CHAPTER ONE

INTRODUCTION

This chapter begins with a brief background to the factors that affect academic performance of Mature-age Students in Science Education programme at the University of Zambia (UNZA). The term 'mature-age' is a term that is used at the University of Zambia to refer to 'In-service students' already serving as teachers. This study will use the term 'Mature-age students' to mean 'In-service students'. Thereafter, the chapter presents the statement of the problem, purpose of the study, research objectives and questions linked to the objectives of the study. It then presents the significance of the study, theoretical framework, operational definitions and limitations of the study. It further presents sections on reliability of instruments used, validity of results, organisation of the study and ends with a summary.

1.1 Background to the study

Worldwide, a number of mature-age students are pursuing university education. The need to raise their status in society, need for belonging, security at their work places, masterly of their teaching subjects and self actualisation among others, motivate mature-age students to enrol for university education (Mc Innis, 2001).

In Australia for instance, the Australian Federal Government policies on education encourage access to university education by all citize . As a result, many mature-age students including school leavers have access to u y education in Australian universities (Krause et al. 2005).

Taniguchi and Kaufman (2005) note that, although the number of mature-age students pursuing university education is increasing, his is not the same with mathematics and science related programmes. In addition, not many mature-age students perform well in Science Education programmes. In 2002, the population of mature-age students between 40 and 49 years, enrolled in Australian universities was 4,975 (Lukic, Broadbent and Maclachlan, 2004). Their academic performance measured by class attendance, course work, and examination scores fell below the pass grade. As a result, at the end of the first acade ar, approximately 27% of them withdrew from their course. Research in this area by Krause et al. (2005) at University of Melbourne indicates that, a number of factors affect the academic performance of mature-age students. Some of these are; student demographic characteristics, student psychological characteristics student prior academic performance, social factors, institutional factors, and outcomes of the learning process.

Concerning demographic characteristics, age and gender were found to have an effect on academic performance (Krause et al, 2005). Similarly, Clarke and Ramsey (1991) found age to correlate with performance in most institutions and courses. The general finding was that older university students perform better than you ger students. However, in some courses such as Mathematics and Science, mature-age students were adversely affected because their learning speed tended to decrease with age, while the depth of learning increased.

As regards student psychological characteristics, academic preparedness and motivation in any learning situation is very cardinal as it deter ines the outcome of

the learning process. Krause et al. (2005) report that significant numbers of students who voluntarily withdrew from full-time study cited unsatisfactory study skills and inadequate pre-requisite knowledge as reasons for withdrawing. Studying and learning approaches at tertiary level appear to be strongly influenced by practices at secondary school level and the miss-match may create problems. It is evident, therefore that, from the relevant literature available, students' performance is clearly related to their own concepts of their academic ability (Murray-Harvey, 1993).

Consequently, student prior performance, admission to university on the basis of academic performance is determined according to one index or some combinati n of indices, such as secondary school results or ranking (overall or in specific subjects). Using student prior performance to rank them indicates that secondary school subject results invariably are strong direct predictor of tertiary performance. McKenzie and Schweitzer (2001) note that students' domain-specific knowledge relates to their intrinsic motivation to study a subject.

On social factors, family and peer support influence students' commitment o the institution and course satisfaction. West et al. (1986) in their study at Monash University report that a few students withdraw from university study because of the difficulty of combining study with family commitments nd needs. Whatever is going on in a student's personal life, will inevitably affect what is going on in school, and vice versa. A student needs time to be in class, and appropriate time for study. In addition, there must be time for family, friends, social activities, and time to just be alone.

As rightly put by Dale and Jennings (1986) in their study on factors affecting the performance of students in undergraduate physics in Australia, institutional factors generally negatively influence academic performance of mature-age students. This happens when the environment is not providing the nece sary facilities that enhance effective teaching and learning. The methods of delivering concepts to the students also have an impact on their academic performance. Additionally, financial difficulties generally appear to have significant negative effect o cademic performance either directly or indirectly (West et al.1986).

Concerning the outcomes of the learning process, Murray-Harvey (1993) in a study in Australian university reports that the outcome of the learning process measures relate to students' intellectual, personal or social development. Intellectual development has been shown to have both a direct and indirect effect on academic performance of mature-age students (Pascarella and Terenzini, 1983). For instance, the study revealed that the positive outcomes act as motivators while negative outcomes may induce hard work to avoid failing.

The above factors are results from studies carried out in other countries. The situation is not different in Zambia. For instance, over the past five years, the academic performance of mature-age students has raised a lot of concern in the students themselves and generally among academic staff in the university. In addition, the number of mature-age students graduating in Science Education at the University of Zambia has not significantly increased a compared to the non-science programmes. The effect of the small numbers of graduates in Science Education can be seen by the shortage of science teachers with degrees, especially in high

schools. It should be noted that this shortage may also be compounded by some of the graduates especially school leavers not taking up teaching jobs but instead they consider it more rewarding to find employment in non-teaching professions.

The University of Zambia has been running a Bachelor of Science with Education programme since the inception of the School of Education but the performance of its students has not been satisfactory thereby having few them graduating. At first year the students are quite many but by the time they re in the final year the number reduces drastically due to repeating, withdrawal and failing some courses.

As a response to the demand for more science teachers, the University of Zambia, in 1999, introduced a programme specifically for in-service science teachers in the School of Education. The programme is called Bachelor of Education Secondary (B.Ed Secondary). It started as a project called Bachelor of Education Mathematics and Science (BEDMAS) undertaken by the University of Zambia (UNZA) in conjunction with the Ministry of Education. The total umber of students enrolled was eighty (80) and all of them were sponsored by the Ministry of Education. The academic performance of this cohort of students in BEDMAS programme was not satisfactory. As a result, almost half of them failed. Thus, from that time the enrolment has been reducing due to a number of reasons, among them, failure by employers to grant mature-age students study leave to pursue studies in Science Education.

In 2009, the University of Zambia introduced a parallel programme to cater for people who could not be given study leave but could manage to come to learn at

university after working hours. This target group is more of mature-age students. However, despite the University providing many modes of accessing Science Education, the numbers of mature-age students in the science programmes still remain small to the point of raising concern. For inst , the 2010 enrolment levels for all students pursuing Bachelor of Education Secondary was only fifty six (56) students. This number translates to the following breakdown; fourteen (14) first year, twenty three (23) second year and nineteen (19) final year students. Under the parallel Science Education programmes there are thirteen (13) students. In the programme of Bachelor of Science with Education, the total number of students is three hundred and eighty three (383). Out of this number only less than fifty are mature-age students.

It is a common practice in the Science Education progra mes at the University of Zambia for students to be excluded from school, repeat courses or change to non-science programmes due to poor academic performance. T situation raised concern to the researcher. What is not clear is: why do mature-age students perform poorly in Science Education when studies by Spence et al. (1983) show that they are driven by intrinsic motivating factors such as a need raise their status, achieve and self-actualise? It is common knowledge that every student enrols into a university study programme including Science Education to achieve by obtaining a degree. The drive to achieve is what Spence (1983) calls achieveme motivation. Achievement motivation is a non-conscious process in which a decision on how to act or not to is made. Similarly, it has been found that achievement often brings benefits while failure brings shame (Wloodkowski, 1985). In addition, as rightly put by Spence (1983), the desire to achieve is as basic and natural to every individual as other

physiological needs such as food, safety, love and bel ging. The question is, with inherent desire to achieve, why do mature-age students perform poorly in the Science Education programmes? No study has been done at the University of Zambia to answer this question. It was therefore, necessary to conduct a study of this nature to determine factors that affect academic performance of mature-age students in Science Education programmes in the School of Education at the University of Zambia.

1.2 Statement of the Problem

It is common practice in Science Education at the University of Zambia for some school leavers and mature-age students to be excluded from school, repeat courses or change to non-science programmes due to poor academic performance. T situation raised concern in the researcher. Particular interest was in mature-age students in Science Education programmes because these students are believed to enrol into university education with clear purposes (Spence, 1983). Among the purposes are the need to raise their status and self-actualisation. It was therefore, necessary to conduct a study of this nature to determine factors that affect academic performance of mature-age students in Science Education at the University of Zambia.

1.3 Purpose of the Study

The study sought to establish factors that affect academic performance of mature-age students in the Science Education Programme at the University of Zambia. In addition, the study sought to recommend measures to address the identified factors in order to ameliorate the situation.

1.4 Study Objectives

The study was guided by the following objectives:

1. To establish factors that motivate mature-age students to choose Science Education Programmes at University of Zambia.
2. To establish factors that affect academic performance of mature-age students pursuing Science Education at University of Zambia
3. To determine measures to address challenges if any, faced by mature-age students in Science Education at the University of Zambia.

1.5 Research Questions

The study sought to answer the following question:

1. What factors motivate mature-age students to choose Science Education programmes at the University of Zambia?
2. What factors affect the academic performance of Mature-age students pursuing Science Education at the University of Zambia?
3. How can the challenges, if any, that affect academic performance of mature-age students in Science Education at the University of Zambia be addressed?

1.6 Significance of the Study

At the time when there is so much need for science teachers in high schools and few students are graduating in the Science Education at the University of Zambia due to poor academic performance, findings of a study of this nature may be significant. It was hoped therefore, that the findings of this study would provide insight on the factors affecting academic performance of mature-age students in Science Education. In addition, lecturers and tutors in the Science Education programmes

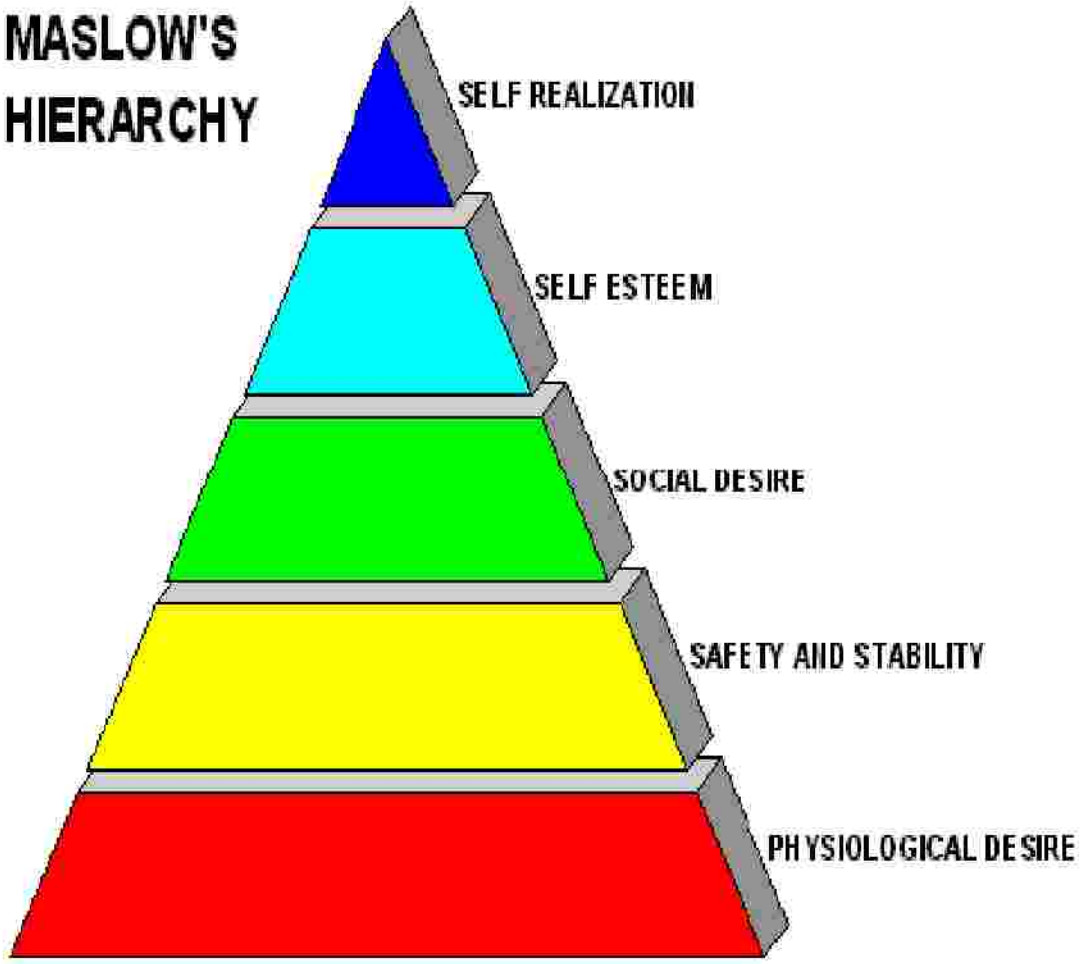
would find ways of helping the mature-age students in order to ameliorate the situation. It was also hoped that the findings of this study would stimulate interest for further research in the subject.

1.7 Theoretical Framework

The study was guided by the Need theory by Abraham Maslow. Abraham Maslow was born in 1908 and died in 1970. The theory postulates that behaviour is influenced by a person's needs. If one need is not met, a person may do something evil or right to have his or her need fulfilled. As noted by Child (1993), the needs follow a specific order or hierarchy. They begin with physiological needs that inc ude food, air, clothing and shelter. After the physiologic needs come the safety needs that include desire for predictable safe environment with justice. For instance, personal security, financial security, health, well being and general protection. Thereafter, the need for love and belonging follows. This includes acceptance, having supportive classmates and having a communicating class system. The fourth level is the esteem needs which consist of need to be appreciated, valued, respected, recognised, prestige, status, attention, competence, mastery and freedom. The last need on the hierarchy is the need for self-actualisation. It includes desire to achieve one's dreams. The physiological needs have to be fulfilled before the safety and other needs.

The figure below shows the hierarchy of needs:

Figure: 1



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Concerning this study, the need theory helped to explain factors affecting academic performance of mature-age students in Science Education Programme at the University of Zambia. For instance, at physiological l el of needs, students concentrate on their academic endeavours only if most the physiological needs are met. These include having a conducive learning environment, hav ng adequate food for their families and being able to pay for water bills so that the home has water supply among others.

Safety needs entail that students need to be protected from threats from fellow students and lecturers if they are to perform well aca mically. Students need to feel loved in whatever situations they may find themselves in. This creates a sense of belonging which in turn gives them the motivation and confidence to work hard regardless of how difficult the courses may be. Even in situations where students face challenges in a course, they get encouraged by friends, tutors and lecturers. But when they fail in a test or examination, the students do not feel that they belong to the class and become discouraged. In fact, failure culminates in a lower self esteem and a negative self concept.

The need theory also helped to explain how social need mature-age students was met. To achieve the social needs, students work in gro The need to belong and appreciation hold the groups together. Through academic study-groups, students tend to socialise, make friends among the groups and help one another academically. As a result, their need to belong and for appreciation gets fulfilled. Positive comments from lecturers and tutors also boost their self-image and confidence in their academic work and feelings of success build their positive self-

esteem. In addition, positive comments on students' work are a source of motivation to better performance in the courses they take. Passing tests and examinations builds confidence in students to the point that they d velop hope to attain higher levels of education and self-actualization. But failure in tests and examinations builds low self-esteem and rejection.

1.8 Operational Definitions of Key Terms

Performance: This refers to one's level of ability in a particular area. In this study, examination and continuous assessment results were used as the basis for gauging performance.

Motivation*:* the psychological feature that arouses mature-age students to act towards a desired goal.

Mature-age student*:* a student with any of the following characteristics: has delayed enrolment to university education, attends university education after working hours and works full time while pursuing studies.

School leaver: a student that enters university not later than two years after completing grade twelve (12) of education. A student below 25 years of age is considered a school leaver at University of Zambia.

Undergraduate: two, three or four year programme leading to bachelor's degree in the University of Zambia, School of Education.

In-service student: a student who is already trained as a teacher undertaking a course of study to upgrade his/her professional skills and knowledge. The term is used interchangeably with Mature-age student.

1.9 Limitations of the study

The use of self-rating questionnaires to collect data from mature-age students themselves on factors affecting their academic performance was limiting because it was difficult for them to be honest in situations that demanded talking about themselves truthfully. Despite this limitation, the findings of the study were consistent with the reviewed literature. In addition, the sample was representative enough such that the findings of this study can still be gene alized.

1.10 Reliability of instruments and Validity of results

Reliability focuses on the degree to which empirical in ors or measures of a theoretical concept are stable or consistent across two or more attempts to measure the concept (Ndhlovu, 2010).

In this study, indicators or measures were the instruments used to collect data on factors motivating students to take up Science Education programmes at the University of Zambia and factors affecting their academic performance in these programmes. In order to ascertain reliability of the instruments used, respondent validation was done. It was done by verifying the results with respondents and by relating the findings with the evidence from the available literature.

In order to ensure that the findings were valid, the r archer cross-checked the respondents' responses with those of other respondents obtained by a different instrument. For example, data collected through questionnaires from mature-age students was cross-checked with data obtained by interviews.

1.11 Organisation of the Dissertation

The study is organized in six chapters. The first chapter covers introduction, the statement of the problem, purpose, objectives, questions, significance, limitations of the study, definitions of concepts used in the study and organisation of the study. Chapter two consists of literature review, while chapter three contains methodology. The research findings are presented in chapter four. Chapter five discusses the findings of the study and chapter six presents conclusion and recommendations.

1.12 Summary

This chapter has covered the introduction to the study. The background to this study emanated from poor academic performance of mature-age students in Science Education programmes at University of Zambia. This situation motivated the researcher to determine the factors that affect academic performance of mature-age students in the Science Education programmes in the School of E ucation at the University of Zambia. In addition, the chapter covered the research problem nder investigation, the purpose, objectives and research questions. The chapter also presented the significance of the study, study limitations, reliability of the instruments used and validity of the study findings. The chapter further presented the operational definitions of terms used, the theoretical framework a d organisation of the study.

CHAPTER TWO

LITERATURE REVIEW

2.0 INTRODUCTION

This chapter presents a review of relevant literature n factors affecting academic performance of mature-age students in Science Education. The literature is presented in the following subheadings: factors motivating mature-age students to choose Science Education programmes in universities, f ctors affecting academic performance of mature-age students in Science Education in universities and he measures to mitigate the challenges if any, faced by mature-age students in Science Education. This is followed by a summary.

2.1 Factors that motivate mature-age students to choose Science Education programmes in universities

Many factors that contribute to students' motivation to choose Science Education programmes at global and national level were reviewed. Since the focus of this study was on mature-age students, the literature presented is linked to mature-age students pursuing Science Education.

Student motivation naturally has to do with students' desire to participate in the learning process. But it is also concerned with the reasons that underlie their involvement in academic activities. Although students be equally motivated to engage in a particular course of study, the factors that motivate them may differ. These factors are presented in the subsequent paragraphs of his section.

2.1.1 Community welfare and social relationship

Mature-age students are interested in the improvement of their community and humankind. As people grow older they feel a great responsibility offer particular services to their communities in various ways. Teachers do this by providing teaching services to their pupils in schools. At the same time, mature-age students just like other students have need for associations and friendships. A study by Kantanis and West et al. (2000) in New Zealand found that perhaps one of the strongest indicators for student choice of a study programme is the level of social support he/she has from family, friends and peers. Therefore, establishing strong support networks is important for academic choice and performance at university in the sciences. Dalziel and Peat (1997) also report that established strong support networks among peers influence choice of study programme. The social relationships act as a motivating factor for students to choose a programme of study and help them to find a balance between study and their social life away from university.

2.1.2Prestige

West et al. (2000) report that mature-age students in all degree programmes are motivated to enrol into university programmes by a desire for personal accomplishment and completion of a previously set goal. All mature-age students in all degree programmes are often believed to be highly motivated to return to university for promotion in their employment, improvement of their professional skills, pay scale benchmarks, career change or attainment of m gement positions.

Additionally, mature-age students recognize the competitive value of university education and seek to emphasize this to their own chil ren by acting as role models. This acts as a motivating factor for enrolling into university.

Kantanis (1999) observed that some mature-age students engage in studies because they want to enjoy personal advancement and achieve a higher status i their professional positions. Hence, motivation to embark on a career is clearly linked to expectations that the career will bring about the d sired rewards and prestige. Science is considered to be challenging, hence, students doing Science Education feel proud once they achieve their goal of successfull mpleting the programme.

2.1.3 Expectation achievement

West et al. (1983) report that mature-age students choose a programme of study because of personal value they will gain from the course. The expectation to achieve pushes students to strive hard to perform to the best their abilities even when things get tough.

2.1.4 Acquisition of knowledge

Ericksen (1978) reports that some students choose Science Education programmes for the sake of acquiring knowledge. They want more knowledge simply because they have an inquiring mind. Since students need more knowledge in Science Education, educators have a duty to help them succeed. Studies by Bligh and Sass (1971 and 1989) in Australia show that there is no single factor for motivating students to choose a Science study programme. Many factors affect a given student's motivation to choose and learn. For instance, interest in the subject,

perception of its usefulness, general desire to achieve, self-confidence, self-esteem, patience and persistence are factors motivating students to engage in studies. In Science Education some students are motivated to choose the programme in this area by approval from significant others while other students are motivated y the desire to overcome the perceived challenges in these programmes as they acquire new knowledge and skills.

2.2 Factors that affect academic performance of studen pursuing Science Education in Universities

Many factors that affect academic performance of mature-age students in Science Education at global and national level were reviewed. he factors are presented in the subsequent paragraphs of this section.

Pascarera and Terenzini (1983) report that academic performance is affected by a host of factors. They note that there are several factors that have the potential to influence academic performance such as student ability motivation, and the quality of secondary education obtained, age and gender. Additionally, students' demographic characteristics, psychological characteris ics and prior academic performance, social and institutional factors as well s outcomes of the learning process were found to affect academic performance of students in Science Education programme.

2.2.1 Students' demographic characteristics

Research that has investigated the effects of age on student performance has generally found that mature-age students receive higher grades in tertiary education settings (Delluchi 1993; Harrington & Harrington 1995; House keeley 1995; Rech

1996; Hoskins, Newstead & Dennis 1997). There have been some reported exceptions, such as Justice and Dorman's (2001) findin of no significant difference in performance between older and younger students and Ekpenyong's (1999) findings of superior performance among younger Master of Business Administration (MBA) students.

As to the field of education, Barrett and Powell (1980 their study titled,
" Mature-age Unmatriculated Students and the Justification of a more Liberal Admission Policy", found that the academic performance of mature-age students were consistently superior to that of students enterin direct from school. The study was done in the United States of America on students studying a nursing programme. There have been several explanations offered for the general finding that older university students perform better than you ger students. Hoskins, Newstead and Dennis (1997) attribute the better performance of mature- age students to better study habits, while Oyinlade (1992) suggests that experience in the work place may provide a heightened appreciation of the benefits of obtaining a qualification and thus result in increased motivation levels.

Carney-Crompton and Tan (2002) found that older students are more likely to employ effective meta-cognitive strategies such as hyper processing (applying extra processing effort to more complex material) and the ge on of constructive information defined as "*elaborating, reorganising, or integrating information*". While they appear to perform better on average, Harrington and Harrington (1995) found mature-age students to be less optimistic regarding their lik y performance than school-leavers entering university especially in the sciences.

Hoskins et al. (1997) report that mature-age students tend to be concentrated in the areas of humanities and the social sciences. Bourner and Hamed (1987) support this, suggesting that mature-age students make up less of the total student enrolled in the sciences. It appears that little effort has bee put into examining the effect of age and background on students in the sciences.

Woodley (1984) reports that studies in the sciences in that mature-age students have no academic advantage over their younger peers, and in some cases perform more poorly. However, Cullen et al. (1996) found withi cohort of students taking two Biology topics in Australia that younger students were more likely to fail or withdraw from topics than older students. There is clearly a need to determine the extent to which mature-age students are at risk in the sciences and to identify the source(s) of the problem.

Richardson (1994) notes that mature-age students are more likely to have developed a deeper approach to their own learning and therefore should elop a deeper understanding of material than students who rely on su cial methods of learning. However, although this group of students may have an i rease in maturity and experience they may also have a gap in background knowledge due to a break o several years since leaving high school.

Carney-Crompton and Tan (2002) report that mature-age students' loss of confidence in their ability to study may affect their performance. The longer a person has been away from school, the harder it often is to f nfident about getting back

to the routine and discipline of study. Competing family needs and routines as well as their own are areas of concern for mature-age students. The ability to attend classes and find quiet time for personal study can be compromised by the needs of their children and managing complex needs of their households after school, may be challenging if the students are not on campus.

2.2.2 Student Psychological Characteristics

Self-set goals are believed to affect student performance directly because it is believed that they motivate individuals who possess the required ability into action. Furthermore, self-set goals determine the choice of tasks and learning strategies a student makes to directly affect performance. As Carroll and Garavallia (2004:2) put it; *"self-set goals influence not only student motivation but al tudent behaviours."* Successful academic performance is a product of effective studying and motivational factors that are derived from set goals.

Students' goals for tertiary study are an important fa in persistence and good performance. As found by Trueman and Hartley (1996) students' goals are strongly influenced by students themselves, their parents' attitudes and need for tertiary education. In addition, Hartley (1996) pointed out that self-esteem indirectly influences performance through institutional commitment and satisfaction with academic activities.

Abbott-Chapman et al. (1992) point out that the academic orientation and motivation of students has been found to be a significant predict r of performance and persistence. Study effort was positively related to st dent performance in university

just like their earlier performance at secondary school did. Romer (1993) found that preparation for class and attendances at class were im nt for the final academic performance of students. Murphy and Roopchand (1993) report that mature-age students demonstrate higher levels of motivation towards studying which is related to being older, having clearer motivating factors and being able to make informed decisions regarding their education.

2.2.3 Student Prior Performance

Determinants of students' performance have been the su ject of on-going debate among educators, academics and policy makers. Abbott Chapman et al. (1992) found that the students' aptitude is the most important determinant of his/her learning. This was in a study with university students at University of Tasmania. In another study of high school students who were in an Economics class in Australia and wanted to take another Economics course, Beron (1990) found that there was a link between perceived usefulness of an additional cou se in economics and the performance of students in a current economics course. From this study one can deduce that prior student performance in any given cou can have far reaching effects on the performance of a related course of study such as Science Education.

Many studies, including Abbott-Chapman et al. (1992) and Auyeung and Sands (1993) found prior good academic performance as a strong predictor of academic performance, both directly and indirectly. Murray-Harvey (1993) noted that students' domain-specific knowledge is linked to their intrinsic motivation to study a subject, which in the long run also relates to their course preference and academic preparedness. Therefore, prior academic performance is one of the reasons why

students choose programmes of study they are familiar h or have prior knowledge about.

Mckenzie and Gow (2004) however, suggest that pre-university performance is not a strong predictor of university academic performance due to differences between pre-university and university study environments. It is po ible to find that a student who performed very well in high school in the sciences perform poorly at university level in the same subject area. The study further indicated that students are likely to experience more external regulation during their pre-university studies than at university where they are expected to direct their own learning. The scenario where students are expected to direct their own learning may to some extent negatively affect their academic performance especially if the necessary facilities are inadequate.

2.2.4 Social Factors

West et al. (1986) report that, the majority of mature-age students have very little expectation for social support as they enter universit education. Their focus is on attending university, getting work done and not being racted by social contact. In most cases mature-age students fear that they would not be completely accepted by younger students either during tutorials or outside cl times. Therefore, they worry about communicating with young students from a generation different from theirs. They feel socially disoriented when surrounded by younger students with very different interests and life experiences. This may negatively affect their academic performance if not properly handled. Parker and Johnson (1981) note that student-to-student interactions with peers have shown to be an extremely effective form of

learning. Therefore, specific programmes directed at t e needs of mature-age students within the sciences should be considered.

Kantanis (1999) notes that, social support is a factor that can affect academic performance of students both negatively and positively The social support networks have great value to enhance academic performance as st nts form friendship groups to exchange information on assignments and find out about tutorials and lecture schedules. Peer support and relationships have been found to enhance persistence of students both directly and indirectly.

West et al. (1986) report that family support influenced students' commitment to the institution and course satisfaction. It was an important factor in pers stence for a small sample of respondents under study at Monash University in Australia. However, West found that a few students withdrew from udies, failed or repeated courses because of the difficulty of combining study with family commitments and needs. Terenzini (1992) noted that families can be eit r a supportive asset or a source of stress especially as relationships change.

West et al. (1986) report that financial matters generally appear to have a small but significant effect on academic performance either directly or indirectly through goal commitment. More financial responsibilities such as mo tgages and children's school expenses which have to be maintained whilst studying can have far reaching consequences on the student.

2.2.5 Institutional Factors

Mathibeli et al. (1996) in their study in Lesotho report that institutional commitment is a factor that influences academic performance. For instance, lack of adequate maintenance and repair of school facilities, lack of school requisites, lack of basics such as water and or electricity contributed to poor educational environment thereby negatively affecting academic performance of students at any level of education.

Bean and Vesper (1994), found that pre-university performance influenced students' institutional commitment regardless of the care given o them by the academic and administrative staff. This means that students who know and have an interest in what they want to do will easily adapt to the university environment on their own.

Mathibeli (1996) in his study in Lesotho high schools and universities found that, schools with lower student-teacher ratios and with more qualified students in terms of prior academic performance tended to produce better results. In this case, the better the results a student has in related subject ar s prior to university entry the better the performance may be predicted.

Kantanis et al. (1993) also report that academic life on campus and extra-curricular activities appear to enhance student integration in the institution. As students relate with one another in extra-curricular activities, their social and academic interaction is strengthened.

Abbott-Chapman et al. (1992) found that a mismatch between prior expectations and actual experiences at university was a significant reason for withdrawing from study

other than just failure in particular courses. Kantanis (1993) found that in some cases low commitment, poor performance and withdrawal were o ten the result of inadequate counselling and decision making about university courses especially science related ones.

McClelland and Kruger (1993) note that pre-requisite knowledge is relevant for good performance in the sciences. For instance, success in science subjects has been found to be better predicted than in the humanities by the Scholastic Aptitude Test (SAT). Certainly, the most well known indicator of academic performance is the grade a student scores in academic tasks. Grades are most often an average of assignments and test scores. Grading systems vary greatly by country and school; common scales include a percentage from 1-100, lettering systems from A-F, and Grade Point Averages (GPA) from 0-4 or above.

West et al. (1985) report that the level of student satisfaction with the teaching and learning activities provided by the institution has been found to predict academic performance. Teaching pedagogy is very cardinal at all levels of education. This is because the more a teacher uses a variety of methods in teaching, the more effective the learning process becomes. Other factors hat affect academic performance of students include, uncaring and unintere d teaching staff, an unsuccessful or inadequately supportive tutoring syste , large and impersonal classes and poor facilities in classes.

Collaborative learning has been discussed by Tinto (1993) as an important element in effective learning and highly related to students' performance.

Results support the importance of homework and indicate that homework and class attendance help students to produce good grades. Tinto noted further that it was difficult to perform well in classes where a student did not attend lectures. Additionally, a good teaching style had positive effects on academic performance of students in Science Education programmes.

Tinto (1993) reported that curriculum is another issue that affects academic performance of students at tertiary level in Science Education. Tinto found that students struggled with the pace at which the material in the undergraduate Science subjects was presented. In addition, examinations posed pressure especially if the assessment was not progressive during the semester. Further, the format of multiple choice questions did not allow students to demonstrate their knowledge in writing or practical activities. The problem was compounded if the student had to carry failed courses. It complicated the timetables and sometimes led to timetable clashes and missed classes.

2.2.6 Outcomes of the Learning Process

Angelo (1991) reports that most of the literature use outcomes related to academic performance in terms of grades, pass rates and persist ce or attrition as predictors of academic success. The latter two terms are generally (but not always) ined in terms of voluntary withdrawals, rather than failures or xclusions. A few outcome measures relate to students' intellectual development personal and social development (Murray-Harvey, 1993). If the academic performance is positive the student is motivated to work hard in order to maintain the good work while gative academic performance acts as reinforcement for extra hard work to improve.

Attendance to all the learning schedules is an important aspect at university especially in sciences because the courses are bulky and require personal commitment at all times.

2.3 How the challenges that affect academic performance of mature-age students pursuing Science Education can be addressed

There is literature that depicts ways to address the challenges faced by science students. These include:

2.3.1 Identifying individual and socio-cultural factors influencing academic performance

Pascarera and Terenzini (1983) report that by identifying the individual and socio-cultural factors that influence how individual students perform, educators are in a better position to make changes to the teaching and learning environments so that future students can achieve success in their academic performance in Science Education programmes. They found an overall indirect gender effect on academic performance and persistence through initial institutional commitment, but separate analyses revealed that different male and female behaviour could be explained differently. This study was carried out in Britain among college students. The implication of this study is that students should be seen as individuals and not as a group of students. Therefore, programmes should be designed in such a way that they cater for the needs of all the students.

2.3.2 Encouraging students to attend all learning sessions

Pascarera and Terenzini (1983) report that traditionally, lectures and tutorials have been the dominant forms of instruction in conventional face-to-face undergraduate courses. Research on class attendance has established that, on average, students

with high attendance achieve higher academic performan in both coursework and examinations than students with poor attendance.

The main implication arising from this study is that, nce class attendance is so clearly associated with academic performance, lecturers ought to encourage attendance and maintain class registers. However, as Romer (1993) found out, simply increasing attendance does not necessarily lead to improved academic performance. This, therefore, means that a better appr ch to achieve meaningful attendance may be to focus on issues that enhance student engagement in the entire learning process.

2.3.3 Engaging the students in the learning process

The term student engagement is used to refer to the extent in which the student is involved with his/her studies. Spence et al. (2000) describe student engagement as, "*a psychological process interest, investment and effort students expend in the work of learning."*

In addition, West et al. (1986) have categorised engagement into behavioural, cognitive and emotional engagement. They report that behavioural engagement entails positive conduct, such as following rules and ding disruptive behaviours. In addition, behavioural engagement is also concerned th involvement in learning and academic tasks and includes conduct such as effort, persistence, concentration, attention, asking questions and contributing to class cussions. Emotional engagement refers to students' affective reactions in he classroom, including interest, boredom, happiness, sadness or anxiety. Cognitive engagement focuses on

the psychological investment in learning, a desire to beyond the required level and a preference for challenge.

2.3.4 Providing a supportive social environment

The process of learning and teaching should be viewed as a socio-cognitive phenomenon that requires a supportive social environment in order to be effective. Kantanis et al. (1993) report that supportive environments in which members are friendly, help one another, show concern for one another's welfare and work collaboratively are associated with increased liking for school, greater intrinsic motivation and improved academic performance of students.

2.3.5 Providing a conducive learning environment

Marton (1976) notes that the lecturers did improve academic performance of students by fostering teamwork. This was by supportive student-lecturer relationship, mutual respect between the lecturer and students and between students themselves. To this effect, lecturers adopted a cooperative pedagogic approach in which learning was viewed as a shared activity between all learners and the lecturer.

McMillan and Forsyth (1991), report that students learn best when incentives for learning in a classroom satisfy their own motives for rolling in a course. Some of the needs students may bring to the classroom are the d to learn something new in order to complete a particular task or activity, become competent, succeed and do well, feel involved and interact with other people. Satisfying such needs is rewarding in itself, and such rewards sustain learning more effectively than grades do.

Therefore, it is important to design assignments, in-class activities and discussion questions to address these kinds of needs.

Lucas (1990) reports that, students learn by doing, making, writing, designing, creating and solving. It is cardinal to make students active participants in the learning process as passivity dampens students' motivation and uriosity. In this case it is important to encourage students to suggest approaches to a problem or to guess th results of an experiment. Lecturers and tutors, therefore, must use a variety of methods that stress student active participation.

2.3.6 Providing a motivating learning environment

Sass (1989) asked his university class in United States of America to recall two recent class periods, one in which they were highly mo ivated and one in which their motivation was low. The students made lists of specific aspects that influenced their level of motivation. In over twenty courses, Sass reports that eight charact cs emerged as major contributors to student motivation:

- Instructor's enthusiasm
- Relevance of the material
- Organization of the course
- Appropriate difficulty level of the material
- Active involvement of students
- Variety
- Rapport between teacher and students
- Use of appropriate, concrete, and understandable examp es

Once the above aspects were met the learning process was more interesting and motivating to students. As a result, their academic performance improved.

2.4 Summary

This chapter has presented a review of the available literature that was considered to be of direct relevance to the present study in order to place the investigation within the context of similar studies, thereby enriching it as well as providing justification for it. From the literature reviewed, it can be seen that ure-age students are motivated to pursue studies by many factors such as self-advancement, prestige, acquisition of knowledge, academic and social relation hips. In addition they enter university with self set goals making them intrinsically motivated and ready to achieve highly in their academic endeavours.

Mature-age students pursuing Science Education were negatively affected in their academic work by issues such as age, financial problems, poor study habits, poor attendance to lectures, bulky course content, unsupportive school environment, lack of social relationships, poor teaching and learning metho s.

As concerning how to address the challenges that affect academic performance of mature-age students, literatures show that; encouraging students to attend all learning sessions, providing a conducive learning environment, using a variety of teaching methods and engaging students in the learning process among others were helpful. To this effect, as rightly put by Sass (1989) students' motivation to learn and good performance depends on lecturers' and tutors' enthusiasm, relevance of the material, organisation of the course, appropriate content of the material, active

involvement of students, variety of methods used in teaching, rapport between teacher and students, and appropriate use of concrete and understandable examples.

An analysis of the above literature shows that very few studies have been done to establish factors that affect academic performance of mature-age students in Science Education programmes in tertiary institutions. addition, no study has been done at the University of Zambia in this area. These two gaps therefore, motivated the researcher to conduct this study which sought to establish factors that affect academic performance of mature-age students in Science Education programmes at the University of Zambia with a view to map out measures to address the situation.

CHAPTER THREE

METHODOLOGY

3.0 INTRODUCTION

This chapter presents the methodology that was used in the study. It begins with a description of the research design, study population, study sample, sampling procedure, and research instruments for data collection and how they were administered. It proceeds to describe problems encountered during data collection and how information collected was analysed in order to answer the research questions. The last part of the chapter presents a sum ary.

3.1 Research Design

The study used a descriptive research design. This design was chosen because it helped to have an in-depth understanding of factors affecting academic performance of mature age students in Science Education programmes the University of Zambia. In addition, because the study relied more on litative than quantitative research methods, the descriptive design was ideal. The intended use of this design was consistent with that of Kombo and Tromp (2006) who pointed out that, descriptive research design can be used when collectin information about people's attitudes, opinions, habits or any of the variety of e ucation or social issues.

3.2 Study Population

The study population consisted of all mature-age students pursuing the undergraduate degree in Science Education at the University of Zambia. In addition, all lecturers and tutors conducting tutorials to students in the Department of Mathematics and Science Education were part of the study population.

3.3 Study Sample

The sample consisted of 88 respondents as follows: eighty (80) Science Education students at the University of Zambia. A total of four (4) lecturers teaching the students and four (4) tutors that conduct tutorials to students in Science Education programmes were part of the sample.

3.4 Sampling Techniques

Simple random sampling techniques were used to select eighty (80) mature-age students. This procedure was chosen because it provided each element in the population an equal chance to be selected as a study s ple (Cohen et al. 2000).

Purposive sampling procedure was used to select four (4) lecturers and four (4) tutors. The reason for using purposive technique was that these respondents were the only ones with the information needed on factors affecting academic performance of mature-age students pursuing Science Education at the University of Zambia.

3.5 Research Instruments

Two research instruments were used and played a key role in guiding the researcher into choosing a combination of qualitative and quantit research methods that were considered sufficient in addressing the research blem in a satisfactory manner.

These were questionnaires and interview guides.

- **Questionnaires**

Questionnaires were used to collect quantitative data from students, lecturers and tutors. A questionnaire is an instrument that contains questions aimed at obtaining specific information on a variety of topics (Kombo and Tromp,2006). A questionnaire was chosen because it could be presented to each respondent in exactly the same way to minimize the role and influence of the interviewer. In addition, results obtained by a questionnaire could easily be objectively compared.

- **Interview guide**

One way of learning about things we cannot directly observe is by asking people who have or are experiencing such situations to tell us. In this study, a semi-structured interview guide was used to collect in-depth qualitative data from the randomly selected ten (10) students out of the eighty (80) respondents who completed the questionnaire doing Science Education at the University of Zambia. The interview guide was designed to collect information on views of mature-age students on factors that affect their academic perform e in Science Education programmes and measures to address the situation. Thro gh this instrument, the researcher was able to collect useful information by asking questions relating to why and how a given phenomenon occurred. Lecturers and tutors were also interviewed using a semi-structured interview guide.

In this study, it was found necessary to triangulate u ng two different methods of data collection, namely questionnaires and semi-structured interviews in order to ensure validity of the findings.

3.6 Data Collection Procedure

A letter of introduction was obtained from the Directorate of Research and Graduate Studies of the University of Zambia. The letter was pr sented to the Head of Department Mathematics and Science Education in the Sc of Education in order for the researcher to be permitted to carry out the research with mature-age students doing Science Education. The data were collected between the last two weeks of the first semester of the University calendar and the first two weeks of the second semester 2010/11. The selected students were given questionnaires to complete. The questionnaires were self-administered since all the respondents in the sample were literate. The close-ended questions collected quantitative data while open-ended questions collected qualitative information. A total number of eighty eight (88) questionnaires were distributed to students, lectur s and tutors. Interviews were conducted on lecturers, tutors and ten (10) randomly selected mature-age students out of the eighty (80) respondents on appointment by using a semi-structured interview guide. The respondents were interviewed after answering the questionnaires. Although this technique was time consuming, it was eff ctive in that it helped to obtain in-depth descriptive information.

3.7 Data Analysis

The quantitative data was analysed using the Statistical Package for Social Sciences (SPSS version 16) in order to obtain frequencies, graphs and percentages in an accurate, precise, easier and fast way. Qualitative data was grouped into emerging themes and thematic analysis was used. Descriptions of each theme were done.

3.8 Ethical Considerations

The study took into account all possible and potential ethical issues. The measures undertaken to ensure compliance with ethical issues included keeping the identity of respondents confidential. Wimmer and Dominick (1994) identify the principle of confidentiality and respect as the most important ethical issues requiring compliance on the part of the researcher. The basic ethical requirements demand that the researcher respects the rights, values and decisions of respondents. In this study, the values of the respondents were given due respect. uring the research, respondents' responses were neither interfered with nor contested by the researcher. Informed consent was obtained from both th respondents and the people in charge of the places where the research was rried out and all the respondents were treated equally.

3.9 Summary

The chapter has described the methodology used in the study. The study used a descriptive research design. Qualitative and quantitative methods were used to collect data from respondents. Questionnaires were use to collect data from mature-age students, their lecturers and tutors while the interview guide was used to collect in-depth data from the ten (10) students who were randomly selected from the eighty (80) mature-age students. Later interviews were also conducted on lecturers and tutors. The simple random and purposive sampling procedures were used to select the sample. The sample consisted of eighty eight (88) respondents. Thematic analysis was used to analyse qualitative data while SPSS computer programme was used to analyse quantitative data.

CHAPTER FOUR

PRESENTATION OF RESEARCH FINDINGS

4.0 INTRODUCTION

This chapter presents the findings of the study on factors affecting academic performance of mature-age students in Science Education at the University of Zambia. The findings from students pursuing Science Education are prese d first, followed by those from lecturers and tutors. The findings are presented according to study objectives. The specific objectives of the study were to:

1. Determine factors that motivate mature-age students to choose Science Education programmes.

2. Identify factors that affect academic performance of mature-age students in Science Education.

3. Identify measures to mitigate challenges if any, faced by mature-age students in Science Education.

4.1 Factors that motivate mature-age students to choose Science Education Programme

This section presents views of mature-age students pursuing Science Education on factors that motivate them to choose Science Education Programmes at the University of Zambia.

4.1.1 Views of Students

Students pointed out several factors which they viewed to e motivated them to choose Science Education. These are discussed in the subsequent sections.

Sources of motivation to choose Science Education

Findings showed that the eighty (80) students who parti ipated in the study indicated that they were inspired by parents in some cases, their guardians, children, peers, spouses and lecturers. Details are shown in the table below:

Table 1: Views of students on who motivated them to pursue Science Education

Source of motivation	Frequency	Percentage (%)
Lecturers	40	50
Children/Spouses	20	25
Peers	10	12.5
Parents/Guardians	10	12.5
TOTAL	80	100

The lecturers were the highest (50%) in terms of people who inspired the students to pursue Science Education. The reason could be because most of the students had done Diploma programmes in Science Education in Colleges of Education. The students also indicated that they were inspired by their own children and spouses to further their education. Parents and peers were the least of the people who inspired the students to pursue Science Education.

Furthermore, students indicated several other factors that motivated them to choose Science Education programmes. These included; need for self-fulfillment, promotion at their work place, acquisition of knowledge and skills, desire to be a role model to their children and obtaining a qualification to help them compete favourably on the labour market. In addition, respondents indicated that they chose Science Education because they had a passion for it since their high school time.

In an in-depth interview, one female respondent said, *"I have liked science since my primary school years. I used to enjoy the subject especially on issues to do with human beings."* Another male participant narrated, *"I chose Science Education because I performed very well at Grade 12 and I also did well at diploma level in Science."*

The need to achieve their goals was another aspect mentioned by all the respondents. In addition, the respondents indicated that their good performance at Grade 12 and diploma level of education was a motivating factor for them to choose Science Education at the University of Zambia.

4.1.2 Views of Lecturers

Lecturers indicated that mature-age students were motivated to choose Science Education programmes due to intrinsic motivation. Other factors motivating them to choose Science Education were the need for self-fulfillment, acquisition of knowledge, and encouragement from friends and families. In addition, they were motivated to achieve higher in their academic life than school leavers. Alluding to this fact, one lecturer said,

> *Most of the mature-age students who choose Science Education are those interested in teaching Science and intend to further their education by obtaining a university qualification.*

4.1.3 Views of Tutors

Concerning views of tutors on factors that motivate mature-age students to choose Science Education programme at the University of Zambia, the following were expressed. Tutors cited the need to obtain academic qualifications as one of the

motivating factors for mature-age students to choose Science Education. They also felt that in comparison to school leavers mature-age students were highly motivated and hardworking. In a face-to-face interview with one of the male tutors, he pointed out that;

> *Mature-age students are very focused and serious in their studies even though at times they do have family and other problems. The family and other responsibilities contribute highly to their average academic performance.*

The tutors also indicated that mature-age students were motivated to do sciences because of the need to improve their professional skil in teaching and have a qualification for the sake of being promoted at their work places.

4.2 Factors that affect academic performance of mature-age students pursuing Science Education programme

As indicated in the introduction of this chapter, the findings obtained from each of the respondents' categories are presented in separate sections.

4.2.1 Views of Students

The study obtained different views from students on factors that affect their academic performance in Science Education. Asked on how their performance was in science courses in the first semester of 2010 academic year, the students gave the following answers shown in table 2 below.

Table 2: Students' self-rating of academic performance in Science Education semester one of 2010 academic year

Students' self-rating	Frequency	Percentage (%)
Not Very Good	65	81.25
Not Good	8	10
Good	7	8.75
Very Good	0	0
TOTAL	80	100

As shown above, Sixty five students (81.25%), constitutes the majority, rated their performance in Science Education in Semester one of 2010 as being not very good. Eight felt that their performance was not good. Only seven of them were of the view that it was good.

As to whether the educational level of their parents had contributed to how much they were motivated to achieve, students indicated that the educational level of their parents contributed greatly to how much they were motivated to achieve highly in their academic goals. The reason given for their answer was that they wanted to be better than their parents in terms of educational qualifications. In a face-to-face interview, one male respondent said, "I aim at doing much better than my parents because they never achieved much in their time educationally."

Concerning how lecturers motivated them to succeed in cience Education, the students revealed that; lecturers explained concepts clearly, encouraged them to continue working hard even after failing, and that they gave motivational words during lectures. Other views on this issue were that lecturers delivered lessons with detailed information and encouraged them to do research.

On whether the university environment inspired them to achieve their academic goals effectively, 65 (81.25%) of the students indicated that the university environment inspired them to achieve their academic go s effectively and 12 (15%) of them indicated that the university environment did not inspire them to achieve their academic goals effectively. Further, three of them indicated no response. The details are displayed in the following figure:

Figure 2: Views on whether the university environment inspired the students to achieve their academic goals effectively or not

All the 80 students representing a 100% indicated that they felt restless if they did not do any academic work in a particular day and that they always worked hard in order to be among the best. Additionally, in order to perform well, they planned ahead for assignments, tests and examinations in Scien Education.

On whether the curriculum content and workload affecte students' academic performance, 78% of the respondents indicated that it did, while 32% were of the view that the curriculum and workload in Science courses did not affect their academic performance. They further said having a lot to do helped them to cope well in their studies. Those who felt that the curriculum content and workload affected their academic performance negatively said so because they were under too much pressure throughout the semester. The following figure gives more details.

Figure 3: Students' Views on whether curriculum content and work load in science courses affected their academic performance or not

When asked as to whether attendance to lectures, tutorials, laboratories was necessary for good performance, all the respondents (100%) said it was. All of them also expressed fear of being excluded from school if they lagged behind in their attendance. In an in-depth interview one male student narrated that,

> *If a student misses a lecture, laboratory or tutorial on two or more occasions, he or she must be assured of being under pressure. Consequently, it can negatively affect his or her academic performance,*

Furthermore, findings revealed that students were negatively affected by too much content which they had to cover in a short period of time. They indicated that they went through a lot of pressure because the delivery of lectures was done rapidly in a semester. Such a situation caused students to work the whole day by attending to lectures, tutorials, laboratories and writing assignments. They added that as a result, they had little or no time for their own personal study and other non-science courses which were part of their programme. Moreover, findings also showed that students were negatively affected by the way courses were combined.

As one female student said,

> *Science Education should have just consisted of Biology, Physics and Chemistry. Mathematics should have been on its own because it is what makes some students fail in most cases.*

Another female student said that,

> *Where we go to learn Science Education in the School of Natural Sciences, the courses are general and not directly related to education. We learn together with students who will eventually specialize in Engineering, Medicine and other disciplines.*

Additionally, a male student said,

> *I find problems in catching up with what is taught because the lecturers are too fast when presenting the material. The material is also too bulky and wide in scope in most cases. Having left school many years ago, I sometimes lose touch.*

Findings also indicated that the courses had varying l ls of difficulty. The following figure shows the details: 60 (75%) of the students said Physics was most difficult, 12 (15%) of them said Mathematics was very difficult, 5 (6%) of them said Chemistry was difficult and 3 (4%) said Biology was a bit difficult.

Figure 4: Students' views on the level of difficulty of Mathematics and Science

On negative factors affecting students' academic perfo mance, findings showed that there were a number of factors that affected the academic performance of mature-age students in a negative way, as shown in table 3 below:

Table 3: Students multiple responses on possible factors that negatively affected their academic performance in science

Problems students face	**Frequency**
Pressure of work due to overloaded curriculum	80
Few reference books	80
Courses too bulky and wide in scope	78
Lack of accommodation on campus	75
Social commitments	68
Financial constraints	68
Repeating failed courses	65
Poor time management by students	60
Inadequate laboratory facilities	58
Poor understanding of concepts in Science Education	55
Lack of involvement in recreation facilities on campus	45
Negative comments about science from peers in other programmes	37
Clashes on the time-table	30
Most of the practical lessons done especially in Physics are new	28
Inadequate internet facilities	20
Some lecturers dictate notes without explanation	20

The research findings established that students face a number of problems as indicated above as they studied Science Education. These factors impinged heavily on their academic performance in Science Education.

However, there were some positive factors which this study established. The following table shows the factors that were said to positively affect academic performance of mature-age students in Science Education.

Table 4: Positive factors enhancing academic performance

Positive factors enhancing academic performance	Frequency
Group discussions	75
Good delivery of lectures by some lecturers	74
Availability of lecturers for consultations	38
Opportunity to participate in research	40
Huge opportunities for continued learning	25
Family and peer support	78
Lecturers' and tutors' encouragement	60
Positive feedback on work done	50
Availability of health facilities on campus	68
Motivation from others who have succeeded in sciences	35

As shown above, the research findings showed that while students were negatively affected in their academic performance in Science Education by some negative factors as indicated in table 3, there were some factors that affected them positively. These factors enhanced good academic performance.

4.2.2 Views of lecturers

The lecturers indicated that there was a mismatch between what is taught in high schools and what is learnt at university level. This sparity causes the mature-age students to be under a lot of pressure and as a result, end up performing poorly in these programmes because some of these students have been away from school for many years. The lecturers further said that the materi to be covered in one semester was too much for a student with other life pr blems such as lack of finances to pay for tuitions, home and work related problems.

To this effect one lecturer commented,

> *It is not easy for mature-age students to perform exceptionally well because of having been away from school for some time. In fact, diploma holders are compelled to redo courses they covered at diploma level. It would be better if they were exempted from some courses so that they begin in 3rd year like other programmes.*

On whether prior academic performance in high school or at diploma level contributed to high performance in Science Education, lecturers had different views. Two (2) lecturers who agreed that high school and diploma academic performance contributed to high academic performance at university revealed that the University of Zambia requires that applicants seeking a degree in Science E ucation should have a merit (four (4)) or better in Mathematics and Sciences at Ordinary level of education. One (1) of the lecturers who disagreed stated that some high fliers at high school or at diploma level performed poorly at University of Zambia. The other lecturer indicated that he was not sure whether high school or diploma academic performance contributed to good academic performance a university level.

Lecturers also indicated that some mature-age students were failing to perform better than the school leavers despite having vast exp rience in the sciences because of over dependence on their past experience of teaching similar subjects. Other cited factors affecting such students' academic performance negatively included: inadequate laboratory facilities, too many courses offered especially at second year where five courses were taken, lack of appropriate and latest reference textbooks in the library, pressure of work due to short period of time alloc d, lack of concentration on study towards the end of the semester and a tendency to over-engage in social activities at the expense of study.

4.2.3 Views of tutors

All the four (4) tutors who participated in the study were of the view that the 2010 semester one result were of average standard. They indicated that the academic performance of mature-age students was not superior to that of school leavers. Mature-age students were managing to perform well in the courses and not necessarily being among the best especially in courses taken from School of Natural Science which did not relate directly to what was needed in a classroom situation at their work places.

The tutors further revealed that the curriculum content and workload given was a contributing factor to their average academic performa ce. Since most mature-age students were serving teachers, it was expected that t y would perform better than the school leavers but that was not the case. Some of the factors mentioned by tutors as being responsible for low academic performance were; over confidence that they have taught similar material for many years their career, lack of adequate reference materials in the university library, poor study habits, lack of consultation from the teaching staff, social and financial problems among others.

In regard to the level of difficulty of the courses st died in Science Education Programmes, the tutors indicated that Mathematics was the most difficult followed by Physics. Tutors pointed out that some mature-age student were finding challenges in the courses such as M111: Introduction to statistical methods in mathematics and P111: Introduction to Physics, offered to them in the School of Natural Sciences at first year as compared to those courses from School of Education such as EAP111:

The development and history of education and MSE (Mathematics and Science Education) courses in teaching methods.

On the positive factors, the tutors cited group discussions as being very cardinal in the whole process of learning because team work provided the necessary encouragement and support for all students regardless heir age and status. Other positive factors enhancing academic performance were t mentorship from lecturers and tutors in laboratories and other science activities such as quizzes and tests. To this effect one male tutor noted, *"Group discussions really play a cardinal role in preparing students for examinations and tests."*

4.3. Measures to address challenges faced by mature-age students in Science Education

As indicated in the introduction of this chapter, the findings obtained fr each of the respondents' category are presented in separate sections.

4.3.1 Views of students

As regards ways in which the challenges faced by students can be addressed, students suggested that the university should draw a specific programme to cater for mature-age and other students studying Mathematics and Scienc Education. The other measures suggested were that some topics such as those which were too bulky and wide in scope should be reviewed in order for students to concentrate with moderate pressure in any given semester.

As one male respondent in a face-to-face interview stated:

> *The bulkiness of the courses poses a great challenge to most students. You find even very intelligent stude s failing some courses due to having a lot to study and and comprehend in a short specified time.*

Students further suggested the following measures: providing adequate latest reference books and journals in science, providing introductory lectures to laboratories, improved internet facilities, more hostels to accommodate more students, encouragement to students to work in groups and study consistently, specialisation only in either of the courses in Science Education or Mathematics, providing the necessary equipment, materials and chemicals for practical lessons.

To this effect one male student narrated:

> *It would be better if students specialized in Science Education. Mathematics should be specialised on its own. A single major would help solve some difficulties encountered in the process of learning all the four subject areas.*

The respondents also indicated that the lecturers were too fast as they delivered their lessons in order to complete the course. To this effect, they proposed that the curriculum should be reviewed to reduce on the amount of work to be covered in a semester. Of all the responses, the issue of reducing on the workload was very prominent by all the eighty (80) respondents.

4.3.2 Views of lecturers

Lecturers suggested several measures to address challe ges faced by mature-age students in Science Education. These included; devising a programme specifically for in-service mature-age students with diplomas to join the University of Zambia Science Education degree programme at third year. By so doing, it would reduce the work load given to students in terms of content because mature-age students already had some content done at diploma level. One lecturer gave his narration of the situation,

It is surprising at times when you observe these teachers during peer teaching to note that they have the gist of Mathematics and Science subjects at their finger tips but some of them have failed to pass some courses. When observing them teach, I even stop writing and think to myself, why are we troubling these students with so much content when they have so much teaching methodology.

Further, the lecturers stated that, if students were to specialize in only one course other than the four (Biology, Mathematics, Chemistry and Physics) taken currently at once would be a step in the right direction. In addit ecturers suggested that the necessary equipment, materials and chemicals should be made available in order to enable lecturers and students conduct practical lessons effectively more often, providing adequate computers and internet facilities, stocking the university library with latest reference materials and encouraging students to have a positive attitude towards Science Education.

For instance, one lecturer said that,

Some students fear the Mathematics and Science Education due to high failure rate, or withdrawal and repeating of courses. The solution to this problem lies in the introduction of a programme fully dedicated to science teachers unlike the current situation where students learn in general with students in other disciplines in the School of Natural Sciences.

The lecturers also indicated that regular review of the curriculum would be a s ep in the right direction for Science Education. They further noted that improving student study habits would help them overcome their academic challenges.

4.3.3 Views of tutors

Tutors suggested the following measures to address the challenges mature-age students face as they study Science Education: improving the lecturer-student ratio, procure latest reference materials, provide the necessary equipment and materials

adequately, reduce on the curriculum content and workload given to students and improve the methodology of lesson delivery to the students. Tutors further suggested that it would be necessary for the University of Zambia management to recruit more lecturers as there was a serious shortfall thereby overstretching the few available. Tutors also reiterated on the need for students to specialize in one of the science courses.

To this effect one male tutor said;

> *If students start to specialize in science courses of their choice from first year their performance would greatly improve. We would have few cases of failures, withdrawals or repeating of courses.*

CHAPTER FIVE
DISCUSSION OF RESEARCH FINDINGS

5.0 INTRODUCTION

This chapter discusses the findings of the study in line with objectives which were; to establish factors that motivate mature-age students to choose Science Education, to establish factors that affect academic performance of ure-age students pursuing Science Education and to determine measures to address challenges faced by mature-age students in Science Education.

5.1 Factors that motivate mature-age students to choose Science Education Programmes

The first objective of the study endeavoured to find o what motivates mature-age students to choose Science Education Programmes at the University of Zambia. Among some of the notable motivating factors indicated were; need for self-fulfillment, desire to be promoted at their work places, desire for acquisition of knowledge and skills, desire to be a role model to their own children and to acquire a qualification in order to compete favourably on the la our market.

With regards to the need to help the young ones and society at large, students stated that they were interested in the improvement of heir community and mankind. This view is consistent with that of Kantanis and West et al. (2000) who reported that perhaps one of the strongest indicators for student ch of a study programme is the level of social support he/she has from family, friends and peers. This may consequently lead to the student working hard academically in order to contribute effectively to society with their knowledge in Science Education. In this case the love

for the sciences in itself is a motivating factor. Students saw the opportunity of being at university as a real career opportunity and were confident of their ability to succeed.

An analysis of these findings show that the university environment played a major role in motivating students to achieve their academic goals effectively as 81.25% of the respondents indicated that the university environment inspired hem to achieve their goals, while 15% of them indicated that the university environment did not inspire them to achieve their academic goals. As rightly pointed out by Bligh and Sass (1971 and 1989), there is no single magical factor for motivating stude s to choose a course of study. Many factors affect a given student's motivation to choose a programme and learn. These factors include t environment of the institution itself among others. The environment includes such facilities as lecture halls, recreation facilities, equipment and materials to aid learning. According to the students, the University of Zambia's environment inspired them to achieve their academic goals because they felt that necessary facilities were available although inadequate due to the high enrolment levels.

In a face-to-face interview, one student indicated that he chose Sc ence Education because his performance at grade 12 and diploma level was very good. Success in science subjects at the two levels mentioned motivated most f the students to choose science related programmes and as such these preparatory courses in the sciences had a positive influence on their decision to study at university. In addition, the good performance at lower levels of education acts as pre-requisite knowledge in higher learning.

This view is consistent with McClelland and Kruger (1993) who noted that pre-requisite knowledge is relevant for good academic performance in the sciences. For instance, success in science subjects has been found to be better predicted than in the Humanities by the Scholastic Aptitude Test (SAT). This means that a student is likely to perform well in most cases if they have prior knowledge in a particular course of study than if they did not.

However, divergent views from some lecturers indicated that pre-university academic performance was not a strong predictor of university academic performance. Even though some of the students were motivated to choose S ce Education basing on their academic performance at high school or diploma level, some of them proved to perform poorly due to the differences between pre-university and university study environments. Lecturers noted that it was possible to find a student who performed very well in high school or at diploma level performing poorly at university in the same subject area. This view is in congruence with McKenzie and Gow (2004) who suggested that pre-university performance is not a strong predictor of university academic performance.

Tutors cited hard work and desire to achieve highly as characteristic of mature-age students. This indicates clearly that the students ar motivated to achieve highly. In fact 100% of the respondents said they felt restless if they had not done any academic work in a particular day. Additionally, they always worked hard to be among the best in their courses, and also planned ahea r assignments, tests and examinations in Science Education. It is important to note that lecturers ought to set an appropriate level of stress. Most students learn best under low to moderate

stress; if the stress is too high, it becomes a barrie to learning. This implies that there must be a certain degree of difficulty in the courses which students pursue in order for them to succeed. This level of difficulty should be set high enough to challenge the students but not so high that they become frustrated. This strategy should predict and reward participation, culminating in high motivation and academic success. These findings are in agreement with West et al. (1986) who found that th level of student satisfaction with the teaching and learning activities provided by the institution predict academic success and persistence.

5.2 Factors that affect academic performance of mature-age students pursuing Science Education

This section begins with factors that negatively affected mature-age students in Science Education programmes and ends with factors tha positively affected their academic performance at the University of Zambia. The majority of the students 65 (81.25%) indicated that they were not happy with their results as they were not very good, 7 (8.75%) of them indicated that their results were good and 8 (10%) of them indicated that their results were not good. The findings clearly show that most of the students 81.25% performed averagely. This performance was attributed to many factors. Among others were; that they struggled with the pace at which the material in the undergraduate science subjects was presented and the degree of difficulty of the science subjects. Poor attendance to lectures, tutorials and laboratories also negatively contributed to their poor performance. Stress and lack of understanding of new and advanced concepts were cited. Therefore, lecturers must understand how mature-age students can learn best compared to school leavers. The best way to motivate mature-age students is simply to enhance their reasons for en ling and

decrease what hinders their academic progress. Similarly, Tinto (1993) and West et al. (1986) found out that academic integration and out-of class contact with the teaching staff to be a significant predictor of academic success.

As regards to which subjects students found difficult, the students were asked to rank the level of difficulty of mathematics and science subjects in the Science Education Programme. They ranked Physics (75%) to be he most difficult, Mathematics (15%) very difficult, Chemistry (6.25%) difficult and Biology (3.75%) a bit difficult. From these findings it is clear that Physics and Mathematics pose a big challenge to the students. The reasons advanced as to why Physics was the most difficult subject for most students was that it is supposed to be understood at three levels namely: the law, concepts and a combination of the law and concepts to olve a practical mathematical problem. In other words Physics requires a lot of mathematical involvement and understanding.

Mathematics was difficult for mature-age students because at leaving high school and college, they did Ordinary level mathematics ("O" level) but when they come to university, they do Advanced level mathematics ("A" level). To this effect, lecturers must use a variety of methods that stress on student a tive participation in the learning process through practical lessons to go with the theories if students are to perform well in Physics and Mathematics. As rightly noted by Lucas (1990), students learn by doing, making, writing, designing, c eating and solving. Therefore, active involvement in the learning process is a key element to academic success. This can be achieved by providing adequate modern equi nt to support this effective way of learning.

Findings from lecturers and tutors showed that the aca mic results for mature-age students for 2010 semester one were good. There were mixed responses on the question that required the lecturers and tutors to indicate which category of students performed better than the other. The lecturers indica ed that mature-age students performed better than school leavers.

An analysis of these findings makes it clear that the demic performance of mature-age students and school leavers is varied. The difference in their academic performance depends on a number of factors. To this effect, as rightly put by Sass (1989) students motivation to learn and their good academic performance depends on lecturers' and tutors' enthusiasm, relevance of the material, organization of the course, appropriate content of the material, active involvement of students, variety of methods used in teaching, rapport between the lecturers and students, appropriate use of concrete and understandable examples.

Furthermore, the findings showed that curriculum conte d workload given to the students negatively affected their academic performance. Most of the resp ndents representing 78% indicated that the curriculum content and workload in science courses adversely affected their academic performance while 32% were of he view that the curriculum content and workload in science courses did not affect their academic performance. As rightly put by Tinto (1993) curriculum content is another issue that affects academic performance of students positively and negatively at tertiary level in Science Education. Tinto found that students struggled with the pace at which the material in the undergraduate science subjects was presented.

In addition, the way the examinations were set also po ed pressure on the students especially if their Continuous Assessment was not impressive during the semester. Financial constraints due to being on self sponsorship and other commitments away from university, inadequate internet facilities, pressure of work due to overloaded curriculum content, lack of reference materials, inadequate laboratory facilities, overcrowded lecture rooms and inappropriate methodology of delivering lectures among others also negatively affected academic performance of mature-age students.

An analysis of these findings show that negative factors affect the way students perform in Science Education and from these findings i an be noted that when this happens students feel discouraged and only aim at “clearing” the courses and not really being at the top. Clearing is a term used by University of Zambia students to mean passing the courses averagely with the aim of not failing. As rightly observed by McMillan and Forsyth (1991) that students learn best when incentives for learning in a classroom satisfy their own motives for enrolling in a course. Satisfying such needs is rewarding in itself, and such rewards sustain learning more effectively than do grades. Students value passing the courses than having good grades for the sole purpose of obtaining a degree in Science Education.

Consistent with this view, Furlong et al. (2003) noted that lecturers could improve the academic performance of students by fostering teamwork in their methods of lecture delivery. This can be achieved through a supportive st dent-lecturer relationship, mutual respect between students and themselves. Instead of the laboratory technicians doing the practical lessons with the students most of the times, lecturers

could do well to involve themselves in practical lesso s at the application stage of the theory they teach. This could help students improve on their grades.

To this effect, lecturers would do well to adopt a coo rative pedagogic approach in which learning should be viewed as a shared activity between all the learners and the lecturers. On the institutional environment, as rightly put by Mathibeli et al. (1996) in a study in Lesotho high schools and universities, institutional commitment is a factor that influences academic performance. For instance, lack of adequate maintenance and repair of school facilities, of school requisites and other basics like water and electricity negatively affected the academic performance of students. An improvement to the institutional environment may improve the quality of grades students obtain in their courses and the amount of pressure they have to go through as they study the sciences.

Concerning the combination of courses, findings show t most of the students were of the view that Mathematics be studied on its ow as a major while sciences (Biology, Chemistry, Physics) be studied individually as independent majors and not a combination of all of them. The reasons given by some of the students were that at diploma level their area of specialization was Science Education. Mathematics was done to help understand mathematical concepts in Physics and Chemistry. Therefore, when at university they expected to learn M thematics to be applied in the two subject areas and not general "A" level Mathematics. They noted that this arrangement contributed to the academic stress they went through in the process of learning new and difficult concepts.

As one lecturer noted, mature-age students were highly motivated and hard working but were negatively affected by too much content to cover in a semester. Compounding the problem was the fact that some of them left school many years ago. The implication of these findings is that lecturers must ensure that the level of students' motivation is maintained by giving them course materials that suit their needs. This view is consistent with that of Erickson (1978: 3) who reported that,

> *Effective learning in the classroom depends on teacher's ability to maintain the interest that brought the students to the course in the first place.*

Therefore, if the levels of motivation are maintained by what goes on in the teaching and learning process the performance of students will ly be improved regardless of how challenging the courses are.

Concerning the positive factors that affect academic performance of mature-age students, the following were highlighted; group discussions, con ultations with lecturers, participation in research, families and peer support, lectures' and tutors' encouragement, positive feedback on work done, good health and motivation from other students who have succeeded in the sciences. These positive factors appeared to inspire the mature-age students in Science Education to keep on working hard even though they encountered other problems distracting their concentration such as financial constraints arising from paying tuition fees for themselves and other problems which may arise from their families.

As regards the academic achievement of mature-age students and school leavers, the lecturers and tutors indicated that mature-age students were performing averagely in the sciences. In contrast to a study by ll et al. (2001) in United

States of America who found out that mature-age students are thought to be highly motivated to succeed due to greater maturity and better study habits, the academic differences in non-science programmes have been attributed to attitudinal variations between mature-age students and school leaver students.

However, in the sciences the picture shows that the average academic performance by mature-age students is due to over dependence on their past experience in teaching and failing to apply the skills obtained in the university. Perhaps in the sciences, it is difficult to apply those skills because science topics are especially rich in content and contact hours are often much higher than in non-science topics. As rightly put by Abbott Chapman et al. (1992) the academic orientation and motivation of students has been found to be a significant predict of good academic performance.

Therefore, being older students with a lot of life's problems to attend to, the students' academic performance may be affected negatively in a number of ways. The implication of the findings of this study is that, educators, policy makers and interested stakeholders in Science Education should look for ways to overcome whatever barriers are preventing most of the mature-age students to enroll in the sciences and if enrolled the barriers that are prevent ng them from succeeding in the sciences.

5.3 Measures to address challenges faced by mature-age students in Science Education

The study found that a good number of measures could be utilized in order to mitigate the challenges mature-age students face as they study the sciences. These

included; reducing on the topics offered to the students so that they could have enough time to study, providing latest journals and reference textbooks in science, providing introductory lectures in laboratories, improving access to internet facilities, letting students specialize in one of the science courses and mathematics be a separate major. In addition, there was need to provide necessary equipment, materials, and chemicals for practical lessons in an effective manner.

On the issue of reducing the curriculum content and work load, 100% of the students said it would help reduce on the amount of stress that they went through as they studied the courses. Some lecturers also suggested that it would be better to exempt mature-age students with diplomas from some courses so that they begin their degree programme in third year like other programmes in the university. The lecturers also stressed the need for students to have positive attitude towards Science Education in order to succeed.

Findings also revealed that reviewing the curriculum would be a step in the right direction for Science Education. Curriculum review is very necessary in the Science Education Programme at the University of Zambia. It is a well known fact that curriculum review is costly, time consuming, require long term revision, demands trial testing in the field and evaluation by a highly talented and motivated team but is necessary. The implication of this finding is that the university must review the Science Education curriculum to suit both mature-age students and school leavers training to be teachers of science.

Tutors also suggested a number of measures such as imp oving the lecturer-student ratio and the methodology of lesson delivery to the students by considering students as active participants in the whole learning process. The tutors further suggested that it would be necessary for management to recruit more lecturers as there was a serious shortfall of lecturers which overstretched the few available. Similar views were reported by Pascarera and Terenzini (1983) who also recommended that providing enough teaching staff enhanced success in ac demic performance. Educators are in a better position to make changes to t e teaching and learning environments if they have few students to attend to so that future students can achieve success in their academic performance in Science Education Programmes. If lecturers are many it would be possible to attend t students in smaller groups. In the final analysis students could be treated as individuals at certain times and not just collectively as a group of students in lecture halls.

The study findings were also in conformity with Maslow's Hierarchy of Needs. This is with regards to an individual's desire to self-actualize in whatever they do. Basic needs must be met in a positive way before an individual moves to the next evel of the hierarchy of needs. If the needs are met with negativity the perso is discouraged and may not continue to move forward in fu filling all the needs required for him/her to realize his/her full potential. Therefore, students need the hierarchy of needs to be positively met if they are to achieve highly in the science courses. The established that there is a close link between motivation and academic performance because it is 'motivation' that drives an individual into action.

All in all, most students respond positively to a well organized co rse taught by an enthusiastic lecturer who has interest in students and what they learn. To this effect, activities that lecturers undertake to promote learning also enhance students' motivation and academic performance. According to the need theory which guided this study, all human beings are motivated to act in a particular y because of the fulfillment of their needs at different stages in the hierarchy of needs. Therefore, a positive fulfillment entails a positive movement to the next level until one is self-actualised to realize his/her full potential.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

This chapter presents the conclusion and recommendations emanating from the findings and discussion of the study. The objectives the study were to establish factors that motivate mature-age students to choose Science Education Programmes, establish factors that affect academic per ormance of mature-age students in Science Education programmes and suggest measures to mitigate the challenges.

6.1 CONCLUSION

The study concentrated on mature-age students with the intention of underscoring their motivation to enroll in Science Education, identifying negative and positive factors affecting their academic performance in Science Education and suggesting measures to be taken to mitigate the challenges they face, if any, as they study Science Education. The findings of the study indicate that although the factors motivating mature-age students were similar to those of school leavers, re were some notable differences in what motivates mature-age students which included the need to be promoted at their work places, desire to be role models to their own children, to improve their knowledge and skills, prestige and to help society at large with their skills. It was clear from the findings and discussions of the study that motivation was a key component in enhancing academic performance of mature-age students in Science Education.

The study found out that students were motivated to ac their academic goals because of the conducive learning environment availed to them by the university, lecturers and tutors. As pointed out by Bligh and Sass (1971 and 1989), there is no single factor for motivating students to choose a course of study. There are many factors affecting a given students 'motivation to choo a programme and learn. In some students good academic performance at high school of diploma level of education motivated them to pursue university education in Science Education.

In terms of factors that negatively affected academic performance of mature-age students in Science Education, these were cited: financial constraints and other commitments, inadequate internet facilities, pressure of work due to bulky courses, lack of latest reference materials, inadequate laboratory facilities, overcrowded lecture rooms and inappropriate methodology of delivering lectures among others. The overloaded curriculum content and combination of Science Education courses with Mathematics in general was another aspect that negatively affected the academic performance of mature-age students in Science Education.

The study has also clearly shown that there are some positive factors enhancing academic performance of mature-age students in Science Education. These include: students' group discussions, participation in research, families and peer support, lecturers' and tutors' encouragement, positive feedback on work done and motivation from other students who have succeeded in the sciences. It was clear from the sentiments of the respondents that the above stated factors were enhancing good academic performance in Science Education.

In order to mitigate the challenges that mature-age students faced, the following measures were suggested; reducing on the bulkiness of topics offered to students so that enough time is dedicated to personal study, improving access to the internet facilities, letting students specialize in one of these courses: Biology, Chemistry, Physics or Mathematics separately. In addition, the study suggested provision of adequate materials, chemicals for practical lessons and reviewing the Science Education curriculum in order to suit the needs of the students training to be teachers of science.

6.2 RECOMMENDATIONS

Based on the study findings, the following recommendations are made:

- In order to improve academic performance of mature-age students in Mathematics and Science Education, bridging courses may be emphasized in order to help students achieve easier comprehension of conceptual knowledge in the targeted courses. For instance, in Physics and Chemistry only applied mathematics may be taught as bridging courses and not all the detailed "A" level mathematics.

- As the demand for well trained science teachers increa s and in view of the fact that mature-age students enrolling in science courses is low, it is essential that new and innovative methods of teaching are developed in or r to retain this highly motivated and capable group.

- The university management should consider recruiting more lecturers in Science Education to reduce the lecturer-student ratio.

- The Department of Mathematics and Science Education through the School of Education should review the current Science Education curriculum so that what is offered at University of Zambia is directly linked to what is taught in schools.

In order to encourage students to become self-motivated independent learners, lecturers can do the following:

- Give frequent, early positive feedback that supports students' beliefs that they can do well.
- Ensure opportunities for students' success by assignin tasks that are neither too easy nor too difficult.
- Help students feel that they are valued members of a learning community.

6.3 SUGGESTION FOR FUTURE RESEARCH

- The study has established that there are a number of factors that affect academic performance of mature-age students in Science Education at UNZA, therefore, it would be interesting for future studies to compare factors affecting academic performance in Science Education with students in other universities in Zambia.
- It would be interesting also to carry out a comparative study of school leavers and mature-age students in science programmes and non-science programmes in terms of academic performance and completion levels in order

to prove further the differences in academic performance and completion levels between the two cohorts of students and programmes for the purpose of finding ways of addressing the problems.

- This study can be replicated in Secondary Colleges of Education to establish whether factors that affect academic performance of mature-age students in universities are the same as those in Secondary Colleges of Education.

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APPENDICES

APPENDIX 1: QUESTIONNAIRE FOR STUDENTS

Introduction,

This questionnaire is intended to collect information on the topic: "**Factors Affecting Academic Performance of Mature-age Students Pursuing Science Education"**. The study is purely academic, hence your confidentiali is guaranteed. Answer the questions as honestly as possible to help us come up with a true reflection on this topic.

INSTRUCTIONS: Answer all questions by ticking your options and fil g in the blank spaces provided.

SECTION A: BIO DATA

1. What is your gender: Male [ ] Female [ ]
2. What is your marital status: 1 Single [ ] 2 Married [ ] 3 Divorced [ ] 4 Widowed [ ] 5 Separated [ ]
3. What is your Age? 18-20 years [ ] 21-25 years [ ] 26-30 years [ ] 31-35 years [ ] 36-40 years [ ] 41-45 years [ ] 46-50 years [ ] 51 years and above [ ]
4. For how long have you been working? 0-5years [ ] 6-10years [ ] 11-20years [ ] above 21years [ ]
5. What was entry status at UNZA? 1 Mature-age student [ ] 2 School leaver [ ]

SECTION B: SUBSTANTIVE DATA

(I): Questions related to students' motivation.

6. Who inspires you to work hard and achieve your acade goals?

(1) parents/guardians, [ ] (2) your children, [ ] (3) siblings: [ ]

(4) Lecturers and tutors [ ] (5) universit environment? [ ]

(6) Others (specify)..... .....

7. Do you think the educational level of your parents/g rdians contributes to how much you are motivated to achieve academic goals? 1 YES **[ ] 2 NO [ ]**

8. Provide reasons to your answer in Q7 above.....

.....

.....

9. How do lecturers and tutors encourage you to succeed in your Science programme?..... .....

.....

.....

.....

10. Does the university environment inspire you to achieve your goals in Science Education? 1 Yes [ ] 2 No [ ]

11. Give reasons to your answer in Q10 above.....

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12. Do you get restless when you feel you have not done ell in your assignments and tests? 1 Yes [ ] 2 No [ ]

13. If your response to Question 12 above is YES, provide reasons…….....

……

.....

.....

14. Have you always worked hard in order to be among the best in your course?

1 Yes [ ] 2 No [ ]

15. Provide reasons to your answer in Q14 above.……....

……

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.....

16. Do you tend to plan ahead for your assignments, tests and examinations?

1 Yes [ ] 2 No [ ] 3 Not sure [ ]

17. Will a day often go by without doing your coursewor 1 Yes [ ] 2 No [ ]

18. If your response is to Q 17 above is NO, provide reasons

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....

(II): Questions related to factors affecting academic performance.

19. How was your academic performance in science last semester? Choose from the grades below: Biology.....Chemistry.....P ysics.....Mathematics.....

1 A+ [ ] 2 A [ ] 3 B+ [ ] 4 B [ ] 5 C+ [ ] 6 C [ ] 7 D+ [ ]

20. How do you consider the performance you have indicated in Question 19 above?

1 Very good [ ] 2 Good [ ] 3 Not very good [ ] 4 Not good [ ]

21. Does the curriculum and work load in science courses affect your performance?

1Yes [ ] 2 No [ ]

22. Give reasons to your answer in Q 21.....

.....

23. Is attendance to lectures, laboratories and tutorial necessary for good performance? 1 Yes [ ] 2 No [ ]

24. Give reasons for your answer in Q23.....

....

25. Does High School performance contribute to academic erformance in science at university level? 1 Yes [ ] 2 No [ ]

26. Provide reasons for your answer in Q 25.....

.....

27. Among the courses taken in Science Education, Mathematics, Biolo , Chemistry and Physics, which course is more difficulty and demanding?

Indicate according to level of difficulty 1..... .....2.....

3.....4.....

28. What factors positively affect your academic performance in science?.....

……..

....

29. What factors negatively affect your academic perform n science?.....

……..

.....

30. Suggest measures to address the negative factors that affect your academic performance in science.…….....

……

……..

THANK YOU VERY MUCH FOR YOUR TIME

APPENDIX 2: QUESTIONNAIRE FOR LECTURERS AND TUTORS

Kindly rate the achievement motivation and academic performance of your students in Science Education by ticking in the appropriate boxes and filling in the appropriate answers on factors affecting academic performance and measures to address the factors.

SECTION A: BIO DATA

Q1. What is your gender? Male [ ] Female [ ]

Q2. What is your appointment at UNZA? Lecturer [ ] T r [ ]

SECTION B: Questions related to motivation and academic performance in science

Q3. How do you rate the performance your students in Science?

Excellent [ ] Very Good [ ] Good [ ] Average [ ] Poor [ ] Very Poor [ ]
Extremely Poor [ ]

Q4. How was the performance of your students in Science n the last semester?

Excellent [ ] Very Good [ ] Good [ ] Average [ ] Poor [ ] Very Poor [ ]
Extremely Poor [ ]

Q5. Which category of students performs better than the ot er?

Mature-age students [ ] School leavers [ ]
Both mature-age students and school leavers [ ]

Q6. Which category of students is highly motivated to achi ve higher than the other?

Mature-age students [ ] School leavers [ ]
Both mature-age students and school leavers [ ]

Q7. How would you rate the performance of mature-age students in Science?

Excellent [ ] Very Good [ ] Good [ ].Average [ ] or [ ] Very Poor [ ]
Extremely Poor [ ]

Q8. How would you rate the performance of school leavers Science? Excellent [ ] Very Good [ ] Good [ ] Average [ ] Poor [ ] Very Poor [ ] Extremely Poor [ ]

Q9. Does the curriculum and work load in Science Education affect academic performance of students? 1 Yes [ ] 2No [ ]

Q10.Give reasons for your answer **Q9**.....
.....
.....
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.....

Q11. Does High School performance predict academic performance in Science Education at university level? 1 Yes [ ] 2 No [ ]

Q12. Give reasons for your answer in **Q11**.....
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Q13. What are some of the factors that affect student academic performance in Science Education?.....
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Q14. How can these factors you have mentioned in **Q13** above be addressed?.....
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THANK YOU VERY MUCH FOR YOUR TIME

APPENDIX 3: INTERVIEW GUIDE FOR STUDENTS

Interview Guide for Students on Factors Affecting Academic Performance of mature-age students in Science Education at the University of Zambia.

1. Are you happy to be at the University of Zambia (UNZA)?

2. What motivated you to choose Science Education?

3. Which people inspire you to achieve your academic goals?

4. Are there any special reasons why you want to have a d gree in Science Education?

5. What factors positively affect your academic performan e in Science Education courses?

6. What factors negatively affect your academic performance in Science Education courses?

7. What other problems do you face as you study at UNZA?

8. Suggest measures to address the challenges that you face as you study Science Education at UNZA.

Thank you for participating in this study.

APPENDIX 4: INTERVIEW GUIDE FOR LECTURERS

Interview Guide for Lecturers on Factors Affecting Aca c Performance of mature-age students in Science Education at the University of Zambia.

1. How do you look at the enrolment levels of mature-age students in Science Education? Is it increasing or not? What are the reasons attributed to your answer?

2. What do you think motivates mature-age students to choose Science Education?

3. How do the mature-age students perform in Science Education as compared o School leavers?

4. What are some of the factors that affect the academic performance of mature-age students in Science Education?

5. Suggest measures to address the challenges mature-age students face as they study Science Education.

Thank you for participating in the study.

APPENDIX 5: INTERVIEW GUIDE FOR TUTORS

Interview Guide for Tutors on Factors Affecting Academ Performance of mature-age students in Science Education at University of Zambia.

1. How would you rate the academic performance of mature-age students in Science Education at UNZA?

2. Does the workload and course content affect how the st dents perform in Science courses?

3. Is attendance to all the learning schedules; lectures, tutorials and laboratories necessary for good academic performance?

4. What challenges do mature-age students face as they study Science Education at UNZA?

5. Suggest measures to address the challenges that affect the academic performance of mature-age students in Science Education.

Thank you for participating in the study.