated to link theory to practice.

5.5 SUMMARY OF FINDINGS FROM INTERVIEWS

This section of the chapter described and presented findings from the interviews with 16 students and 10 lecturers from three TTIs. In the process, themes, sub-theme and sub-subthemes emerged from the data which were analysed to help in understanding the social factors that influenced student-teachers to fragment their course subject knowledge. From the lecturers, suggestions on ways to promote interdisciplinarity were proposed. Both lecturers and students suggested that the disciplinary culture was a major social factor causing knowledge fragmentation. The 26 participants concurred that there was animosity between disciplines and members which fuelled disciplinary in the use of the course subjects' knowledge by students. Ideologically, specialisation leads to social warring, divisions and classes designed to subjugate the proletariat. In the absence of ideology, Geuss (2009:5) argued that subjects would behave like estranged related enemies who are "guest-friends" from the same family tree. The interviewees unanimously agreed that interdisciplinarity was beneficial to student-teachers in a number of ways; for example, provision of revision and enhanced comprehension that led to the creation of new and practical ideas.

The data generated from student interviewees raised rank-ordering of course disciplines based on how the participants listed their course subjects and sang the praises of their MS areas, for example, by describing them as the best and most important and drawing comparisons with others. It also emerged that some lecturers failed to give prospective teachers the requisite tools for practice or actually prevented students from developing such tools through compartmentalised orientation. All this caused perceptions that some subjects were more important than others (Mudavanhu, 2014:221-222). The responses showed, however, that interdisciplinarity had a place in teacher education as all knowledge could be used across boundaries. Regardless of these positive views, it emerged that there was disharmony on the approaches practised in the institutions ranging from disciplinary to interdisciplinarity and a mixture of the two.

Another issue that emerged related to the benefits of interdisciplinarity which interviewees identified as including improved understanding, increased teacher knowledge, a chance for repetition and revision, development of creativity and critical

thinking, encouraging research as well as holistic development of the teacher. In line with these views, Mudavanhu (2014:90) observed that the interplay between theory and practice is synergistic because student-teachers learn educational theory that they later practise in school settings during TP.

The student interviewees blamed knowledge fragmentation on general conflict emanating from negative perceptions of some subjects, biased valuation of subjects, specialisation, orientation campaigns and fear of straying across boundaries. This is supported by Hellman (2015:345-346) who viewed the naturalised fragmentation as leading to specialised, narrow compartments that compete in general value and sovereignty for relevance in understanding society, blocking production of meaningful and valuable knowledge. Other personal attributes identified as causing knowledge fragmentation included rigidity causing resistance to change, inattentiveness, a lack of commitment and unpreparedness among others.

Pursuant to these views, the majority of the interviewees confirmed the notion that disciplines represented academic tribes which led to disciplinarity though others were non-committal. Their responses also suggested ways of resolving impotent disciplinarity tendencies that included removal of the culture of categorising disciplines and MSs, the need for lecturers to stress knowledge integration and desisting from stipulating some subjects but not others as entry requirements.

All lecturers defined academic disciplines, for example, as areas of specialisation. Most of them expressed pro-interdisciplinary views, arguing that all knowledge was one whole. From their responses, interdisciplinarity benefits were identified to include promotion of broad-mindedness, development of critical thinking, a combination of thinking and doing and improved comprehension. Again, despite such benefits, the majority of the lecturers indicated the dominance of the disciplinary approach in their institutions.

In their responses, the lecturers proposed ways to ameliorate disciplinarity antagonism as shunning isolation of knowledge, integration of ICT, use of different disciplines' sources, team-teaching, students as lecturers, lecturer capacity-building towards IKI and engaging resource persons. According to Collins (2017: iv), Jones (2009:76), and Petri (2010:73), through team-teaching, teachers from multiple disciplines can collaboratively design a curriculum and facilitate learning. On

engaging students to teach, Davies and Fung (2018:15) stressed that the best way to learn something is to teach it as a unique technique connecting students with peers in other areas and levels. Thus, students at lower levels get help from those at upper levels who may be tasked to present lectures, showing the juniors how to use knowledge from across disciplines for various goals.

The lecturers identified specialisation, negative attitudes, conflict, ignorance and time challenges as some of the social causes of knowledge fragmentation. These causes, it emerged, led the participants to buy into the notion that subjects resemble Becher's academic tribes and territories. For example, regarding specialisation, Wolff (2004:4) argued that recipients are socialised in specific ways of thinking about and understanding their places and relationships to the societies within which they live. Furthermore, findings revealed that some subjects, like tribes, are dominant; subject members behave like cultural vanguards and conflict exists between the disciplinary and interdisciplinary approaches and subjects. Becher's concept of academic tribes and territories is also illustrated by Biglan's (1973:195) study of the characteristics of subject matter in different academic areas. Out of the 33 academic fields, Biglan's Taxonomy classified the disciplines into the 'hard' and 'soft' categories in a kind of horizontal structuring along a continuum. In the continuum, the 'hard' empirical sciences are at one end, the 'soft' social sciences in the middle and the 'soft' humanities at the other extreme (Davies & Devlin, 2010:17-18). The result is disciplinary tribes and territories of hard/soft, pure/applied, convergent/divergent and urban/rural categorisation (Trowler, 2014:18).

To curb the fragmentation of knowledge and promote interdisciplinarity without destroying any subjects, lecturer interviewees proposed various strategies. This included shunning isolation of knowledge, encouraging knowledge overlap, using ICT tools, consulting different disciplinary sources, lecturing beyond boundaries by reading other disciplines and sharing topics depending on individual flair. Buttressing disciplinary knowledge with topics from other subjects, reconstruction of new integration programmes involving everyone, workshoping lecturers to encourage (advocacy) them to avoid strictly focusing on their specialisation areas by looking at how their areas link with other areas were proposed. Participants also suggested capacity-building lectures, relating every topic to others, team-teaching by members from different subjects, putting in place collaborative processes in planning and

creating syllabuses and inviting resource persons. Other suggestions were creating open systems for teamwork (for example, designing syllabuses collaboratively, co-opting members from other areas in meetings and workshops of other subjects); adopting an open innovation approach to teaching-learning; doing away with the 'big brother' mentality held by some areas and their members; and consulting others. Interaction with members from other disciplines, exploiting cross-cutting themes and using a thematic approach to teaching and learning were also identified. On cross-cutting themes, Kidron and Kali (2015:6-7) proposed that they serve as a backbone where knowledge from different disciplines is integrated through artefacts (essays, examinations, discussions and other tasks). Through these integrative artefacts, students are required to integrate ideas from more than one disciplinary domain. The next section presents data generated from the analysis of documents.

5.6 FINDINGS FROM DOCUMENT ANALYSIS

After the interviews with students and lecturers, the researcher sought to corroborate the data obtained with that of documentary evidence. The institution's selection advertisement/application form, timetables (lecturing and examination), syllabi, lecture programmes, lecture notes and essays were analysed. Cohen (2007:475) posited that document analysis is unobtrusive as it depends on official and personal documents unintentionally produced for the current research and the subjects are not aware that they are being studied. For the purposes of this study, the documents that were analysed were obtained from one of the three sites due to the lockdown conditions necessitated by the outbreak of the COVID-19 pandemic in Zimbabwe. From that teacher training institution, the Professional Foundations Department was purposively identified, and its TOE Cluster was subsequently purposively selected because it comprised three closely related subjects that easily lend themselves to integration. The data generated are described and presented below beginning with the theme on fragmentation related to student recruitment criteria.

5.6.1 Knowledge Fragmentation related to Student Selection and Entry Qualifications

One of the institutions' selection advertisements invited applications from suitably qualified persons who wished to train as teachers. The stipulated minimum entry qualifications were "5 'O' Level passes with C or better' It went on to categorically

specify “English and mathematics” as the compulsory subjects that one must have passed to qualify for entrance.

The application form accompanying the selection advertisement had various sections to be completed by applicants. One such section was labelled “Details of your Ordinary Level passes.” This section had columns for ‘Subjects’, ‘symbol’ and ‘Year’ attained. Under the ‘subject’ column, only the first five subjects were specifically provided (the others were left open for completion by applicants) in a particular hierarchy as follows:

1. English
2. Mathematics
3. Shona
4. Ndebele
5. Sciences

The nature of the advertisement and the application form was skewed towards promoting some subjects while denigrating others. This was a national culture for what seemed genuine concerns but may end up influencing disciplinary cultural hegemony. A similar pattern was also noted in the college’s lecturing timetables.

5.6.2 Knowledge Fragmentation Caused by Timetabling and Subject Distribution Pattern

5.6.2.1 Lecturing timetables

Three lecturing timetables for 2021 were analysed and it was noted that one timetable had three slots per day throughout the five-day week, from 8-10, 10.30-12.30 to 14.00-15.00.

The first timetable for January had three slots for TOE/TECD, three for MS and three for PSA. The PSBs had a slot each per week. Of these, mathematics, ICT, Science & Technology and Agriculture PSBs had a mid-morning slot but on Friday after break (10.30-12.30). The rest of the PSBs (technical subjects, languages, heritage & FAREME) had afternoon slots (14.00-15.00). HLSE and NSS shared one afternoon (14.00-15.00) slot falling on Fridays on an alternating basis.

The General Course class timetable of Jan 2019-2021 for final face-to-face tuition 2021 after lockdown had four slots per day for the week. TOE had 3 slots, MS had 3 and a fourth alternating with PSA. HLSE had one slot that alternated with a slot for study time weekly. Some practical MSs (Music/PE; Art/HE; Agric/Science & Technology) and Indigenous Languages/English had an additional slot to the four though alternating weekly. TOE and PSA had all their slots in the first and second slots between 08.00 and 11.30 while all the others had some slots in the third and fourth periods (11.45-16.00). An interesting scenario was that PSA and MS shared a Wednesday afternoon (14.30-16.00) slot, alternating on a weekly basis. Research had one lecture (11.45-13.15) on a Friday.

The data revealed a tendency to give preferential treatment to some subjects in terms of the position of slots, frequency of slots or sharing/not sharing slots. Such a scenario painted a picture that there were some subjects that were more highly regarded than others. This had a great potential to promote knowledge fragmentation due to disciplinary cultural hegemony. A third timetable revealed the following pattern.

The third timetable analysed revealed that TOE had three slots in the first and second periods (08.00 and 11.30). PSA had two slots, both of which were first lectures (08.00-09.30). MS had three lectures towards end of day (11.45-16.00) with one alternating weekly with Art PSB. The PSBs had six sets of paired slots with pairs alternating weekly. HLSE and SNE shared a Thursday slot (10.00-11.30) alternating weekly. NSS and EMT had each a slot on Tuesday and Wednesday respectively. Communication Skills had the last slot (14.30-16.00) on a Friday.

As revealed in the analysis of the other timetables, some subjects were given the lion's share in many respects. For example, some subjects were allocated more slots than others. These slots were mostly allocated in the prime hours of the days and week. On the other hand, there were others that played second fiddle as reflected by the few slots, alternating or sharing arrangements. Of course, all these seemingly innocent or rational arrangements are ideologically inclined towards entrenching disciplinary cultural hegemony. Next is data from an examination timetable.

5.6.2.2 Examination timetables

The examination timetable for the year 2021 was analysed. It was noted that the distribution of practical examination papers was the first activity on the timetable beginning on 08.01.21. The practical MSs, Music, PES, Textile Technology, Agriculture and Biology, were the only ones involved in the exercise. On 08.02.21, internal practical examinations began for Music, PES and Food & Nutrition. This was followed on 11.02.21 by the distribution of a practical paper to Art & Design MS candidates. PS Syllabus 'A' examination was on 15.02.21 using the same venues. This was followed on 16.02.21, by TECD & TOE examinations using traditional venues.

Main subject examinations were sat for on 17.02.21, the same slot after PSA & TOE in different rooms but not their usual lecture rooms. On 18.02.21, practical examinations for Biology, Physics, Computer Science were sat for with each subject using its own laboratory as the venue while Agriculture used its area. The Internal Practical examinations for Textiles Planning were on 22.02.21, the same slot on the timetable in the subject area's lecture room. From 23.02.21 to 26.02.21, external practical examinations were in progress which always come last for Clothing & Textiles, Food & Nutrition, PES and Music in their respective areas.

While reasons may be given to justify every action taken in coming up with the organisational processes, it is clear that these considerations are suggestive of the hidden curriculum wielding the power to send suggestive but unintended messages. For example, certain subjects were always the first to be examined. There are certain venues that seemed to be reserved for certain subjects with justification. Seemingly innocent, these small acts send value-laden status messages that have the potential to influence knowledge fragmentation. The next part presents data generated from the analysis of the TOE syllabus.

5.6.3 Knowledge Fragmentation as Revealed by Syllabus Course Specifications

The search for the social roots of knowledge fragmentation by student-teachers covered the analysis of a TOE Syllabus 2021 compared with the 2011 one. An examination of the syllabus aims showed that the institution's TOE curriculum aimed

to cultivate critical thinking, analysis, application of theories as well as evaluation of the applicability of educational theories among others, which augur well for interdisciplinarity.

The syllabus objectives also focused on ensuring that the student-teachers “demonstrate mastery of principles and concepts of education”, “apply theories of education to teaching and learning”, “evaluate the applicability of educational theories to teaching and learning” and “integrate Information and Communication Technology in teaching and learning”. All these objectives have a clear inclination towards interdisciplinarity, but integration is limited to ICT.

Another aspect of interest was the order of the subjects in the syllabus document with Psychology of Education and Inclusivity coming first, followed by Sociology of Education and Educational Administration and Philosophy of Education and Curriculum Studies coming last. Such permanent ordering, regardless of the criteria used, has implications for the treatment of knowledge with regard to disciplinarity and interdisciplinarity. For instance, one may think it is belittling to attach some areas to Psychology, Sociology and Philosophy of Education. Moreover, the wisdom of starting with Psychology and ending with Philosophy may be subjective.

The analysis also looked at the teaching approaches and noted slight changes between the 2011 and 2021 versions. The methods included observation, seminars, lectures, tutorials, structured reading tasks, discussions, simulation, research, OPEN, DISTANCE and e-learning being common across both syllabi but ICT integration, resource persons and problem-solving only appearing in the 2021 syllabus. The difference in the two syllabi reveal signs of reflective practice as 2011 integration shortfalls were partly addressed in the 2021 syllabus, though minimal. However, documentation and implementation are two different things.

5.6.4 Knowledge Fragmentation by Students as Revealed in Lecture Programme Topics and Takers

Analysis of the schemes of work and lecture programme for TOE 2021 final year looked at topic distribution. It was noted that lectures were largely inclined towards specialist lines except for a few minor topics in Psychology and Sociology that were taken by non-specialists.

Another aspect of interest was that of time allocation among the three subjects (Psychology of Education and Inclusivity (PEI), Sociology of Education and Educational Administration (SEEA) and Philosophy of Education and Curriculum Studies (PECS) housed under TOE. The analysis showed that PEI had 32 x 90-minute slots, SEEA 35 x 90 slots & PECS 27 x 90 slots. The positions of the three subjects on the programme were that PEI was first, SEEA second and PECS third. Time allocation was uneven among the three subjects which may imply the value ascribed to each.

A look at lecturer appearances revealed bias in the number of appearances of lecturers where Lecturer A appeared 25-five times, B lectured 15 times, C had 18 appearances, D had 7, E had 14, F had 8 and G had 5 lectures per term.

The analysis of the schemes of work and lecture programmes revealed specialist allocation of the three TOE areas. Another disparity noted was that the three subjects had different time allocations. Some had more than others and could determine the prevailing approach. The unequal treatment of the subjects has implications towards knowledge integration. Lecture notes were analysed next.

5.6.5 Knowledge Fragmentation Caused by Approach to Lecture Notes

An examination of SEEA lecture notes showed that the lecture notes on social stratification were handled along pure sociological lines. For example, the term stratification was defined sociologically with no reference to geographical conception of the earth's crust strata for better understanding of layers of people socially just like layers of the earth's crust.

Another aspect of interest was the references or sources used and recommended to students. It was found that most of the sources were old, published between 1973-1999, and were discipline-based. In some cases, dependence on one source was noted.

On 10/09/21, one lecturer posted on Google Classroom and WhatsApp group notes borrowed from another lecturer and only edited the names of the lending lecturer by placing the borrower's details.

The evidence from the lecture notes showed complete disciplinary, reliance on disciplinary sources and reluctance/laziness to research for newer information. These vices have the potential to discourage interdisciplinarity. In an effort to triangulate sources of data, examination and coursework were analysed.

5.6.6 The Place of Interdisciplinarity in Teacher Education: Examination Scripts and Coursework Assignments

The researcher analysed examination scripts and assignment essays in search of evidence confirming or refuting interviewee data. All in all, 68 documents were analysed. Of these, 34 were examination scripts which earned distinctions (80% or more) or 60% to 79% and the other 34 were assignment essays of a similar nature. First to be analysed were the examination scripts.

5.6.6.1 The place of interdisciplinarity in examination essays: Interdisciplinarity versus disciplinary

After going through all the 34 candidates' three essay responses (102 essays), the data generated revealed that the majority of the candidates (14) produced all three answers that were purely disciplinary without any evidence of integrating knowledge from other areas to her subjects or other departments. The second largest number was 13 cases that had two essays that were purely disciplinary, and the least number of essays (seven) had one essay that was disciplinarily slanted.

Of the 34 candidates' essay answers, analysis showed that not even one of them used interdisciplinarity in all three answers. Seven candidates' essays were found to embrace interdisciplinarity in two of their answers while 12 of them integrated knowledge from the section's three subjects in one essay. However, this was isolated, shallow and non-recurrent. Table 5.17 summarises the examination script analysis data.

Table 5.17: Interdisciplinarity embracing examination answers

Candidates	Number of essays	Question numbers
0	3	0
7	2	3, 4, 6, 8
12	1	1, 3, 6, 7, 8,

None of the candidates embraced interdisciplinarity in all three sections' answers. Seven candidates embraced isolated incidents of interdisciplinarity in two of their answers which included questions 3, 4, 6 and 8 while 12 candidates integrated only in single essays to questions 1, 3, 6, 7, 8 and 9. All the incidents of integration noted were not acknowledged by both internal and external examiners.

Table 5.18: Disciplinarity focused examination answers

Candidates	Number of essays	Question numbers
14	3	1, 3, 4, 6, 8, 9
13	2	1, 3, 5, 6, 7, 8, 9
7	1	1, 4, 6, 8,

Fourteen candidates focused on disciplinary knowledge in writing all the three answers from questions 1, 3, 4, 6, 8 and 9. Thirteen candidates wrote two purely disciplinary responses for questions 1, 3, 5, 6, 7, 8 and 9. Seven candidates produced single responses that depended on disciplinary knowledge for questions 1, 4, 6 and 8. The inconsistencies noted in the examination scripts seemed to support the view that integration is incidentally embraced. This is especially so as all the isolated cases were not recognised by the examiners. Thus, it can be implied that the approach was overtly an issue which made disciplinarity thrive.

5.6.6.2 Coursework assignment data description and presentation

The course work for final-year students was analysed. Thirty-four students' three assignment essays were the documents that were purposively sampled on the grounds that they were in the good to very good range (60 to 79 marks) to excellent (80 and above range), moderated and some even relooked at by external examiners. The data generated from these documents is presented in Table 5.19 and 5.20.

Table 5.19: Coursework assignments embracing interdisciplinarity

Candidate	3 Essays	2 Essays	1 Essay	Nil	Psychology	Sociology	Philosophy
408		✓				✓	✓
417			✓				✓
471			✓				✓
550		✓			✓		✓
563			✓			✓	

Candidate	3 Essays	2 Essays	1 Essay	Nil	Psychology	Sociology	Philosophy
587		✓			✓	✓	
524			✓				✓
385			✓			✓	
596			✓				✓
362		✓				✓	✓

Ten candidates' course work assignments revealed that the answers infused the elements of an interdisciplinary approach. Despite this, none of them infused interdisciplinarity in all the three subjects' answers. Four candidates had two of their three answers integrating knowledge from other disciplines. Two of these included ideas from other subjects in SEEA and Philosophy of Education and Curriculum Studies (PECS), another in Psychology of Education and Inclusive Education (PEIE) and PECS, and the fourth in PEIE and SEEA. The other six had a single essay each that embraced interdisciplinarity with one being PEIE, three SEEA and two PECS. The pattern seemed to confirm inconsistency in approaches used.

Table 5.20: Disciplinarity focused coursework assignments

Candidate	3 Essays	2 Essays	1 Essay	0 Essay	Psychology	Sociology	Philosophy
322	✓				✓	✓	✓
326	✓				✓	✓	✓
405	✓				✓	✓	✓
406	✓				✓	✓	✓
431	✓				✓	✓	✓
458	✓				✓	✓	✓
377	✓				✓	✓	✓
376	✓				✓	✓	✓
441	✓				✓	✓	✓
399	✓				✓	✓	✓
528	✓				✓	✓	✓
553	✓				✓	✓	✓
436	✓				✓	✓	✓
304	✓				✓	✓	✓
601	✓				✓	✓	✓
450	✓				✓	✓	✓
608	✓				✓	✓	✓
573	✓				✓	✓	✓

Candidate	3 Essays	2 Essays	1 Essay	0 Essay	Psychology	Sociology	Philosophy
541	✓				✓	✓	✓
364	✓				✓	✓	✓
311	✓				✓	✓	✓
416	✓				✓	✓	✓
337	✓				✓	✓	✓
367	✓				✓	✓	✓

Thirty-four candidates' course work assignments were analysed. Twenty-four of assignments were largely disciplinary in nature. They had all three subjects' essay answers restricted to the disciplines' views.

In total, 68 candidates' coursework and examination essay answers were analysed to establish the plausibility of interdisciplinarity in teacher training. This translated to 204 essays.

The perusal of the coursework essays, 10 (408, 417, 471, 550, 563, 583, 524, 384, 596 & 362) candidates embraced interdisciplinarity in some of their essays that added up to 23 essays. Some examples that proved the place (position or location) of interdisciplinarity in student-teachers' work included 408, 387 and 471 who infused sociological views in a philosophical essay, two theoretical views from sociology were infused in a psychological answer and HLSE and ICT ideas were integrated in a philosophical answer. Despite this encouraging evidence of the plausibility of knowledge integration, the extent seems to be minimal and sparse as only 10 of the 68 showed evidence of embracing interdisciplinarity as illustrated by excerpts from the following candidates' essays:

Turning the coin to the other side, African education was less holistic as it promoted gender disparities and more valuable opportunities were given to males at the expense of females (Candidate 408).

However, evidence shows that efforts have been halted by the nature and type of labels societies place on individuals with disabilities. The situation is worse for a girl child with disabilities as they experience multiple disadvantages on account of gender and disability (Candidate 387).

Relating to the global pandemic of Coronavirus that affected many nations, differences were noticed due to online learning that took place. Some learners could not afford to access education because they could not afford electronic gadgets and internet connection that was required for online learning to take place (sic) (Candidate 471).

These sparse excerpts revealed the plausibility and utility of knowledge integration. However, the instances should have been many more since these were assignments that allowed research first. The small number implied that interdisciplinarity depended on individual creativity. In the end, data obtained through document analysis confirmed the findings obtained from the interviews with student-teachers and lecturers from the three sites. For example, both revealed sporadic cases of knowledge integration and dominance of interdisciplinarity.

5.7 SUMMARY OF FINDINGS FROM DOCUMENTS ANALYSED

The preceding section described and presented findings obtained from the analysis of one institution's documents. The documents analysed included vacancy advertisements and application forms, lecture timetables, examination timetables, syllabi, lecture schemes and programmes, lecture notes, examination scripts and assignments. These revealed the relevance of interdisciplinarity in teacher education. Despite this evidence, the overall pattern showed the predominance of the disciplinary approach tantamount to Gramsci's cultural hegemony; for example, specifying compulsory subjects that included English and Mathematics first in that order as entry requirements. In addition, timetables analysed showed the cultural hegemony in the form of huge chunks of time allocation to some subjects, for instance, where TOE had three slots per week while Communication Skills and HLSE alternated on a weekly basis. Similar trends were also revealed in the perusal of the examination timetable where the what, when and where of conducting examinations has become taken for granted, predetermined and accepted by all as the given and normal trend. These findings are also reflected in Kirshner and Merriënboer's (2007:245) observation that compartmentalisation as fragmentation of knowledge into subjects emerged in western academia and is often overlooked as naturalised in the wider society. This observation is reminiscent of Gramsci's cultural hegemony.

The syllabi which are policy guidelines were found to be largely silent on interdisciplinarity except in very few cases that seem to suggest it. The documents revealed that while the aim was to nurture critical thinkers who are able to apply theory to practice, the syllabi perpetuated the disciplines' cultural hegemony by rank-ordering them. The presentation has become the accepted norm with PEIE, SEEA and PECS in that order as reflected in lecture schemes, programmes and examination question papers. The documents' teaching approaches section prescribed several approaches but did not mention interdisciplinarity by name.

Data generated from the analysis of scheme and lecture programmes revealed the cultural hegemony of specialisation that influenced lecturers to teach along subject specialisation lines and differential time allocation suggestive of prejudicial bias for and against some subjects.

Lecture notes that were analysed also revealed disciplinary tendencies; for example, there was a tendency to depend solely on specific subjects' literature. In the majority of cases, the sources were obsolete and the notes recycled.

Results obtained confirmed those from the interviews that disciplinary has morphed into a kind of culture with certain subjects imposing cultural hegemony. For example, most of the students' examination essay answers were found to be largely disciplinary as the candidates stuck to the target discipline in the majority of their essays. A similar pattern was also noted in all three of their coursework essays where not a single candidate integrated knowledge from sister subjects or beyond. To triangulate the results, the next part describes and presents data obtained through observation of social interaction in one of the institutions.

5.8 OBSERVATION DATA DESCRIPTION AND PRESENTATION

With data from interviews and document analysis in place, the researcher went on to take time to observe activities obtaining in the selected site. The observation used an open observation guide to determine the social factors that influenced student-teachers to fragment course knowledge. Interactions targeted were both formal and informal exchanges and activities at the purposively selected institution. These interactive scenarios were chosen as the rightful contexts portraying what actually went on that affected fragmented use of course knowledge.

5.8.1 Causes of Knowledge Fragmentation by Student-teachers as Portrayed by Social Interaction Patterns

In observing the activities in their natural settings, the researcher sought to corroborate earlier findings from interviews and documentary analysis. The focus was to establish causes of disciplinarity as displayed by social actors at the site. The sub-subthemes that emerged are described next, beginning with the tendency to boast.

5.8.1.1 Bragging culture

On 30 August 2021, after the announcement of reopening of colleges set for 6 September 2021 following COVID-19 lockdown review, the researcher saw three senior lecturers called in to strategise the reopening of the institution. The three were discussing their sectional changes outside one of their offices and one of them remarked: *“TOE is where it happens. We are the leaders. We are the admin.”*

On 08 September 2021, all sections were asked to submit their brochures for a career guidance day. Two members from one section was editing a Brochure. The researcher noticed the caption “TOE-Where it happens” on the brochure.

The two observed incidences revealed boastfulness coming from one of the institution’s sections. It is highly probable that, if this happened in front of the students, it would have the potential to influence them to be positively biased towards such a celebrated area. This could be the reason why most student participants included this area in naming the subjects that they studied. The other sub-theme that came out addressed the pattern of lecturing.

5.8.1.2 Lecture attendance

One of the methods proposed by lecturers was team-teaching. In conducting observations of activities at the institution, the researcher looked out for lecture attendance. A crude form of team-teaching marked by mere presence was witnessed.

Educational institutions reopened on 06 September 2021. On that day, the researcher observed that the first lecture after lockdown for third year students (the finalists) was TOE. It was attended by three male lecturers. The lead lecturer

addressed the class from start to finish (08:00-09:30) while the other two just sat and watched. There was physical presence but no 'teamness'.

Another scenario revealed individuals presenting lectures. For instance, on 12 November 2021, a lady lecturer was teaching one of the TOE subjects alone. She used hard copy notes that looked old, and the leaves had turned brown/yellow due to exposure to sunlight and use. There were no technological gadgets (laptop and whiteboard) used.

From these observations, neither team-teaching nor co-teaching were used to promote knowledge integration. The overused notes suggested reluctance to research and regularly update content by integrating. In addition, failure to integrate technological MimioTeach¹ resources available raised questions regarding computer literacy. Another area considered for observation was the institutional organogram in relation to power.

5.8.1.3 Areas of specialisation and power

Sociologically, power is an individual's ability to control or direct others based on the five power bases identified by French and Raven (1960, cited in Ambur, 2000:1) that include coercive, legitimate, reward, referent, and expert. On 03 September 2021, in relation to power, the researcher observed that there were some administrative adjustments which affected the institution's organogram. It was noted that personnel from TOE and mathematics occupied the two topmost administrative positions in acting capacities. The observation seemed to confirm the notion that some disciplines are more powerful than others in principle and reality. The status seemed consented to by most.

On 07 September 2021, the researcher observed a PSA lecture being conducted. Three lecturers were in attendance, two males and one female. The LIC was leading the proceedings on methodology but later on gave room to a SPED specialist as the incoming lecturer addressed the students on linguistic signing. This was not integration but pluridisciplinarity/ multidisciplinary. Power dynamics were noted in play as sign language was given the last few minutes while methodology used a

¹The MimioTeach interactive system is a portable interactive device that is capable of transforming any whiteboard or any flat surface into a fully collaborative whiteboard solution (<https://www.mimio-boards.com/mimioteach-interactive-system.html>)

bigger portion of the time. The presentation of two different areas in the same lecture seemed to confirm the ignorance of interdisciplinarity findings from the interviews. Observation also revealed the prevalence of conflict between disciplines' membership as observed the same day involving timetable issues.

5.8.1.4 Conflict over lecture placement on timetable

On 07 September 2021, the researcher observed some lecturers collecting final 2021 term timetables from a HOD. One of them remarked, "*Yaaa, humuonika* [Yaaa, that's it]. This is better, we now have one slot morning, two in the mid-morning and no lecture on Friday. You did well, Boss."

The HOD replied, "*Really? Someone was mad at me for placing MS in the afternoon (14:30-16:00) on Monday arguing that MSs are more demanding than the likes of PSA and others I had placed earlier (PSA, TOE, Agric/Science & Technology)*" (laughed). The evidence from this observation matches interview findings that identified resource conflict between disciplines as discouraging knowledge integration. The conflict arose from the conception of some subjects as more demanding than others and, therefore, requiring preferential placement on the timetable. This idea of value judgement was also observed on 10 September 2021.

5.8.1.5 Disciplinary value judgement

Value judgement is an assessment of the disciplines as good or bad/important or unimportant in terms of one's standards or priorities. Such assessment was observed on 10 September 2021 when the researcher met a group of former students collecting their examination results and materials from different subject areas. The group of students expressed satisfaction that they had accessed the "most important subject folders" which they identified as TOE, PSA & MSs. One of them said, "*Mamwe ese handinabasanawo*" (I don't care about all the others). Similar behaviour was observed again on 13 September 2021.

On that day, 13 September 2021, a class of students had three assignments which were due on the same day for MS, HELSE and a PSB. After conversing for some time, a group of students chose to submit MS first, then PSB and HLSE in that order. At face value, this may be assumed to have been a mere decision made to submit in that order. However, decision-making, though based on rational, intuitive processes,

is arguably a political behaviour (Elban, 2017:2). Because of that, the students' decision on the order of submission could have been influenced by the politics of the academic tribes and territories. The value-laden trend seemed entrenched into the system to the point of being naturalised as noted on 1 September 2021.

A Heads of Subject (HOS) notice was posted on the staff WhatsApp group on 1 September 2021. The researcher noted the order of presentation of the subjects which started with Food and Textile Technology followed by Science, Social Studies, English, Early Childhood Education, with practical subjects like ICT, HELS and NSS last. A chat carrying an addendum followed later with an apology for having forgotten and omitting Art Education HOS. This may seem a simple mechanical error, but it could be a manifestation of the regard for the subject. For example, it suggests that the area is of little significance that can be forgotten because it has been overshadowed by others whose currency is strong. This resembled some responses from some student-teachers who named some subjects that they studied but either forgot or chose to omit from their responses.

On the same day, 1 September 2021, the researcher observed that a Lecturers-in-Charge post was published on the institution's social media platform. The researcher was interested in the order of the areas which started with TP followed by TOE, Mathematics and Science, practical subjects, ECD, Languages, Humanities and PS. This list may have broken the norm somehow because PSA was described by interviewees as the backbone of the course. The seemingly relegated position could be a reflection of conflict mirrored by the one who posted the notice. This could be because the viewpoint of the sender was influenced by the sciences and practicals whose currency, from the sender's view, was stronger than that of PSA.

The majority of the observations seemed to confirm findings from the interview and document analysis. Other observations that revealed the relevance of interdisciplinarity were also noted. These are covered next, looking at the use of connections between disciplines.

5.8.1.6 The place of interdisciplinarity in teacher training: using links between disciplines

Findings from interviews and document analysis showed the feasibility of knowledge integration. To avoid the folly of imposing interdisciplinarity on student-teachers, it was important to determine its relevance. Thus, observation was conducted targeting evidence of the relevance of IKI.

A PSA afternoon lecture (14:30-16:00) was manned by one male lecturer on 08 September 2021. The lecturer was presenting a PSA lecture, but he began to complain about students' poor in-text referencing in writing PSA assignments. He gave the example of an error where students cited saying, "According to Mukusha (2020) says that" He began to correct the error by explaining that once one had used 'according to' it was incorrect to use a reporting verb after the date. He emphasised that one had to choose to either write, "According to Mukusha (2020),"" or "Mukusha (2020) says that ...". He also corrected subject-verb agreement where two or more authors were cited. The lecturer taught PSA, referencing, Communication Skills and English while dealing with PAS as the focal subject which showed the plausibility of interdisciplinarity in holistic teacher development.

A similar scenario presented itself on 17 September 2021. During research or Curriculum Depth Study [CDS] consultation time, a student came to his supervisor with a draft for supervision. The supervisor complained that the typed document had many errors of spacing, spelling, punctuation and sentence construction. He blamed the student for failing to use ICT skills imparted in the relevant ICT area to edit and perfect the document. He even wondered if the ICT programme was serving its purpose in this regard. Just like the PSA lecturer made efforts to integrate knowledge, the research supervisor helped to conscientise the supervisee that ICT and research could be integrated. Despite such assistance showing the validity of IKI, student-teacher may continue to compartmentalise knowledge due to negative stereotyping of subjects as observed on 9 September 2021.

5.8.1.7 Negatively stereotyping disciplines

On 9 September 2021, the researcher noticed that an Art lecture was being conducted in one of the Computer Studies laboratories. Some students accidentally

opened the lab door intending to use the desktops in the room. They were surprised to find an Art lecturer teaching. The students shut the door and the following exchanges took place:

Student 1: VeArt vanobatei mulab? (What are the Art people doing in the Lab?)

Student 2: Ngavaende kustudio kwavouko. (They should go to their Art Studio.)

These utterances by the students revealed stereotyped notions of incompatibility of the different subjects. Really, there was no harm in conducting an art lecture in an unoccupied computer laboratory. Probably the lecture required the use of computer software. Thus, stereotyped demarcations make the students assume antagonism and incompatibility of areas. Such traditional stereotyped views of disciplines as academic tribes and territories could have influenced two lecturers observed discussing differential treatment of learning areas as shown next.

On 17 September 2021, two lecturers from the same subject area were found talking about student performance in in the PSB area, thus:

Lecturer 1: The performance in PSB is not good.

Lecturer 2: It's because vanopa more attention to MS kupfuura PSB. Hamenonei. (It's because they devote more attention to MS than PSB. I don't know why.)

Lecturer 1: Ishuwaiyoyo. Makaona zvandakaona chaizvo. (Exactly. You noticed the exact thing that I noticed.)

The above evidence shows that the lecturers were convinced that the student-teachers treated the subjects differently. The MS and PSB are integrable, but it would seem students had negative stereotyped perceptions of PSB. The perceptions influenced the amount of effort the students were prepared to direct towards MS. Surprisingly, lecturers also harboured stereotyped views of subjects as observed on 20 September 2021.

In the afternoon, after lunch break, on 20 September 2021, music students were practising traditional dances and songs outside their lecture room. One lecturer walked towards them and shouted: “*Rimwe zuva muchabudirwa nemashave nemidzimu pano. Basa rekuimba traditional songs and dances. Hakuna zvimwe zvirinane here?*” (One day you will be possessed by the spirits of the dead. You always perform these traditional songs and dances. Are there no other better genres?)

The lecturers are supposed to spearhead knowledge integration for students to practise it. These cases of lecturers deriding other subjects publicly entrench disciplinary. The sad thing is that the unveiled attacks were hurled at both students and their lecturers, sometimes by the same perpetrators as witnessed on 21 September 2021.

On the following day, 21 September 2021, the same lecturer met a music lecturer in one of the corridors and repeated his mockery, saying: “*Imi vakomana moita basa rekuimbisa nziyo nekudzanisa mastudents nziyo dzemidzumu everyday pano apa. Hamuna zvimwe besides izvi here?* (Both laughed) (Hey you guys, you always ask students to perform traditional songs and dances here. Don’t you have something better?). *Musaseka because one day vachasvikirwa mukatitrovesa* (more laughter). (Don’t laugh because one day they will be possessed and beat us).”

These negative stereotyped remarks damage the self-esteem of the members in the subject area. They influence those outside to hold the area in disdain. The ultimate result is stereotyped disciplinary due to a superiority or inferiority complex. The latter complex was observed during an Indigenous language lecture as described below.

On 23 September 2021, during a MS slot, a local language lecture (Shona) was with a class in a lecture room, saying: “*Sei muchizvitarisira pasi? Chidzidzo chenyu chakakosha sezvimwe. Ini pano ndinotambira mari yakafanana nevanodzidzisa zvamoti zvidzidzo zvakakosha. Ndaisekwa nemumwe wemalecturers aripano tichiita Masters ku university achiti ungaita rurimi rwaamai kuvha here but nhasi tose tiri varairidzi pano* (class burst into laughter). *Shuwa henyu. Even lecturers at university, angavaweShona, Maths or Science anotambira same salary so musavhairirwa.* (Why do you look down upon yourselves? Your MS is as important as any other. I

am earning the same salary as any other lecturer in any subject you deem important. At university, studying for a master's degree, one of the lecturers who is now also here used to laugh at me saying it was foolish to come to university to study the mother language. (laughter) Seriously! Even lecturers teaching Shona, Maths or Science at university earn the same salary, so don't be intimidated.)

The lecturer's counsel indicated the extent to which lecturers and students nurture stereotyped views about different subjects. The effects, as revealed in the episode, include low self-esteem and fear that may influence all involved to stick to disciplinarity. The unfair and untrue beliefs that lecturers and students hold and communicate about the different areas observed in action at the institution consolidated the findings from the interviews and document analysis. Findings showed a concerted effort to effect cultural hegemony by student-teachers and lecturers from their different disciplinary camps. The next section triangulates the key findings that emerged from the interviews, document analysis and observation to address the research questions, aims and objectives.

5.9 SUMMARY OF FINDINGS FROM OBSERVATIONS

Having generated data via interviews and documentary analysis in trying to establish social factors that inhibited student-teachers from embracing interdisciplinarity, the researcher proceeded to further triangulate these methods with observation. MacDonald and Headlam, (2011:50-51) contended that the observation method is useful in exploring underlying realities of situations such as discrepancies between what participants say and believe, and what actually happens. This is supported by Robson (2002:310) and Walliman (2011:100) who posited that observation provides a reality check by recording people's reactions to questions which can demonstrate their views better than their verbal responses.

The observations provided evidence that interdisciplinarity is practicable in student-teacher development efforts; for example, it is possible to integrate methodology, typing, referencing and grammar in one lecture. In addition, through observation of unfolding events at one of the three sites, it emerged that practically, fragmentation was a result of a multifarious factors in subtle ways that all converged on the researcher's view that cultural hegemony was at play in promoting disciplinarity while discouraging interdisciplinarity among student-teachers. For instance, it was

observed that a bragging culture existed among students and lecturers that had the potential to intimidate 'alien' members from trespassing into unknown areas of other subjects boastfully labelled 'where it happens'.

Another finding was that lecturers presented lectures individually and recycled notes as they were reluctant to research new ideas across subjects. Where lecturers attended a lecture together, it was found out that some were mere spectators who did not contribute to the proceedings. In addition, it was found that specialisation promoted fragmentation of both knowledge and personnel appointments as it had an influence on power dynamics which is the crux of Gramsci's cultural hegemony. Findings also revealed that there was subtle conflict between subject camps on such issues as timetabling, furniture, spaces and ICT tools, among others.

5.10 COMMENTS ON THE FINDINGS/ SYNTHESIS OF RESEARCH FINDINGS

The researcher chose to embark on this research after being intrigued by the course knowledge fragmentation phenomenon by prospective teachers. Most of them tended to deal with knowledge from their course subjects in isolation which was misguided because the subjects are intended to combine in the production of teacher knowledge. Put another way, there is knowledge fragmentation in teacher training, yet the subject knowledge is designed to feed into the students holistically, in a combined form. It was deemed that this anomaly could be due to social factors within the TTIs. The findings from this study are, thus, discussed and synthesised in this segment in light of the literature reviewed on disciplinarity, interdisciplinarity, the place of interdisciplinarity in teacher training and ways of assisting student-teachers to embrace knowledge integration.

The discussion of findings addresses the main research question and the attendant sub-questions that guided the study. It begins with the main research question as follows: Why do pre-service student-teachers compartmentalise course knowledge according to disciplines?

Based on the theory that guided this research, it can be concluded that student-teachers compartmentalise course subject knowledge due to the subtle influence of disciplinary cultural hegemony. This is categorically and eloquently affirmed by Moran (2005:15) who asserted that disciplinary hegemony is embodied in

disciplinarity as the systematisation of knowledge into discrete, specialised, hierarchical domains. According to Moran, this was strengthened in the enlightenment era's scientific specialisms, and by the drive for the classification and codification of knowledge into encyclopaedic systems. Moran concluded that disciplines, therefore, are about power, hierarchy and control in the organisation of knowledge. The power matrices manifest in various ways.

Teacher education in Zimbabwe is provided by various players who include the government, churches and universities (Mudavanhu, 2014:31; Muasrurwa, 2011:952-953). Despite the different players involved, generally, the curriculum has similar features, for example, the telephonic interviews solicited the names of subjects that the student participants studied at the three institutions which showed the similarities. The research findings revealed this resemblance along with rank-order undertones judging from the student participants' tendency to name some subjects first. It also emerged that some subjects were predominantly named by most participants while others were ignored or forgotten. This is supported by Chiweshe et al.'s (2013:892) observation that practical subjects are looked down upon in some sections of society. Similarly, most students named TOE, PSA and MS (SA, SB, SC, SD, SE, SF & SG) which confirmed SA's view that some fields are relevant, but others are not. Cultural hegemonic tones were also discernible in the 16 student-teachers' eulogies for their MS, for example, using superlative descriptors (SA, SB, SC, SD, SE, SF, SG, SH, SI & SJ). Further evidence of disciplines being at loggerheads and attempting to dominate each other was indicated in the subject comparisons the students drew with emphasis on important contributions and skills development among others.

Another finding was that subjects had material usable across their boundaries although disciplinarity and interdisciplinarity contestation was reported, from the lecturers and students and at the general institutional level. Despite several benefits identified, findings indicated that there were various causes that fuelled knowledge fragmentation in teacher education in Zimbabwe reminiscent of conflict between the subject camps. For example, specialisation, attitudes, teaching approaches, ignorance, work overload versus limited time and socialisation/orientation campaigns among other individual traits were to blame for knowledge fragmentation. Overall, these causes pointed to conflict between subjects as the major cause of knowledge

fragmentation by student-teachers as each area sought to make its knowledge dominant, thus, cultural hegemony. This view of conflict is supported by Mukorera (1999:39) who pointed out that lecturers for TOE and MS were more recognised than other clusters because most of them were former secondary school teachers who were subject specialists which offered them a secure professional identity as they were considered to possess the most universal currency. It is this conflict that led both lecturers and students to describe some sections as the “backbones of the course” (Mavundutse, 2004:14) that must be passed at all costs. These opinions endorse some course sections but denigrate others and possibly fuel compartmentalisation.

5.11 DISCUSSION RELATED TO SUB-QUESTIONS

5.11.1 What is the Origin of Knowledge Compartmentalisation?

Data generated in relation to the first sub-question revealed the origin of knowledge fragmentation as located in various places that included course disciplines rank order undertones and students’ disciplinary eulogies. It emerged that most participants habitually named some subjects in a predetermined order, for example, some frequently mentioned TOE or MS first and then others. In other cases, other subjects were mentioned as an afterthought or were omitted completely. This showed that subject areas are the origin of knowledge fragmentation. The majority of the students shared the notion that subjects represented the academic tribes and territories of Becher that tried to impose cultural hegemony at all costs. As a result, there is conflict between disciplines with provocative comments from members entangled in vicious battles of domination. By virtue of their different labels and ways of dealing with knowledge, it was noted, that subjects caused knowledge fragmentation due to competition, bias, stereotyping, prejudice, isolation and discrimination. This is supported by Mukorera (1999:37) who blamed the arrangement of teacher education programmes for the compartmentalisation of the components that constitute Zimbabwean teacher training.

In addition, students’ disciplinary eulogies pointed to the source of knowledge fragmentation as it revealed that students considered or thought of their areas of specialisation as special and isolated. The participants described their areas of specialisation in different ways such as the best, favourably comparable with others,

stressing importance and skills gained among other value-laden expressions (Mukorera, 1999:38). The value-laden nature of the areas lies in their traditional divisions into TOE, TP with MS placed above the fray, while PS has neither the rigour of theory nor the relevance of practice (Mukorera, 1999:83). Similarly, Henry (2005:30-31) argued that in the recent era of interdisciplinary ascendancy, disciplinary vulnerability has been heightened, precisely because integration represents a challenge to disciplinary hegemony at a time when traditional liberal arts disciplines are under attack for their ineffectiveness, inflexibility, narrowness and lack of relevance. All this locates the origin of knowledge fragmentation in disciplinary cultural hegemony.

Lecturer interviewees' responses raised similar findings as their definitions of academic disciplines suggested the origin of knowledge compartmentalisation. For example, definitions included areas of specialisation, fields of study, components of curriculum, learning areas, modules or departments. All these definitions point to division of knowledge or intentional narrowing and grouping of knowledge into subjects (Ndhlovu et al., 2021:16).

The division has the potential to be misunderstood by students as meaning divorced from each other, and nurtures condescendence that leads to cultural hegemony. Such traditional categorisation is described by Davies and Devlin (2007:2) as 'limiting'. The limitation is echoed by NaYoung and Kisida (2021:12) who blame specialisation for weakening student-teacher (and even teacher-teacher) relationships.

5.11.2 What Is the Place of Interdisciplinarity in Teacher Education?

Interdisciplinarity is germane in teacher education because the curriculum is designed to develop student-teachers holistically by providing them with teacher knowledge. Millar (2016:481) found that interdisciplinarity had a place within the university curriculum because the knowledge and methods from other disciplines helped to address critical issues such as climate change. In teacher education, academic subjects supply the personal education and knowledge of the teaching subjects and PS deals with the knowledge of the teaching subject at school level with some of the related executive skills (Mukorera, 1999:27). Teacher knowledge is a result of the integration of GPK and CK. Teacher knowledge can be supported by

interdisciplinarity since it has the capacity to pool knowledge from all the areas for the development of the student. In relation to this, findings from the study demonstrated that the approach can be used to enhance student-teacher development. The course disciplines have material that is integrable for various purposes, for example, to understand learners, to compare theories, to discuss issues and so on.

The research findings also revealed the position held by interdisciplinarity through the responses from students concerning the benefits of the approach. From the data generated, it was found that interdisciplinarity improves understanding, increases knowledge, provides valuable repetition and revision, develops creativity and critical thinking and encourages research and holistic teacher development. This is summed up by Kidron and Kali (2015:13) who conjectured that interdisciplinary understanding entails a deep understanding of disciplinary ideas combined with the ability to see connections between different disciplinary ideas in several domains.

The findings from the student participants regarding the position held by interdisciplinarity in teacher training concurred with those raised by lecturers. The findings showed that the majority of them were pro-interdisciplinarity arguing that knowledge is not compartmentalised, and the course areas were theoretically isolated but practically mergeable because almost all their knowledge could migrate across disciplinary borders to satisfy identified needs. These findings are supported by Millar (2016:476) who found out that the academics wanted students to form a broad understanding of different disciplines.

To consolidate the viability of interdisciplinarity, another finding was that the approach was beneficial in a number of ways; for example, it promoted broadmindedness and knowledge application, helped students to use multiple lenses to add flesh to the dry bones of disciplinary knowledge, developed critical learner exit skills, promoted application of knowledge, combined thinking and doing, enhanced the topic of interest, enriched knowledge and resulted in hybridisation of knowledge. To use Kizel's (2016:5) words, interdisciplinarity releases the student-teachers from an ensnaring segmented disciplinary cage of limitations towards the wholeness of the unity of knowledge.

It was also found that despite evidence that interdisciplinarity with its myriad of benefits is suitable for teacher training, disciplinarity was the norm due to cultural hegemony conflicts. This is supported by MacLeod (2018 :711) who pointed to conflict of epistemic values where collaborating fields may harbour deep disagreements over the standards for assessing the reliability of certain scientific claims. The result, according to MacLeod, is opacity and entrenched roles in systems of practice. Findings pointed to isolated, incidental and individual instances of interdisciplinarity; for example, lecture notes did not integrate. This inconsistency was also found in a study by Dambudzo (2015:23) on teaching for sustainable development in developing countries where integration with the environment and industry and developing competences when teaching was erratic. The majority of the examination and assignment essays analysed confirmed the dominance of disciplinarity. Social interactions on one site illustrated numerous cases that discouraged knowledge integration. Regardless of these problems, findings showed that there was room for interdisciplinarity in lectures and beyond.

5.11.3 Why do student-teachers fragment course disciplinary knowledge?

Since findings pointed to numerous benefits of interdisciplinarity in teacher education, it was necessary to enquire into the causes of knowledge fragmentation. The research findings from interviews with student-teachers highlighted inconsistencies in approaches in the institutions. In addition, findings pointed to general conflict between disciplines for causing knowledge fragmentation, for instance, looking down upon some disciplines, valuing some disciplines, negativity, specialisation, orientation campaigns, fear to cross disciplinary borders and favouring some disciplines over others. Moreover, findings blamed the disciplinarity culture for the development of subjects into kinds of academic tribes and territories. These findings are supported by Korthagen et al. (2006:1020) and Mhlolo (2014:34) who concurred that compartmentalisation may account for the failure to discern the link between theory and practice due to traditional practices in teacher education. In addition, Mudavanhu (2014:221-222) identified the existence of perceptions of some subjects as more important than others. Such perceptions emanating from compartmentalised knowledge into subjects led to differential valuing of subjects and is a breeding ground for conflict. This is confirmed by Becher (2006:151-152) who posited that compartmentalisation of academic disciplines is strongly believed to be

behind academic institutions' organisational arrangements on the grounds of disciplinary groupings that shape academic identities and careers; hence, the notion of academic tribes and territories.

Lecturer interview data indicated that the social roots of knowledge fragmentation by student-teachers existed for various reasons, for example, specialisation, nescience, negative attitudes, time constraints and staff conflict. In addition, these causes were found to lead to subjects behaving like academic tribes and territories, stampeding to establish cultural domination or leadership. In tandem with these findings, Henry (2005:31) concluded that interdisciplinarity has come to represent both a direct challenge to disciplinary hegemony and an indirect weapon for opportunistic university administrators in an era of the growing corporatism of universities to wrench power and control from the dominant disciplines. This is true since knowledge production is influenced by power relations. In other words, all these causes are rooted in cultural hegemony due to social power relations in the production of disciplinary knowledge.

Moreover, findings from data generated through document analysis showed the causes of knowledge fragmentation by student-teachers. The documents that were analysed included selection advertisements and application forms, timetables, syllabi, lecture programmes, lecture notes and examination and assignment essays. All the data from these documents showed promotion of fragmentation of knowledge; for example, specifying compulsory subjects as conditions for qualifying, differential placement and time allocation on both lecture and examination timetables as well as strict specialisation in lecturing. With regard to entry qualifications in Zimbabwe, colleges prioritise Mathematics and English for all courses even where these are not relevant. This led the Minister of Higher and Tertiary Education, Science and Technology Development to argue that Mathematics could not be a requirement for all programmes and blamed the inflexibility and conservativeness of universities, polytechnics and colleges (The Zimbabwe Mail, 2018) for disseminating cultural hegemony. For example, at one point in Zimbabwe, all colleges were required to teach mathematics to those students who had been enrolled without mathematics (MOHET, 2001; Mswazie & Gamira, 2011:412).

Similar findings emerged from observations of the social interactions at one of the sites. The findings from observations showed a bragging culture, solo lecturing, power dynamics, conflict over lecture slots on the timetable and disciplinary value judgements as social causes of knowledge fragmentation by student-teachers. These findings reflect Reeves' (1988:48) position that differentiated faculties exist in competitive separatism with few or no bonds between specialisms or opportunities to explore common aims and values that have shaped the fissiparous character of academic fragmentation. The competitive separatism ends up in a situation of winners and losers with the winners emasculating the loser through cultural hegemony that naturalises and secures the dominance of some subjects over others.

5.11.4 How Best Can Interdisciplinarity Be Embraced Towards Theory-Praxis Nexus?

According to Frodeman and Mitcham (2007:507), interdisciplinarity is appealing because disciplinarity is seen as the basis of the divide-and-conquer strategy of modern natural science. However, MacLeod (2018:716) explains that the problems for attempting to work across disciplinary boundaries can be understood as elements or consequences of the domain-specific structure of disciplinary practice. For example, introducing interdisciplinarity generally requires several adjustments to the structure and functions of an institution, such as methodology, technologies, epistemic values, environments and cognitive structures which undergird many domain-specific practices key to interdisciplinary success (Duerr, 2008:176; MacLeod, 2018:716; Youngblood, 2007:3). Regardless of such demands, the researcher believed that that could be done with minor adjustments if it began on a small scale and increased over time. In Barber's (2012:613) view, promoting interdisciplinarity entails connecting ideas and philosophies to the everyday experiences, from one discipline to another, from the past to the present, between campus and community life, from one part to the whole and from the abstract to the concrete. Starting small means that institutions may encourage integration from things like vocabularies and expressions which can be extended incrementally to ideas and theories up to a point where structural adjustments can "[unlock] and [free] subjects from their tight little boxes" (Dryden & Vos, 2015:433).

Findings revealed ways that could be used in embracing interdisciplinarity. Hibbert et al. (2014:98) proposed the development of a culture that supports interdisciplinarity for student interaction outside their home disciplines. In relation to this proposal, the data generated from interviews identified team-teaching as one such way. Through team-teaching, teachers from multiple disciplines collaboratively design a curriculum and facilitate learning (Collins, 2017: iv; Jones, 2009:76; Petri, 2010:73). Findings further called for removal of segregatory tendencies, negative attitudes, patronisation and prejudices towards certain subjects. Findings encouraged lecturer cooperation in guiding students towards knowledge integration. This is supported by Hoadley et al. (2012:98) who advocated for facilitators to meet often in order to plan carefully around the integration idea and prepare outcomes. Another way that was proposed was the use of cross-cutting themes. This view is also advocated by Kidron and Kali (2015:6-7) when they say cross-cutting themes serve as a backbone through which knowledge from different disciplines is fused through integrative artefacts (essays, examinations, discussions and other tasks) where students are required to integrate ideas from more than one disciplinary domain and theme lenses.

Other findings included shunning isolation of knowledge, encouraging knowledge overlap, use of ICT tools and unconventional sources of knowledge, for example, using local novels to teach history. Lecturers were encouraged to operate beyond boundaries by reading articles on other disciplines and sharing topics. Findings also pointed to the need to buttress disciplinary knowledge with topics from other subjects. Collins (2017:10) explains that this means related subjects are presented together to resolve a lack of knowledge of others' roles, perceived incompatible differences in status, expertise and negative stereotyping. Workshopping lecturers and advocacy were raised as means of promoting IKI.

Inviting resources persons, creating an open system for teamwork, such as when designing syllabuses and co-opting members from other areas in meetings and workshops were also proposed. Findings stressed an open innovation approach to teaching-learning by removing the big brother mentality held by some areas and their members. It was found that consultation and interaction with members from other disciplines were vital ways of promoting interdisciplinarity. Findings suggested the need to empower student-teachers by asking them to be mini-lecturers because Davies and Fung (2018:15) stress that the best way to learn something is to teach it

as a unique technique connecting students with peers in other areas and at other levels. According to Duerr (2008:177), this method promotes independence, confidence and the ability to learn how to learn, and develops LLS.

Apart from the ways proposed and supported by the interviewees, literature is replete with other means of promoting interdisciplinarity, for example, integrating subjects. According to Humphreys, Post and Ellis (1981:11), integration of subjects explores knowledge in various subjects related to certain aspects of their environment and sees links among subjects. This technique is organised in such a way that it cuts across subject-matter lines, bringing various aspects of the curriculum into meaningful association to focus upon broad areas of study (Shoemaker, 1989:5).

Another way involves introduction of specific learning goals which entails introducing students to specific learning goals in order to guide them through interdisciplinary information integration (Carmichael & LaPierre, 2014:60). Golding (2009:8) explains integration of perspectives as involving the presentation of a given subject in a way that allows students to integrate the perspectives into a new whole of unexpected but illuminating connections and syntheses.

The development of conceptions about the nature of interdisciplinarity is also another method of inculcating interdisciplinarity in student-teachers. For successful interdisciplinary teaching and learning to occur, students must develop conceptions about the nature of interdisciplinarity (Golding, 2009:18). In addition, nurturing student development towards tolerance to multiplicity is a technique towards encouraging interdisciplinarity. Through this way, students may develop relativism where they do not consider knowledge as objective because they realise that beliefs, theories and values are wholly relative, contingent and contextual (Herron, 2010:99; Perry, 1999:121).

Through adoption of these ways, TTIs in Zimbabwe may assist student-teachers to embrace interdisciplinarity in the generation of functional knowledge that marries theory to practice and solves professional and social problems.

5.12 CONCLUSIONS

This study was inspired by the realisation that most student-teachers used course subjects in siloed form, fragmented, yet all knowledge from these areas was designed to equip the students with teacher knowledge. Teacher knowledge is the sum total of GPK and CK that can be easily facilitated by embracing interdisciplinarity. Thus, in order to establish the reasons behind the knowledge fragmentation practice by student-teachers, the study was guided by a major research question and related sub-questions. Student-teachers were influenced by social patterns of interaction that saw disciplines forming camps advancing domination agendas in various ways. As the war for supremacy raged on, some students chose to protect their territories while others shunned venturing into the protected areas for fear of antagonism. Only a handful dared to challenge the status quo by intermittently embracing interdisciplinarity. The competitive nature of disciplinary knowledge was the major cause that led to conflict and resulted in knowledge fragmentation.

One major theme that emerged revealed conflict embedded in the rank-ordering of course disciplines where a trend to name certain subjects regarded as important emerged while others were forgotten, ignored or mentioned as afterthoughts. This was confirmed by students' eulogies for their areas of specialisation in featuring descriptions such as the best or important. This was confirmed by lecturers' definitions of academic discipline as compartments, areas of specialisation or learning areas.

The findings from this research also showed the existence of material usable across subject boundaries through the interdisciplinary approach. Most student participants vouched for the presence of interdisciplinarity material in all subjects that constituted their course of study. This was also supported by findings from most of the lecturer interviewees with personal views of interdisciplinarity showing that the participants were pro-interdisciplinarity. Benefits identified included improving understanding, being pragmatic and linking thoughts to actions. From the majority of the lecturer participants, it emerged that the disciplinary approach dominated in the institutions.

Although most student participants claimed that interdisciplinarity was practised at their institutions, subsequent data from the same students seemed to contradict this

finding. For example, one student confirmed that subjects were like academic tribes and identified social reasons causing knowledge fragmentation. These responses could have been confused as participants sought to please the researcher.

In addition, some findings showed that interdisciplinarity was functional in teacher education. This was evident from the benefits of the approach that came from student participants. The benefits, for example, improving understanding and mastery and knowledge, repetition and practice, development of creativity and critical thinking, opportunity for revision, research, application of knowledge and teacher development, emerged. Similar findings from observations corroborated the viability of interdisciplinarity in teacher training with themes on instances of the use of links between disciplines in lectures which was incidental, erratic and narrow and supported by very few individuals.

Another critical finding of this work was the causes of knowledge fragmentation by students. The main theme was conflict that existed between disciplines and their members with sub-themes that included the habits of patronising some disciplines while valuing others, negativity, specialisation, biased orientation campaigns, fear to venture into other fields of study and favourite disciplines.

Findings blamed teaching approaches for promoting knowledge fragmentation by students. Disciplinarity approaches, ignorance of the interdisciplinarity, the complexity of integration, a lack of models to emulate and socialisation into disciplinarity were raised. In addition, personal attributes noted different individual traits such as laziness and inattentiveness. Additional findings in this category suggested that causes emanated from the unique nature of subjects and the abundance of fields of study vis-à-vis numerous shortages such as time and resources. Other causes raised included specialisation, nescience, negative attitudes, time constraints and conflicts that justified Becher's (1989) label of the subjects as 'academic tribes and territories.

Findings from documents analysed confirmed the causes of fragmentation as lying in the institutional entry qualifications that stipulated specific subjects as prerequisites. Timetabling where some subjects' cultural hegemony was observable from their preferential positioning and time allocation was one source. Course specifications sought to inculcate critical thinking, but the suggested lecturing methods were at

odds with the aims of interdisciplinarity. Critical thinking occurs when students are able to analyse, evaluate, interpret or synthesise information and apply creative thoughts to form arguments, solve problems or reach conclusions. Such capabilities define interdisciplinarity.

Further findings showing the root cause of knowledge fragmentation emerged from the analysis of lecture schemes, programmes and notes. These revealed a clear slant towards specialisation. The other finding emerged from social interaction patterns that noted the existence of a bragging culture, absence of team lecturing, prevalence of areas of specialisation and reflected an institutional organogram dominated by departmentalisation, for example, most members in the administration were from Professional Foundations. Conflict over lecture placement on timetables, biased disciplinary value judgements and stereotyping disciplines which culminated in cultural hegemony where disciplines represented 'academic tribes and territories' was another cause.'

The research identified possible ways of embracing interdisciplinarity towards theory-praxis. This included collaboration that called for shunning the isolation of knowledge, sharing topics depending on abilities, team-teaching, inviting resources persons and capacity building lectures.

5.13 CHAPTER SUMMARY

The themes, sub-themes and sub-subthemes from the research data generated from interview participants, document analysis and observation were presented, described, analysed, interpreted and discussed thematically. The interview data revealed the origin of knowledge fragmentation, for example, specialisation, rank-ordering subjects and prejudiced eulogies. The data also revealed the relevance of interdisciplinarity to the student-teachers because the subjects had connections beneficial to the recipients by way of improving understanding of teaching issues, providing holistic teacher knowledge, repetition, developing creativity and critical thinking, among others. Critically, the data revealed cultural hegemony influencing the causes of knowledge fragmentation by student-teachers due to, for instance, negative attitudes, specialisation and biased socialisation all aimed at some dominating others to the point of normalisation. Proposed ways of encouraging knowledge integration included shunning absolute disciplinaryity, team-teaching and

promoting a collaborative culture at various subject levels. The interview data were corroborated by document analysis and observation data. Data from observations pointed to entry qualifications and timetable placement as evidence of dominance of certain subjects causing knowledge fragmentation. Observation data further confirmed the existence of subject cultural hegemony as some members were seen bragging, teaching along disciplinary lines, arguing over the use of resources and negative stereotyping. The next chapter is Chapter 6 that summarises the findings, provides conclusions and recommendations.

CHAPTER 6

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

This final chapter presents a summary of key findings and conclusions from this study that sought to establish the reasons for course knowledge fragmentation and ways to embrace integration by student-teachers. The summary is presented in relation to the neo-Marxist theory of cultural hegemony by Antonio Gramsci. It also includes the recommendations to various stakeholders and proposes a model on ways to overcome knowledge fragmentation and implement interdisciplinarity. The chapter also addresses the limitations of the study, makes suggestions for further research and ends with reflective views.

6.2 SUMMARY OF THE STUDY

The summary of this study is presented beginning with the chapter summaries followed by the summary of findings based on the research questions. This is followed by the key findings, conclusions of the study, recommendations, the model for embracing interdisciplinarity and limitations of the study.

Chapter 1 introduced the study and provided its background. The introduction focused on the Zimbabwe context regarding the course content and its intended use by student-teachers in the Midlands Province. The background covered the compartmentalised structure of course disciplines in teacher education misconstrued to mean standalone subjects. Other elements covered in the chapter were the research questions, and delimitations of the study, the theoretical framework, and the methodology.

Chapter 2 reviewed literature related to Gramsci's cultural hegemony theory that guided the study. It revealed that the cultural hegemony frames the worldview of the dominant bloc and the social and economic structures ostensibly designed as just, legitimate and beneficial to all. The chapter also looked at literature related to compartmentalisation of disciplinary knowledge in teacher education in Zimbabwe as well as the influence of fragmentation on the theory-practice nexus.

Chapter 3 reviewed literature on international perspectives on disciplines and interdisciplinarity by exploring the origins of compartmentalisation. It traced this to the labelling of knowledge pockets as distinct subjects that ignited disciplinary factional wars resembling academic tribes and territories. The chapter revealed the value of integrating these knowledge silos through interdisciplinarity.

Chapter 4 covered the research methodology and design including the ontological and epistemological assumptions. The research adopted the qualitative methodology and a case study design to study the case of one province in Zimbabwe's HEIs offering teacher education. It discussed the data collection process through interviews, document analysis and observation.

Chapter 5 presented, analysed interpreted and discussed data generated through interviews, document analysis and observation. From the data, it emerged that knowledge fragmentation was traceable to the tribal nature of subjects forging cultural hegemony battles. It was found that interdisciplinarity was relevant in teacher education to produce a holistic teacher. It revealed several cultural hegemonic social causes of knowledge fragmentation that include specialisation, biases and disciplinary tribalism.

Chapter 6 presents the summary and conclusions of the study and proposes recommendations on how to improve practice related to the problem subject fragmentation by student-teachers.

6.3 SUMMARY OF LITERATURE

The review of literature related to the research was covered in Chapters 2 and 3. Chapter 2 reviewed literature related to Antonio Gramsci (1891-1937) which formed the theoretical framework. Literature on disciplinarity, interdisciplinarity and theory-praxis in the Zimbabwean context was part of this chapter. It emerged that Gramsci's cultural hegemony was behind disciplinarity because Gramsci saw the realm of ideas as an important site of ideological contestation. He reasoned that the dominant ideology had a strong hold on consciousness and society. Thus, the dominant ideology of fragmentation and leadership seemed consented to by all. This is actuated through the establishment of a custom-made culture to mythically meet the needs of the majority while serving the dominant bloc. The unique thing about culture

is that it is acceptable by all as common-sense. Similar views by Luis Althusser, Michael Young and Samuel Bowles and Herbert Gintis were also reviewed.

The literature on disciplinarity and interdisciplinarity in Zimbabwe revealed how the advent of colonial education dismantled the holistic, humanistic and contextual education. The colonial influence on education continued after independence and showed the fragmented nature in the content, delivery and use of knowledge that haunted the post-colonial era including teacher education, yet the system is expected to produce competent teachers.

Chapter 3 reviewed literature on international perspectives on compartmentalisation and interdisciplinarity. It emerged that compartmentalised knowledge into disciplines made it difficult to bridge the rigid boundaries between subjects. In view of this, Becher (2006:15) identified antagonism between subjects due to the tribal nature of disciplines with the potential to hinder integration. The history of subjects was noted to be fraught with hegemonic traces that permeated the international community amid calls for interdisciplinarity for innovation and development.

6.4 SUMMARY OF THE FINDINGS

The study sought to establish social factors causing course knowledge fragmentation by student-teachers in Zimbabwe's Midlands Province's TTIs so as to encourage interdisciplinarity. This was done through interviews, document analysis and observation. The findings, based on the main research question and its sub-questions, are presented below.

6.4.1 Main Research Question

The chief research question that this study sought to address was formulated as follows: Why do student-teachers compartmentalise knowledge acquired from course disciplines?

The findings revealed that students treated course subject knowledge separately because of ingrained disciplinarity and cultural hegemony manifesting in various social forces. The social forces are the attempts by some quarters of the academic fraternity to dominate or lead others by presenting the disciplinary arrangement as a given. The arrangement garners 'spontaneous consent' by the spread of ideologies

of the powerful, which are beliefs, assumptions and values transmitted through social institutions such as education (Ahsan, Iqbal, Siddique & Saeed, 2021:7927). This was revealed by the way the student interviewees named and described some subjects but forgot, ignored or denigrated others (cf. 5.3.1.1; 5.3.1.2 & Table 5.2) and the meaning of the label 'discipline' itself (cf. 5.3.6 & Table 5.9) yet IKI was found to be germane because subjects have mergeable material (cf. 5.3.2; Table 5.3 & Figure 5.1). The disciplinary cultural hegemony accounted for knowledge fragmentation due to the conflict (cf. 5.3.5.1 along with its sub-subthemes & 5.8.1.4) between disciplines and members due to their desire to establish cultural domination or defend their positions in the same fashion that the tribes, races and nations fought for relevance (cf. 5.3.5; 5.3.5.1; 5.3.5.1.1; 5.3.5.1.2; 5.3.5.8 & Table 5.5). These views and others are expanded on in the findings that addressed the sub-research questions that follow.

6.4.2 Sub-questions.

- What is the origin of knowledge compartmentalisation?
- What is the place of interdisciplinary knowledge integration (IKI) in teacher education?
- Why do students fragment course disciplinary knowledge?
- How best can interdisciplinarity be embraced towards theory-practice nexus?

6.4.3 Findings Relating to Sub-Question 1

Data regarding the social origin of knowledge fragmentation located it in the organisation of all knowledge into disciplines (cf. 5.3.6.1; Table 5.9) defined as 'divisions', 'branches of knowledge', 'areas of specialisation' or 'departments'. Other social causes found included the practice of ranking/rating the subjects based on common-sense views (cf. Table 5.2), comparing the subjects and conflict between disciplines and members (cf. 5.3.1.2.2; 5.3.5.1 & 5.3.7.1) in attempts to dominate others. Social impediments were also found to be specialisation, negativity, staff conflict (cf. Table 5.15; 5.3.5.1.1; 5.3.5.1.3; 5.3.5.1.4; 5.4.5.5) among others. Findings also indicated that competition, prejudices, stereotypes and discrimination drove students towards knowledge fragmentation. Evidence was revealed in biased timetabling (cf. 5.6.2.1 & 5.6.2.2), syllabus specifications (cf. 5.6.3) lecture

programmes (cf. 5.6.4) and lecture notes (cf. 5.6.5). Observation findings situated causes in the culture of boasting (cf. 5.8.1.1) and solo lecture attendance (cf. 5.8.1.2).

6.4.4 Findings Relating to Sub-Question 2

Despite the prevalence of disciplinarity in the study sites, the findings related to this question revealed the relevance of interdisciplinarity in teacher education. This was supported by evidence from the majority of interviewees (cf. Table 5.7; 5.3.4.9 & Table 5.10) because of numerous benefits (cf. Fig. Fig. 5.1; 5.3.4.1; 5.4.3.2; 5.3.4.3; 5.3.4.4; 5.3.4.6 & 5.3.4.7) among others. Evidence supporting this relevance showed that the approach enhanced breadth and depth of understanding across borders. For example, it was said to be useful in comparing theoretical values and discussing, analysing, examining and evaluating educational issues. Moreover, findings revealed the practicability of interdisciplinarity in looking at issues through various lenses, developing certification skills, hybridising knowledge and linking theory to practice (cf. 5.4.2). Documents analysis data (cf. 5.5.6.6; 5.6.6.1 & Table 5.17 & Table 5.19) and observation data (cf. 5.8.1.6) indicated the relevance of interdisciplinarity, despite being haphazard.

6.4.5 Findings Relating to Sub-Question 3

This question sought to determine the reasons behind student-teachers' use of course knowledge along the subject lines. The findings showed various causes of the phenomenon (cf. 5.3.5; 5.3.6; & 5.3.6.8; 5.3.7.1) and disciplinary dominance (cf. 5.3.6.1) resulting in conflict (cf. 5.3.5.1) with disciplines largely viewed as resembling 'academic tribes and territories' (cf. Table 5.16) starting from entry requirements (cf. 5.6.1) and other institutional practices including social interaction (cf. 5.8.1). Specialisation was fingered frequently (cf. 5.3.5.1.4 & Table 5.15) as polarising disciplinary knowledge and members of staff and students belonging to certain disciplines. Other causes included negative attitudes, specialisation, campaigns to lure students during orientation, stereotypical perceptions and staff conflict (cf. 5.4.5.5; Table 5.5; & 5.4.6.1) and division of knowledge into subjects as revealed in descriptions (cf. Table 5.9). The entry requirements into teaching (cf. 5.6.1) were also fingered in causing knowledge fragmentation by student-teachers. Other

sources of the unproductive practice concerned value judgements and the methods used for lecturing (cf. Tables 5.11 & 5.12).

6.4.6 Findings Relating to Sub-Question 4

This research question sought to establish how the interdisciplinary approach could be promoted by encouraging student-teachers to link theory to practice (cf. 5.4.4 & Table 5.14). The findings identified collaboration (cf. 5.4.4.1) as the major way of promoting IKI, for example, through team-teaching (cf. 5.4.4.1.1) and cultivation of interdisciplinary culture (cf. 5.4.4.2). Nurturing acceptance of, and a positive attitude towards all disciplines was also proposed to remove the toxic perceptions of disciplines. Other ways that emerged included modelling by lecturers and interdisciplinarity advocacy. Using the thematic approach and sharing lecturing topics based on individual abilities were proposed as some strategies for promoting interdisciplinarity. The findings also suggested assigning student-teachers to serve as mini-lecturers on some topics.

6.5 CONCLUSIONS OF THE STUDY

The major concern in embarking on this study was to find out the reasons behind student-teachers' tendency to use course subject knowledge in isolation, yet they were all intended to complement each other in moulding the recipients into holistic and competent practitioners. As such, the major conclusion reached from the study findings is that social factors promoted knowledge fragmentation by student-teachers in the Midlands Province of Zimbabwe. This conclusion was supported by the responses from participants on the origin of knowledge fragmentation (cf. 5.3.1 Tables 5.2, 5.5 & 5.15). The participants identified and defined academic disciplines that made up the teacher training programmes as areas of specialisation. These matched the collective views of Davies and Devlin (2010:16) and Nissan (1995:122) that an academic discipline is a self-contained and secluded domain of human experiences with its own community of experts, and a peculiar constellation of distinctive components in the form of goals, skills and concepts. Most participants indicated that these subject areas could be used collaboratively to benefit the students in theory and practice.

It was further concluded that the reasons behind the fragmented use of disciplinary knowledge was disciplinary competition aimed at cultural hegemony. In other words, disciplinarity was found to be a result of specialisation and the desire to have the knowledge of certain disciplines count as *the* knowledge that dominates and dictates the validity, pace, depth, breadth, value and nature of what counted as worthwhile knowledge (cf. 5.3.5; & Table 5.11). In relation to these conclusions, Nsamenang (2005:327-330) criticised classroom and book learning for being separated from reality because it divides knowledge domains into subjects unreflective of real life. Moreover, subjects promote individual achievement, personal ambition and competition (Oyserman, 1993:1006) that have the potential to court cultural hegemony. In the process, those subject areas that wield more power endeavour to subjugate others in various ways that explain why the disciplinary approach dominates. Such conclusions were backed up by evidence from documents and observations. For example, students' examination and assignment essays were dominated by discipline-specific information (cf. Tables 5.18 & 5.20) and institutional interactions revealed similar academic tribalistic practices such as belittling certain disciplines and boasting by others (cf. 5.8.1.1) spilling into power dynamics (cf. 5.8.1.3). Acceptably, sporadic instances of interdisciplinarity were witnessed (cf. Tables 5.17 & 5,19) though incidental (cf. Table 5.4 & 5.3.3.1).

From the main question, it was noted that disciplinarity specialisation contributed to the practice of knowledge fragmentation (cf. 5.3.5.1.4). As Brown (2016:9) argues, talking about disciplines at colleges and universities means discussing power to instruct, organise, categorise and control. In the final analysis, the currency of some disciplines ends up imposing cultural hegemony in institutions and knowledge fragmentation. Data generated by the interviewees indicated that students valued or devalued certain subjects (cf. 5.3.5.1.2). The same picture also emerged in documents stating entry qualifications for various programmes (cf. 5.6.1). Generally, it was concluded that fragmentation was driven by social factors at both micro (institutional) and macro (national) levels of society due to cultural hegemony, which required re-socialisation of students towards interdisciplinarity.

Having located the underlying reasons for knowledge fragmentation by student-teachers, the evidence generated indicated that the unbeneficial disciplinarity could be supplemented successfully with interdisciplinarity. Supplementing could be done

by adopting the suggested methods of lecturing such as team-teaching, peer teaching and modelling interdisciplinarity advocacy. It is concluded that student-teachers stood to benefit from the proposed approach if it was intentionally practised and supported by stakeholders in teacher education institutions.

6.6 RECOMMENDATIONS

Based on the research findings, the following recommendations are proposed to the MHTEISTD institutions involved in teacher development, lecturers and student-teachers.

6.6.1 Recommendations to the MHTEISTD

In tandem with the main objective of this study to establish factors behind knowledge fragmentation by student-teachers, the study recommends that:

- the MHTEISTD should put in place mechanisms, policies and programmes to mandate the adoption of interdisciplinarity.
- the Ministry should persuade institutions to institute interdisciplinarity in view of the heritage-based doctrine locally called Doctrine Education 5.0, which seeks to promote Zimbabwe's modernisation and industrialisation using teachers as change agents.
- this can be done by realigning programmes with Doctrine Education 5.0 to realise innovation and industrialisation.

6.6.2 Recommendations to the Department of Teacher Education / Centre for Teacher Education and Materials Development (CTEMD) and Universities involved in Teacher Education

The findings of this study showed that interdisciplinarity is beneficial in teacher education, and as such, the CTEMd responsible for quality assurance in teacher education institutions and independent universities are recommended to:

- advocate the interdisciplinarity approach to achieve SDG4.
- it is suggested that any efforts to harmonise may have to target integration of vocabularies, concepts, theories and views across subject boundaries while retaining the identities of the concerned disciplines.

- The findings advocate interdisciplinarity by merging subjects without actually discarding any of the subjects.
- It is the recommendation of this study, that one way that TTIs can respond to the MHTEISTD's call to transform teacher education is through interdisciplinarity
- This calls for a shift from mere theorising of policies to implementation to realise Vision 2030 espoused by the Government of Zimbabwe.

6.6.3 Recommendations to Teacher Training Institutions

For teachers to effectively execute their facilitation role, they definitely need a fusion of content knowledge, pedagogical knowledge and pedagogical content knowledge. As such, TTIs are recommended to:

- Move away from exclusive disciplinarity for it fails to address academic and social issues holistically envisaged by SDG4. It is best to first integrate course subject knowledge to holistically inform content knowledge, pedagogical knowledge and pedagogical content knowledge.
- Thus, the study strongly recommends implementing interdisciplinarity in the teacher education curriculum. This way, interdisciplinary approach could gain momentum provided the TTIs formalise it. With the semi-autonomous state that the teacher education institutions enjoy regarding the development of programmes, course outlines and syllabi, the institutions could take advantage of this and infuse interdisciplinarity formally and overtly in their curricula during reviews.
- Alternatively, it is recommended that the institutions should establish an area, section, or department mandated to operationalise the approach.
- It is also recommended that the institutions should initiate capacity development workshops on interdisciplinarity, supported by the MHTESITD. The advocacy can entail conscientising staff and students on the value of interdisciplinarity, the techniques of embracing the approach as well as discouraging tribalistic disciplinary wars.

6.6.4 Recommendations to Lecturers

Lecturers mediate teacher development as more knowledgeable others. As such, lecturers:

- are best placed to provide interdisciplinarity modelling for student-teachers to emulate. Imitation builds the students' general knowledge (GK), that is, the knowledge of a broad range of facts about the course's various components. In other words, student-teachers become knowledgeable in a wide range of subjects. It improves their CK ranging from facts, theories, principles and ideas to vocabulary, all of which are useful for interdisciplinarity. Through modelling, lecturers may demonstrate to students, different ways of using knowledge from other subjects in their lectures and notes so as to promote the same in students.
- In addition, lecturers expose student-teachers to CK, which includes facts, concepts, theories and principles that are taught and learned in specific academic courses' GPK covering classroom management and knowledge about learners and learning, assessment, and educational contexts and purposes. Combined, GPK + CK = teacher knowledge, which is a body of professional knowledge that includes both knowledge of general pedagogical principles and skills as well as knowledge of the subject matter to be taught, which is possible through interdisciplinarity.
- To adopt interdisciplinarity successfully, it is critical for the lecturers to first embrace the approach themselves. To do this, there is a need to desist from harmful competition that encourages knowledge compartmentalisation. To this end, lecturers are persuaded to employ ways that encourage and support interdisciplinarity.
- In addition, they are encouraged to avoid fuelling disciplinary conflict by over-emphasising the importance of their areas of specialisation and belittling others that have a place in the course programme because all subjects contribute to the development of professional teachers in their own ways. In the process, there is need for lecturers to move away from trivialising and condescending other subjects.

- To be successful, lecturers may credit interdisciplinarity efforts exhibited by student-teachers, openly acknowledge this or award marks.
- Lecturers need to exploit the existing disciplines without disbanding or merging them in a way that swallows some into oblivion. This can be achieved by using teaching strategies such as team-teaching or peer teaching.

6.6.5 Recommendations to Student-Teachers

Student-teachers are the focal point of this study as they are the recipients of course disciplinary knowledge that is designed to holistically develop them into competent practitioners. The impact of students' quality is felt beyond the TTIs. As products of teacher education, student-teachers affect the whole education system with regard to creation and innovation for national development as envisaged by Education 5.0, the heritage-based doctrine. The study findings revealed that interdisciplinarity has a place in teacher training both theoretically and practically. Therefore, student teachers are recommended to

- to utilise the vocabularies, terms, theories, views and concepts from different subjects in various ways across subjects to explain, clarify, support, defend, argue, reflect, compare or exemplify issues.
- use disciplinary knowledge to address contextual issues across disciplinary boundaries for the acquisition of a good body of teacher knowledge in order to transcend the theory-practice divide.

6.7 THE TEIP MODEL FOR EMBRACING INTERDISCIPLINARITY IN TEACHER EDUCATION

In order to relate this research to the reality of teacher education and clarify the recommendations, this section presents a visual representation of interdisciplinary procedures in teacher education and the linkages of the phases of the model. The visual representation is accompanied by a textual explanation of each stage and its connections to the other stages. This pictorial representation shows how all the stages contribute to holistic development, firstly, of teacher knowledge, and secondly, the student-teacher. The proposed Teacher Education Interdisciplinarity Pentagon (TEIP) model in Figure 6.1 demonstrates how interdisciplinarity can be approached in teacher education institutions starting from the academic tribes and

territories (fragmented disciplines) to ways of using disciplinary knowledge and disciplinary aspects to achieve the intended outcomes.

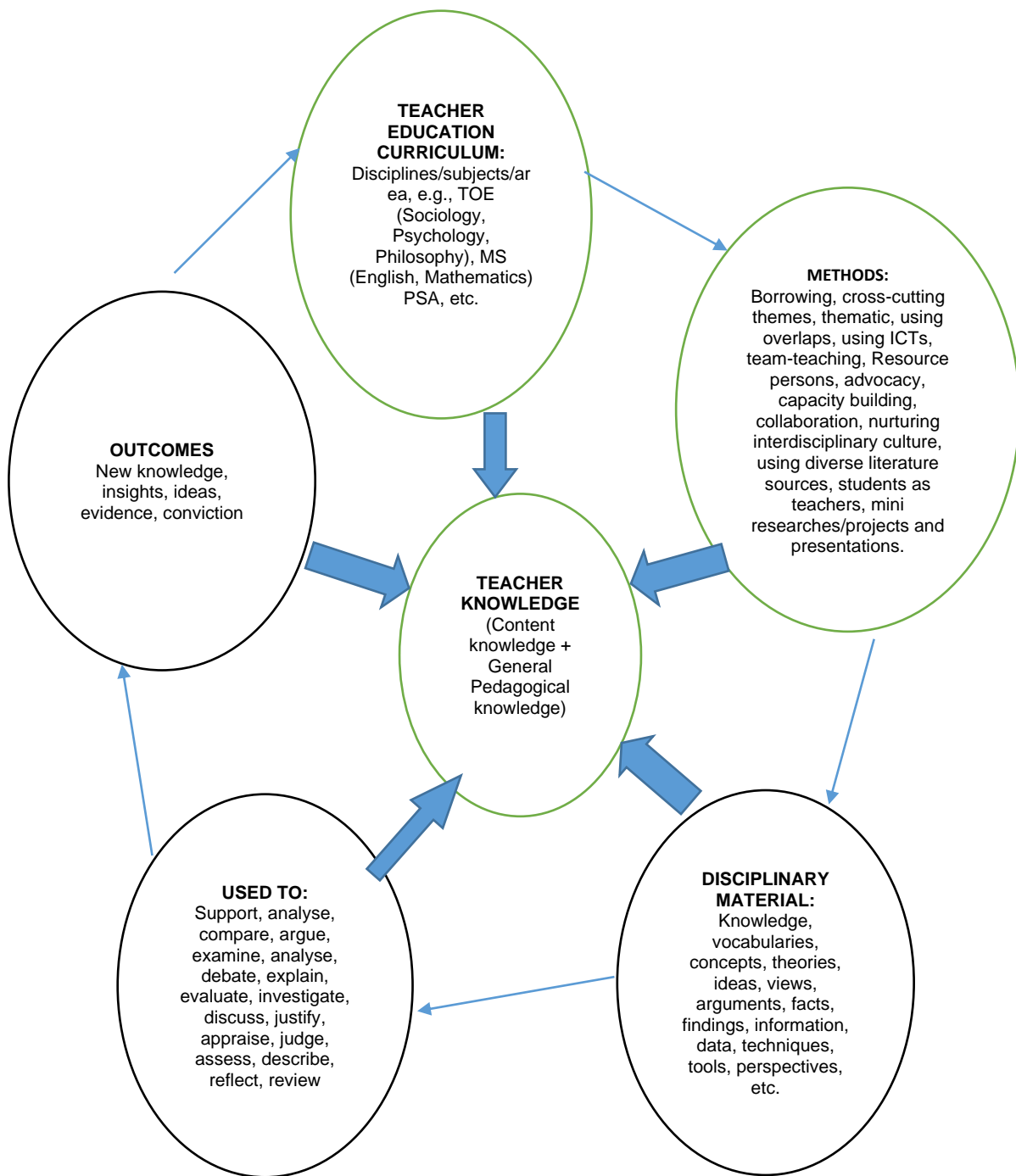


Figure 6.1: Teacher Education Interdisciplinarity Pentagon (TEIP) Model

The intended outcomes can then be used to feed new, emerging, innovative insights, facts, theories, principles, ideas and vocabulary back into the teacher education curriculum. While the outer processes unfold in stages, they concurrently enrich

teacher knowledge as a centripetal force. Through the proposed model, the social factors that have been found to inhibit IKI may be addressed, and new, pragmatic knowledge may be generated by student-teachers.

6.7.1 The Teacher Education Curriculum

Teacher education curriculum in Zimbabwe has a common structure that includes foundational subjects that develop teachers' theoretical pedagogical knowledge. It also has the MSs that are purely academic subjects, for instance, languages, sciences, practicals and humanities. Another aspect is PS that translates the theoretical pedagogical knowledge into practice. In addition, there are contemporary studies such as Health and Life Skills and NSS. All these, if all things are equal, must work together in an interdisciplinary way to mould student-teachers holistically. Although the structure has been fashioned in a disciplinary style that has promoted a fragmented disciplinary approach to the delivery of these subjects, the model indicates that all the subjects constitute forms of knowledge that need to be used interdisciplinarily. All the fragmented areas feed into the holistic development of teacher knowledge and the student-teacher simultaneously. The model incorporates the disciplines because they are the foundation of interdisciplinarity. All the subjects have something that can be used by other subjects, but social forces have led to the situation that has made them appear incompatible and separate. For instance, all the forces lend themselves to cultural hegemony perpetrated by looking down upon some disciplines, valuing other subjects and specialisations, and using skewed methodologies, among other things that have erected artificial disciplinary walls, which must be dismantled by employing pro-interdisciplinarity methods.

6.7.2 Ways to Promote Interdisciplinarity

If all the separate disciplines are meant to develop student-teachers by combining their different forms of knowledge into the theory-practice marriage, then ways to achieve this need to be found. The presentation of course subjects in a disciplinary design has led to entrenched cultural hegemony that has seen some subjects and membership engaged in subtle battles for dominance and supremacy, which has widened the rift among them. It has been accepted and taken for granted that disciplines are separate and irreconcilable. For this misconception to be resolved, the methodologies that nurture interdisciplinarity should be used in teacher

education. Some of the ways of inculcating interdisciplinarity in student-teachers include using a thematic approach, integrating ICTs, team-teaching and advocacy for interdisciplinarity as a general approach.

6.7.3 Material from Disciplines That Can Be Used in Interdisciplinarity

Interdisciplinarity combines disciplinary insights in pursuit of a common task by crossing traditional boundaries for a holistic understanding. This can be general interdisciplinarity where there is dialogue between multiple disciplines. It can also be integration targeted at making information whole by synthesising, connecting, or blending ideas, data, information, methods, tools, concepts, and/or theories from two or more disciplines. In essence, interdisciplinarity promotes interaction between several disciplines. This kind of interaction or dialogue is through different disciplinary knowledge forms, concepts, theories, views, arguments, facts, findings, information, techniques, tools, perspectives and aspects borrowed for use when a need arises.

6.7.4 Use of the Disciplinary Material

When applied within education and training pedagogies, interdisciplinarity describes studies that use methods and insights of several established disciplines to address a task at hand. This means that students and lecturers engage in connecting and integrating several academic schools of thought infused with their personal perspectives in dealing with selected tasks. It is applied where traditional disciplines alone are unable to address a problem or complex tasks that can only be understood by combining views of more than one discipline. This shows that interdisciplinarity leads to the creation of knowledge by thinking across traditional boundaries within, between and among academic disciplines and schools of thought in education to deal with new academic, educational and social needs. The newly created or recreated knowledge is useful in responding to questions and linking theory to practice in order to address recurrent, new and topical emerging issues in education.

The disciplinary material is used to bridge knowledge across traditional disciplinary boundaries. This shows how interdisciplinary activity takes place between two or more disciplines where its application culminates in the marriage of theory to practice

in lectures, discussions, assignments, teaching practice and examinations in order to facilitate holistic understanding and teacher development.

6.7.5 Outcomes

When implemented, the model develops teacher knowledge by facilitation of CK + GPK. This development takes place at each stage of the model. In other words, the disparate disciplines feed into the target of teacher education curriculum, which entails teacher knowledge. As the independent subject knowledge silos are summoned to interact at opportune moments through different proposed methods, they further contribute to knowledge generation and student-teacher development. The same contributions are made as the diverse disciplinary material is borrowed and used for different purposes, which culminate in products and ongoing innovation.

The result of implementing an interdisciplinarity model in teacher education is something completely new, distinctive, apart from and beyond the limits of any single discipline. Consequently, interdisciplinarity amounts to a cognitive advancement or addition to knowledge. It leads to more comprehensive understanding that can be used for a variety of purposes, for example, to support, analyse, or argue issues in education. All these uses result in addition, elaboration and authentication of knowledge. In the process, interdisciplinarity interrogates educational knowledge structures, policies, ideas and societal values through different disciplinary lenses. The new knowledge, insights, ideas, evidence, conviction, words and terms are generated and deposited into the cyclic model at various points.

6.8 LIMITATIONS OF THE STUDY

Simon (2011:2) defined limitations as potential weaknesses in a study, which are out of the researcher's control and may compromise the generalisability of findings. In the process of conducting this study, one such limitation arose from the research having been conducted during the period of the COVID-19 pandemic. This had far-reaching implications for this research because of global shutdowns. In Zimbabwe, this began on 29 March 2020 and was reviewed regularly up to 1 March 2021. As a result of the lockdown measures, access to research participants and sites was restricted as they were closed, and movement banned. To circumvent the movement restrictions, the researcher obtained contact details of some of the target participants

and conducted telephonic interviews. Consequently, the researcher could not physically see some participants. Moreover, with the calls lasting between 10 and 30 minutes, the data collection process proved costly, particularly because the funds for research activities had not been disbursed.

Moreover, collecting data from a sample selected from all the three TTIs in the city of Gweru was problematic. The prevailing COVID-19 regulations and guidelines would not allow visiting sites far afield due to intercity travel bans. Research with larger samples drawn from different cities would have been ideal. Regardless of these limiting circumstances, the fact that the three TTIs were involved ensured access to the right information sources. Triangulation of the methods and sources was helpful in countering some negative effects of the challenges noted above.

6.9 CONTRIBUTIONS OF THE STUDY

Literature on interdisciplinarity is replete with approaches and evaluations that can be used in different areas or settings. However, it seems to be silent on knowledge fragmentation by student-teachers and the social factors that influence the fragmented use in teacher education.

The present research sought to address the understanding of the social reasons for the compartmentalised use of course knowledge by student-teachers. In doing so, it made important contributions to society, education generally, individual student-teachers and the researcher with regard to the causes of knowledge compartmentalisation and how to redress the phenomenon.

The first contribution extends the research available on interdisciplinarity and the approach's relevance in generating novel ideas for the invention of goods and services that lead to social development. The study is the first to consider the practice of interdisciplinarity in teacher education, particularly focusing on factors that impede the embrace of this approach.

The second contribution of this exploratory study adds to the literature that is available on interdisciplinarity in general and teacher education, specifically. It explores the social forces that cause knowledge fragmentation so that interdisciplinarity can be established.

Thirdly, to the best of the researcher's knowledge, no previous study has explored the social forces behind knowledge fragmentation in teacher education. However, research has shown the efficacy of knowledge integration in higher education (Boix-Mansilla, 2007, 2010 & 2016; Boix-Mansilla & Duraisingh, 2007; Davies, Devlin & Tight, 2010; Jones, 2009; Kidron & Kali, 2015).

The theoretical lens for the study was Antonio Gramsci's cultural hegemony. The theory supports the view of the taken-for-granted nature of disciplines and disciplinarity as academic tribes, ideologically created by a dominant bloc to achieve control and domination by acquiescence.

Gramscianism presents cultural hegemony as a way of implementing ideas that, with passage of time, end up becoming 'common sense' and the norm (Dirzauskaite, 2017:28). The normalisation of the dominant group's ideas is consented to by the subaltern class because of ideology that has the power to change or maintain the status quo. The dominant group convinces the subaltern group to accept the dominant group's moral, political and cultural values (Syukur, 2019:73). The upper class imposes its ways of doing things on the lower classes (Syukur, 2019:71). According to this theory, the state and ruling capitalist class use cultural institutions to maintain power over the subaltern class in capitalist societies (Tok, 2003:239), for example, education and the fragmented disciplines, to divide and conquer the subalterns. In the context of this study, fragmented subjects have had a strong hold on student-teachers' awareness to the point of that knowledge compartmentalisation is naturalised.

Based on the cultural hegemony theory, the study ascertained the conflict existing between disciplines in influencing knowledge fragmentation. The study added to the theoretical development by developing an interdisciplinary Teacher Education Interdisciplinarity Pentagon (TEIP) Model to help in effective embrace of the approach by student-teachers.

6.10 SUGGESTIONS FOR FURTHER STUDY

This study sought to establish why student-teachers who studied a conglomeration of subjects constituting an entire course programme tended to fragment the subjects' knowledge. However, this focus omitted other areas that could be studied on the

subject. One such area could be conducting a similar study in other provinces. A study of that magnitude has the potential to provide further evidence on why the students fragment their course subjects' knowledge. Research could also focus on programmes other than teacher education. This can sensitise a wider spectrum of academics to the feasibility of an interdisciplinarity approach.

While this study showed that some subjects had established cultural hegemony that promoted compartmentalisation, comparative research could be conducted on the disciplinarity and interdisciplinarity approaches in academia and/or practice.

In the process of conducting interviews, some participants used multidisciplinary and pluridisciplinarity as though they are synonymous with interdisciplinarity. This indicated that there was confusion regarding these terms, a gap that could be addressed by conducting studies on various approaches and their use in the knowledge economy.

While interdisciplinarity as an approach has been widely used in research, it is necessary to study how it can be used in education. In this case, it can be studied by focusing on how selected disciplines enrich each other in various ways.

6.11 CONCLUSION

In undertaking this study, the researcher was intrigued by student-teachers' tendency to fragment their course knowledge. The research sought to establish the social causes of the phenomenon so as to promote interdisciplinarity and avoid misleading student-teachers into assuming that the courses were unrelated (Mukorera, 1999:35). Interdisciplinarity helps to focus on more than one discipline in addressing a specific issue to produce knowledge through innovative scholarship and create working networks across disciplines and departments throughout an institution, which would foster an informed and critical crop of learners (Kleinberg, 2008:10). This is possible because the boundaries between the disciplines are not clear-cut, but blurred, meaning that disciplinary content cannot be confined to a single subject (Hoadley, Janson, Reed, Gultig & Adendorf, 2012:278).

Through interviews, document analysis and observation, it was established that lecturers and students were aware that the course subjects could be used to enrich each other in diverse ways. However, evidence showed that interdisciplinarity was

minimal and accidental. It was clear that the knowledge fragmentation practice was influenced by social factors such as restrictive entry requirements and preferential treatment of some subjects over others.

The findings revealed the existence of naturalised social factors embodied in specialisation, attitudes, labelling and others, that largely confirmed the cultural hegemony of some subjects and those who promote them as superior to others. This confirmed Gramsci's cultural hegemony that gave rise to specialised, narrow compartmentalisation of knowledge inferring that a group of people can hold power over social institutions, and thus influence the everyday thoughts, expectations and behaviour of society by directing the normative ideas, values, and beliefs that become the dominant worldview of that society (Hellman, 2015:345-346).

The study was relevant as it helped to close the gap that existed in research on the causes of knowledge fragmentation by student-teachers. In the process, it contributed to knowledge on interdisciplinarity in teacher education in Zimbabwe by suggesting possible ways to promote the approach.

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APPENDICES

APPENDIX A: EDU ETHICAL APPROVAL



UNISA COLLEGE OF EDUCATION ETHICS REVIEW COMMITTEE

Date: 2020/09/09

Ref: **2020/09/09/61514004/18/AM**

Name: Mr W Chigerwe

Student No.: 61514004

Dear Mr W Chigerwe

Decision: Ethics Approval from
2020/09/09 to 2025/09/09

Researcher(s): Name: Mr W Chigerwe
E-mail address: wchigerwe@gmail.com
Telephone: +263779317999

Supervisor(s): Name: Prof M Lekhetho
E-mail address: lekham@unisa.ac.za
Telephone: 0865410602

Title of research:

An exploration of social factors influencing Zimbabwean student teachers to fragment course content by discipline

Qualification: PhD Socio-Education

Thank you for the application for research ethics clearance by the UNISA College of Education Ethics Review Committee for the above mentioned research. Ethics approval is granted for the period 2020/09/09 to 2025/09/09.

The low risk application was reviewed by the Ethics Review Committee on 2020/09/09 in compliance with the UNISA Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.

The proposed research may now commence with the provisions that:

1. The researcher will ensure that the research project adheres to the relevant guidelines set out in the Unisa Covid-19 position statement on research ethics attached.
2. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.

3. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the UNISA College of Education Ethics Review Committee.
4. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
5. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing.
6. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
7. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data requires additional ethics clearance.
8. No field work activities may continue after the expiry date **2025/09/09**. Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:

The reference number **2020/09/09/61514004/18/AM** should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.

Kind regards,

Prof AT Mothabane
CHAIRPERSON: CEDU RERC
motthat@unisa.ac.za

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Approved - decision template - updated 16 Feb 2017

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**APPENDIX B: APPLICATION LETTER SEEKING
MINISTRY APPROVAL**



Mkoba Teachers College
P O Box MK 20
Mkoba
Gweru
21 October 2020

The Permanent Secretary
Ministry of Higher & Tertiary Education, Innovation, Science and Technology Development
Private Bag 7732
Causeway
Harare

Dear Sir/Madam

Re: Request for permission to conduct research in Tertiary Institutions in the Midlands Province that train teachers.

Research Topic: 'An exploration of social factors influencing Zimbabwean student teachers to fragment course content by discipline.'

I kindly write this letter asking for permission to conduct research on the above topic at tertiary institutions in the Midlands Province that train teachers.

I am a lecturer in Theory of Education at Mkoba Teachers College studying for a PhD with the University of South Africa and have received clearance from UNISA College of Education (CEDU) Ethics Review Committee (ERC) which has recommended that I include more than one research site.

In the process, I promise to observe confidentiality. The information generated will be used strictly for research purposes. I will adhere to and abide by all Covid-19 protocols.

I look forward to receiving favourable consideration.

Yours faithfully

.....

CHIGERWE WILFRED (EC No. 0278635N; Cell 0779317999; e-mail

wchigerwe@gmail.com)

APPENDIX C: MINISTRY APPROVAL LETTER



All official communications should be addressed to:
The Secretary for Higher & Tertiary Education
Telephones: 79941-5, 79641-5, 79655-5
Fax Numbers: 79199, 79739, 79997
Email: secretary@hete.gov.zw
Telegraphic address: "EDUCATION"



Reference:
MINISTRY OF HIGHER AND TERTIARY
EDUCATION, SCIENCE AND
TECHNOLOGY DEVELOPMENT
P. BAG CY 710
CAUSEWAY

REF/P: CHIGWERE W.(MR)
E.C NO: 0278635 N

STAFF CONFIDENTIAL

27 November 2020

Mr. W. Chigwere
c/o Mikoba Teachers College

**AUTHORITY TO CARRYOUT A RESEARCH AT THE MINISTRY INSTITUTIONS
IN MIDLANDS PROVINCE: MINISTRY OF HIGHER AND TERTIARY
EDUCATION, INNOVATION, SCIENCE AND TECHNOLOGY DEVELOPMENT**

Reference is made to your letter dated 21 October 2020 in which you requested for permission to carry out a research on 'AN EXPLORATION OF SOCIAL FACTORS INFLUENCING ZIMBABWEAN STUDENT TEACHERS TO FRAGMENT COURSE CONTENT BY DISCIPLINE' A case study of Ministry's Teacher Training Institutions in the Midlands Province.

It is hoped that your research will benefit the Ministry and it would be appreciated if you could supply the office of the Permanent Secretary with a final copy of your study, as the findings would be relevant to the Ministry's strategic planning process.

F. Manyema
F. Manyema (Mr.)
Human Resources Officer
FOR: PERMANENT SECRETARY

The Principal
File

MIN OF HIGHER & TERTIARY EDU
OFFICE 2, P. BAG CY 710
CAUSEWAY HARARE 96
30 NOV 2020
P. BAG CY 710, CAUSEWAY
HARARE
Mikoba Teachers College

MINISTRY OF HIGHER AND TERTIARY EDUCATION
17 DEC 2020
P.O. BOX 1120, HARARE

MINISTRY OF HIGHER AND TERTIARY EDUCATION
17 DEC 2020
P.O. BOX 1120, HARARE

APPENDIX D: INTERVIEW GUIDE FOR STUDENT TEACHERS



1. May you briefly **tell me about the disciplines you study** at this college? Do you think the subjects are relevant to you as student teachers?
2. What do you think about **your** academic discipline (**Main Subject** or **Study**) compared to other Main Subjects?
3. In your view, **do you think these subjects share commonalities?** May you explain, e.g. concepts, theories, themes or other aspects.
4. **How is knowledge from the college's different subjects** used by:
 - (a) lecturers?
 - (b) student teachers?
5. **How do you use** the knowledge you get from the different disciplines yourself?
6. What do you think about content from the various disciplines being **used across the disciplinary boundaries?**
7. What are **the benefits of utilising knowledge across disciplines?**
8. Tell me your thoughts about the theory from the disciplines and teaching practice?
9. **Why are lecturers and student teachers not** using knowledge from disciplines together?
10. What do you think if someone says **the disciplines and their members fight** like tribal enemies?

If you have any other ideas on knowledge separation or integration, feel free to share with me.

APPENDIX E: INTERVIEW GUIDE FOR LECTURERS



1. What do you understand by the term **academic disciplines**?
2. Do you think the **knowledge from these disciplines should be integrated**?
3. Do you think these **disciplines are helpful to student teachers separately or in collaboration**?
4. What is your **understanding of interdisciplinary knowledge integration (IKI)**?
5. How do you **describe the way the subjects are taught to and used by students** with regards to common aspects?
6. How do **you** teach **your discipline** yourself?
7. In **what ways can interdisciplinary knowledge integration be embraced in preparing pre-service teachers**?
8. What are **the benefits of utilising knowledge across discipline in teacher education**?
9. Do you think there could be **challenges in integrating disciplinary knowledge**?
10. **Why do student teachers use disciplinary knowledge in isolation**? What could be the social forces behind fragmented subject knowledge?

If you have any other ideas on knowledge separation or integration, feel free to share with me.

APPENDIX F: DOCUMENT ANALYSIS GUIDE



DOCUMENT	DISCIPLINARY/INTERDISCIPLINARY ASPECTS	COMMENTS
1. Lecture notes		
2. Essays		
3. Advertisement/Application Form		
4. Syllabus		
5. Lecture Programme		
6. Timetables		

APPENDIX G: OBSERVATION GUIDE



This observation guide will be used at the college to observe various aspects in relation to disciplinarity and interdisciplinarity.

Observer:

Date:

ACTIVITIES/ASPECTS AND PLACE	OBSERVATIONS AND COMMENTS

APPENDIX H: CONSENT LETTER (LECTURERS & STUDENT TEACHERS)



Dear Participant

My name is Wilfred Chigerwe. I am a PhD student at the University of South Africa in the College of Education under the supervision of Professor M. Lekhetho. You are invited to participate in a research study entitled: ***Social Factors Influencing Knowledge Fragmentation in Teacher Education: Exploring Student Teacher Engagement***. The purpose of the study is to the social reasons that discourage pre-service teachers from integrating course content, address the causes and promote knowledge integration for holistic teacher development.

You will be asked to answer some interview questions regarding the topic of the study. I hope that this study can help to uncover the social reasons that stop student teachers from merging the different disciplines' knowledge, find ways of doing it and embrace integration of the subjects' knowledge. The interview will involve audio recording of the proceedings by the researcher for research use only.

Neither your name nor any other information identifying you will be associated with the audio recording or transcript. Your identity will be anonymous and what will be said during the interview will be kept in strict confidence. Your participation is voluntary and you may withdraw from participating at any point without any consequences.

The interview will take between 30 to 60 minutes of your time to complete. There will be no compensation for participating in this study.

The research report will be availed to participants on request and my contact details are +263 779 317 999 or wchigerwe@gmail.com. Feel free to seek clarification if need be.

Your signature on the reply slip indicates that you are an adult, you have read the above information and agree to participate in the research to explore social factors that stop student teachers from linking knowledge across disciplinary boundaries.

I am looking forward your participation in this research.

Yours Sincerely

A handwritten signature in blue ink, appearing to read "Wilfred Chigerwe".

Wilfred Chigerwe

APPENDIX I: CONSENT FORM (LECTURERS & STUDENT TEACHERS)



CONSENT FORM

I have read the information presented in the information letter about the study in education. I have had the opportunity to ask any questions related to this study, to receive satisfactory answers to my questions and to add any additional details I requested.

I am aware that I have the option of allowing the researcher to audio record me during the interview as a measure to ensure an accuracy in capturing my responses. I am also aware that excerpts from the interview may be cited verbatim but anonymously in the research report. I was informed that I may withdraw my consent, at any time without penalty, by advising the researcher.

With full knowledge of all the foregoing, I agree, of my own free will, to participate in this study.

Participant's Name (Please print):

Participant Signature:

Date:

Researcher Name: Wilfred Chigerwe

Researcher's signature: 

APPENDIX J: FIELD EVENT LOG SHEET



Title: An exploration of hegemonic social factors influencing student teachers to fragment course knowledge.

Research Site location:

Research Site Address:

Data Collection Method:

Date	Time	Participant	Adverse event	Action taken

--	--	--	--	--

APPENDIX K: TURNITIN REPORT

TOWARDS INTERDISCIPLINARITY IN TEACHER EDUCATION: DEMISTIFYING HEGEMONIC SOCIAL FACTORS INFLUENCING KNOWLEDGE FRAGMENTATION IN ZIMBABWE			
ORIGINALITY REPORT			
21%	18%	10%	12%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS
PRIMARY SOURCES			
1	uir.unisa.ac.za Internet Source		2%
2	hdl.handle.net Internet Source		1%
3	researchspace.ukzn.ac.za Internet Source		<1%
4	www.tandfonline.com Internet Source		<1%
5	scholar.ufs.ac.za Internet Source		<1%
6	vital.seals.ac.za:8080 Internet Source		<1%
7	repository.nwu.ac.za Internet Source		<1%
8	Submitted to University of South Africa Student Paper		<1%
	opendocs.ids.ac.uk		

APPENDIX L: CONFIRMATION OF PROFESSIONAL EDITING



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Website: www.jaybe9.wixsite.com/bluediamondsediting

20 May 2023

Declaration of editing

TOWARDS INTERDISCIPLINARITY IN TEACHER EDUCATION: DEMYSTIFYING HEGEMONIC SOCIAL FACTORS INFLUENCING FRAGMENTED USE OF KNOWLEDGE BY STUDENT TEACHERS IN ZIMBABWE

by

WILFRED CHIGERWE

I declare that I have edited and proofread this thesis. My involvement was restricted to language usage and spelling, completeness and consistency and referencing style. I did no structural re-writing of the content.

I am qualified to have done such editing, being in possession of a Bachelor's degree with a major in English, having taught English to matriculation, and having a Certificate in Copy Editing from the University of Cape Town. I have edited more than 400 Masters and Doctoral theses, as well as articles, books and reports.

As the copy editor, I am not responsible for detecting, or removing, passages in the document that closely resemble other texts and could thus be viewed as plagiarism. I am not accountable for any changes made to this document by the author or any other party subsequent to the date of this declaration.

Sincerely,

A handwritten signature in black ink that reads "J Baumgardt".

Dr J Baumgardt
UNISA: D. Ed. Education Management
University of Cape Town: Certificate in Copy Editing
University of Cape Town: Certificate in Corporate Coaching



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