IMPACT OF A LEARNING STYLE ON STUDENT

ACADEMIC PERFORMANCE

Abstract

The domain of education is marked by debates about the declining quality of education, which most policymakers believe is subject to the inability of most institutions to actualise educational development aspirations. Therefore, educational institutions are striving to employ effective teaching processes and learning styles. The purpose of this research is to investigate the impact of learning styles on students' academic performance at Financial Training & Management Services (FTMS) College in Malaysia. The study employed a pragmatic paradigm and a mixed methods research design. A combination of archival research and a case study strategy was adopted. The research employed a customized questionnaire, based on Barsch's Learning Style Inventory (BLSI). The sample of 327 students was used in this research. The research results showed that there is a positive and strong correlation between learning styles and academic learning. It was also observed that sequential learning had a better effect on academic performance (.320) than visual (.213), verbal (.164) and active learning (.130). This research provides valuable knowledge to educators and academic institutions that are planning to adopt a combination of learning styles to teach their students effectively. Further research should focus on a larger sample size and the utilization of the interviews to improve the data credibility and acceptability of the future research findings. It could be conducted either in Malaysia or in other countries.

Keywords: learning styles, active learning, verbal learning, visual learning, sequential learning, academic performance

List of Figures

List of Tables

Table of Contents

1 Introduction

1.1 Background

The world is largely enthralled by talks concerning the falling quality of education, which most policymakers believe is caused by the inability of most institutions to actualize educational development aspirations (Komarraju et al. 2011). The utilization of conventional lecture methods to deliver lessons by instructors is gradually overshadowing the other teaching methods such as discovery, discussion and project among others. The persistent use of lecture teaching methods has largely hindered effective teaching and learning processes because it prevents students from identifying their learning styles as well as applying them while learning. Students, who are taught with appropriate methods, tend to learn better and show high tendency of improving their academic performance.

Every year, the American government spends a huge sum of financial resources on improvement of quality of education (Vermunt 2005). It is a considerably expensive to invest in the future of students hence the need to fight for better performance in eventuality. A lot of emphasis has put on values and curriculum of education to make learners achieve the needs of the corporate world. Learning and teaching is the foundation of all advancements in all levels of education namely; primary, secondary, college and university levels (Komarraju et al. 2011). Each level of education presents a new level of difficulty and challenge that students are expected to bear. The taxonomy of educational objectives categorizes learning into three groups; affective, cognitive and psychomotor. Competency-based learning is the major objective of education. Student potential is largely dependent on their learning preference. Presumably, learning style can be described as the preference of a learning method over the other to process new information including strategies, which are consistently used by teachers (Dunn et al. 2009).

Through the identification of a dominant learning style, students can potentiate their capabilities and strengths, as well as enhance effectiveness in their learning experience.

The cognitive domain stated in educational settings assist students to implement and understand the issues that they need to learn in their classroom objectives (Vermunt 2005; Homayoni & Abdolahi 2003). The structure of educational taxonomy consists of knowledge, comprehension, application, analysis, synthesis, as well as evaluation. Some scholars revised the structure and came up with a four-knowledge dimensional taxonomy that includes; factual knowledge, procedural knowledge, conceptual knowledge and meta-cognitive knowledge (Demirbas & Demirkan 2007). All educators need to give students several skills and instructors to facilitate their learning abilities through various teaching methods. However, instructors cannot just assume that students will comfortably understand the content when they only sit in classes and follow the provided instructions (Yeung, Read, & Schmid 2012). It is vital to create an environment where there is high level of awareness between teachers, students and learning materials.

Students' learning is mostly taken for granted by most people in the society. Learners are perceived to be academically capable of grasping content from the lessons and assignments that they are given. Quite a number of the students pass; however, those who fail turn the blame to the academic standards as well as teaching methods (Vermunt 2005). Minimal consideration is provided to the ways through which the students learn as well as the learning styles that are employed in this process. Ideally, the teaching methodology of teachers should match the students learning ways and how they prefer to learn. Instructors should adapt their teaching strategies to suit the ways by means of which students learn and the styles of learning that they prefer to apply.

Elements of the learning styles have been under research since 1892. However, the term "learning styles" was first expressed by Thelen, who discovered group dynamics at work (Chamorro-Premuzi, & Furnham 2008). The scholar described the term as a tendency to adopt a specific learning strategy. Going by this definition, teachers have the obligation to understand how their students learn. Both students and teachers could prefer one style of learning for several subjects, which they learn or teach. Therefore, the teachers should utilize different learning styles. Students would then realize the style that best suits them and use it to enhance their academic performance.

Schools, colleges and universities need to adopt a theory of learning which is founded on classroom approach. Different theories of learning exist and caution needs to be exercised whenever a selection is to be made (Yeung, Read, & Schmid 2012). The learning theories include behaviourism, cognitivism and constructivism theories. Teaching quality is measured through the effectiveness of the learning style that a teacher selects to achieve the learning objectives in a particular subject. Since most teachers are often unaware of the approach that is likely to be most effective, the measurement of success of teachers is left to the learners (Chamorro-Premuzic & Furnham 2008). The relationship between approaches of teaching and what students learned is observable through a process in which the belief of teachers influence their teaching strategies, which in turn influence the students' learning styles. Ideally, the learning styles used by students represent the type of learners that they turn to be in future. Various inventories, which identify the type of learners, students, turn out to be, have been published by scholars in the recent past (Yeung, Read, & Schmid 2012). In classrooms where just a single learning approach is encouraged, students could possibly learn or work less effectively. Therefore, the teachers should be well aware of different learning styles.

The changes from traditional to progressive methods of education have led to increased interest in individual differences among learners (Chamorro-Premuzic & Furnham 2008). The current learning paradigm is student-centred, based on inclusivity, cooperative learning as well as diversity. Moreover, technology is perceived to be having potential of enhancing the capabilities of both learners and teachers. Methods used by teachers vary from one individual to another. Whereas some prefer to lecture, others discuss or demonstrate. Some also focus on principles and applications while others stress on understanding and memorization (Urval et al. 2014). The extent of the area of content that students learn in the classroom is not only partly determined by the learners' native abilities and prior preparation, but also the compatibility of the learning styles with the teaching methods (Yeung, Read, & Schmid 2012). The only way teachers can meet the multiple goals of learning is by adopting alternative teaching methods.

Students at college and university levels are often exposed to education systems, which are job oriented. As such, their learning styles tend to differ from students in other fields. At the college or university level, students pursue necessary skills and knowledge for performing specific jobs, occupations and professional activities in the labour market (Chamorro-Premuzic & Furnham 2008). Just like in other learning fields, identification and understanding of learner differences in adapting to the needs of an institute for the creation of better learning conditions is vital in universities. The need to employ teaching strategies in the student learning styles as well as preferences is a classroom reality that can be observed in classroom situations. It is however, important to note that research has never recommended for creation of individual methods for each student in the classrooms (Yeung, Read, & Schmid 2012). The best interaction of students and teachers is created by developing group of learners who share common characteristics in terms of learning styles.

1.2   Research Rationale

It is commonly assumed that learning styles do not deal with what students learn but instead how they prefer to engage in the learning process (Urval et al. 2014). Learners express different preferences and strengths, especially in the way they absorb and process information. Some students prefer working with concrete information while others would rather deal with abstractions. It is common to classify and describe unique styles in various domains. Various studies show different learning styles in schools. Recent research indicates that the style through which an individual learns is a vital factor to consider in the aggregate education process (Entwistle & Ramsden 2015). Acknowledging unique styles of learning is an attempt to characterize the process through which an individual acquires knowledge (Urval et al. 2014). Studies show that there is a direct connection between the academic performance of students and the learning styles. However, there is no evidence that suggests the impact of the styles on academic performance of the learners. Therefore, this research is aimed at demonstrating the impacts of the learning styles on the academic outcome of the learning process.

Effective instructions reach out to all learners and not just the ones with specific learning styles. Learners who are taught with an entirely antithetical method to their learning styles could be made uncomfortable to properly study, yet they might have some exposure the undesired methods used to develop a complete range of learning strategies and skills. Policy makers need to understand that the different types of students in learning institutions have varied learning style preference (Entwistle & Ramsden 2015). Therefore, teachers need to employ different teaching methods to ensure that they bring all learners on board. The current research aims at providing an insight on the significance of learning style by showing how they affect academic performance in the long run.

One of the key steps of increasing quality education is by getting to know the students. Previous research shows that students have different ways of learning and that the differences impact learning to great levels (Entwistle & Ramsden 2015). It is not possible for a single method to work for all students in a class. Fortunately, when teachers know the traits of their students, they can adapt their methods to match the different student preferences (Li et al. 2014). As such, understanding the kind of students in a classroom helps teachers to adapt their methods to improve quality of education. Instructors need to pay attention to various factors impacting students' success together with being knowledgeable about different techniques of teaching and refining teaching methods (Li et al. 2014). The current study would therefore help in broadening the understanding of learners about the role that learning styles play in their personal development and academic performance.

Since the learning process involves interaction between teachers, students and learning materials, teachers should focus on the learning styles of their students (Prajapati et al. 2011). The styles are components of a broader concept of personality. Because learning styles play a significant role in in learning process, instructors need not to ignore addressing how to relate it with their teaching methods. Learners need to adapt their skills to and knowledge to the lessons that they learn in class. They have to develop the ability to solve problems as well as to produce fresh ideas, which prepare them for the actual employment duties (Li et al. 2014). The factor of learning styles and their impact on students' academic performance have been assessed in this current research with close consideration to teaching practices, student perception of learning outcomes and syllabi (Li et al. 2014). The study relies on the existing body of language for preliminary information on learning styles and their significance to teachers and students.

Education standards and academic performance will be largely improved if both students and teachers appreciate the roles played by the learning styles in the sector.

1.3　Significance of the Research

Modern education faces various challenges. It is through the attempt to manage the challenges that teachers need to employ teaching methods that best match the learning styles preferred by the students (Prajapati et al. 2011). However, the understanding of the most appropriate learning styles would not be easy, if the effect of learning styles on students' academic performance is not well analysed. This current research plays an important role in developing education by showing the influence of learning styles on the academic performance of the students. To that extent, it will enable stakeholders to base their preference on potential influence associated with a particular style (Ghazivakili et al. 2014). Again, the study will add to the available literature on the topic for future studies. Therefore, it will offer a body of information to future researchers who would be interested in the same field. The study will help teachers to appreciate the need to understand the students' learning styles (Prajapati et al. 2011). Attaining knowledge about the learning styles of students is helpful to teachers because it provides them with the ability to use the most suitable support for the learners (Ghazivakili et al. 2014). Understanding knowledge on learning styles, as well as individual learning styles will help several educational institutions to enhance academic success and class attendance of their students.

1.4　Research Aim

The aim of the following research is to demonstrate how learning styles affect the performance of learners. The complexities in the labour market and advancements in technology have called for improved quality of education. Learners can only be fully prepared for corporate

environment if they attain the right skills and knowledge in their areas of interest. This can only be achieved if there is effective learning that leads to better academic performance. The current research also aims at demonstrating what learning styles are and their relationship with teaching methods as well as academic success.

1.5   Research Objectives

The objectives of this research can be categorized into general objectives and specific objectives. The general objective of the research is to determine the impact of learning styles on students' academic performance. On the other hand, specific objectives of the research include:

i.   To determine the impact of active learning on student's academic performance.

ii.   To determine the impact of visual learning on student's academic performance.

iii.   To determine the impact of verbal learning on student's academic performance.

iv.   To determine the effect of sequential learning on student's academic performance

1.6   Research Questions

i.   Is there any impact of active learning on students' academic performance?

ii.   Does visual learning affect student's academic performance?

iii.   Is there any impacts of verbal learning on student's academic performance?

iv.   Is there any influence of sequential learning on students' academic performance?

2   Literature Review

2.1   Introduction

Available literature shows that most schools implement different tools to assess the knowledge, understanding and skills of their students (Abidin et al. 2011). Some learning styles utilized by students and teachers are more efficient and effective than others. Specific learning styles enhance efficiency and effectiveness in the learning process while others demonstrate high levels of inefficiencies (Dunn et al. 2009). Approaches used by teachers and the learning styles employed by the students are very important in the process of learning and knowledge retention. The methods of teaching have a direct effect on ability of students to successfully store and structure information. On the other hand, learning has a direct influence on the ability of students to efficiently structure information that they are given in class. Several studies explored the relationship between academic success of students and the learning styles that they use. Some of the studies show that regardless of the low correlation between learning styles and general academic performance, there is a significant relationship between academic performance and learning styles on an individual scale.

2.2   Review of Key Concepts

2.1.1 Learning Style

Learning styles can be largely described as the range of competing theories which aim at accounting for the differences in individuals' learning (Pashler et al. 2008). The theories hold that everybody can be categorized in accordance with their style of learning. Learning style refer to the natural tendencies which are demonstrated by individual learners that show the preferences and strengths for absorbing and processing information. In addition, the term can be defined as

the manner through which learners most efficiently and effectively perceive, store, process and recall learned materials.

According to Pritchard (2013), the term learning style can be described as a tool that incorporates four knowledge acquisition aspects. The aspects were described by the researcher as cognitive style, patterns of attitudes, tendency to pursue situations as well as inclination to utilize some strategies ahead of others. In a different study, Fleming and Baume (2006), described learning as a constant behaviour pattern and performance, through which people approach educational experience. It is a composite of characteristics of affective, cognitive and psychological behaviours, which serve as stable indicators of how learners interact, perceive, and respond to different learning environments. Additionally, it is deeply formed in the structure of neutral organization and personality that affects human development together with cultural experience of schools, homes and societies. Mupinga, Nora and Yaw (2006), elucidated that learning styles are the educational conditions in which students are likely to learn. Therefore, the styles do not necessarily deal with "what" the learners learn, but instead, "how" the learners prefer to attain knowledge. Dunn et al. (2009) defined learning styles as methods used by people to acquire knowledge. The researchers argued that the styles happen to be the vehicles through information is transferred to learners and processed by their brains.

2.2.1 Active Learning

Active learning is a term that was introduced by an English scholar known as R.W Revans who lived between 1907 and 2003 (Bean 2011). The scholar was quite instrumental in the promotion of active learning in the world. In the recent times, James Eison and Charles Bonwell have been recognized as the pioneers of the active learning style in the education sector. Settles (2012) defined active learning as a tool, which requires learners to participate in the

learning process alongside passively listening. According to Bean (2011), active learning is the engagement of learners with the materials being learned. Therefore, students need to closely interact with concepts under study through assignments, discussions and research as they learn. Active learning style has also been defined as a process, which involves students in doing and thinking about things they learn.

According to Al-Hebaishi (2012), active learning refers to various activities through which learners participate in the process of learning instead of just listening or watching passively as information get transmitted. The activities highlighted by the researcher include problem solving, reading, answering questions, discussion and writing among others. According to Goldfinch and Hughes (2007), active learning style is a method of knowledge acquisition which supports the notion that knowledge is durable if learners are cognitively engaged in the learning process. The long-term retention, transfer and understanding is an outcome of mental work of learners who are actively engaged in sense-making and knowledge construction.

Active learning styles are defined as instructional methods that engage students in the learning process (Duman 2010). While the definition includes traditional activities like homework, Duman (2010) was keen to note that active learning is specific on activities, which are introduced in the classroom. The researcher was categorical in identifying that the core elements of active learning are engagement and activities of the student in the learning process. In addition, Hsieh and Dwyer (2009) hold that active learning is an instruction tool which requires students to fully commit to discussions, writing, reading and answering questions at the expense of just listening to their teachers. The definition holds that students should contribute to the learning process by participating in learning activities instead of leaving everything to their teachers or instructors (Sadeghi et al. 2012).

Available literature indicates that active learning is mindful experiential and engaging. Through this style of learning, students can explore various experiences, which are not only effective but also interesting hence giving them room to take responsibility for their education. Educators can use various active learning techniques in any class. However, some activities in active learning are best designed for small classes. Active learning encourages students to work in groups, communicate with one another, as well as to respond to questions through writing and polling. Small classes enhance effective utilization of active learning strategies as it gives the instructor easy time in monitoring the progress of learners.

2.2.2   Visual Learning

Visual learning was defined by Abidin et al. (2011), as a learning style through which students absorb and process information through reading and seeing pictures. The definition implies that learners remember and understand things by sight. The learners easily remember concepts by picturing them in their minds when need arises. The researchers proved that visual learning style does not need distractions around classrooms as students might easily be carried away. According to Krätzig and Arbuthnott (2006), visual learning falls among the three popular learning styles that were fronted by Neil D. Fleming in the VAK learning model. The scholars defined visual learning as tool that requires people to see information as they learn it. Ideally, seeing information was clarified by the researchers to be taking different forms ranging from spatial awareness, color photographic memory and tone among others.

Gilakjani and Ahmadi (2011) defined visual learning as a style that requires students to use their eyes more often. Visual learners are categorised into linguistic and spatial learners. Apparently, those who are visual-linguistic learn through written language by reading in writing. As such, the learners remember things that they write even if they fail to read them regularly.

Such people tend to pay close attention to lecturers as they watch them demonstrate concepts while in class. On the other hand, Gilakjani and Ahmadi (2011) argue that learners who fall in the category of visual-spatial have challenges with written languages but perform better in dealing with videos, chats, demonstrations among other visual materials.

Jonassen and Grabowski (2012) defined visual learning as a style that involves use of diagrams, maps, graphs and charts. The scholars held that visual learners utilize images to understand ideas and concepts. However, the scholars were keen to identify that the learning style does not involve photographs and videos (Jonassen & Grabowski 2012). Visual learners grasp concepts better when instructors present information using shapes, patterns and other visual aids at the expense of spoken and written words. Similarly, in accordance with Krätzig and Arbuthnott (2006), visual learning is a style that requires students to relate verbal and written information with images. As such, create images of concepts and situations in their mind and digest new information. Students who use visual learning style tend to remember more information that is presented in images than those that are presented verbally or in writing. Abidin et al. (2011) provided various ways through which visual learners behave. Ideally, the earners easily master sign languages and they tend to pay a lot of attention to body language (Abidin et al. 2011). Characteristically, the visual learners find it difficult to remember concepts that are completely delivered in writing or verbally, without any diagrammatic representation or demonstration accompanying it.

2.2.3 Verbal Learning

Verbal learning style involves both spoken and written word (Baykan & Naçar 2007). Students who utilize the style find it easy to express themselves in writing and when speaking. According to Willingham, Hughes and Dobolyi (2015), verbal communication is a learning style

through which individuals respond to informational stimuli using auditory strategies. Ideally, the verbal learning style implies that students efficiently learn by listening to people and taking information in writing (Willingham, Hughes, & Dobolyi 2015). The implication is that learners have the ability to solve problems, draw conclusions and learn through just writing and speaking.

Alkhasawneh et al. (2008) defined verbal learning as a style that involves fascination with the music, arts, legal documents, politics, writings, old-world and novels. Verbal learners are defined as people who love to receive and process information through writing and speaking (Pham 2012). Ideally, verbal learners usually lack the skills needed to position things in space. Therefore, they largely rely on language skills, which are mostly manifested through writing and speaking. Verbal learning style refers to the ability of an individual to reason, solve a problem and learn through language (Karthigeyan & Nirmala 2013). Since the better part of school curriculum is taught through verbal communication, verbal learners tend to perform well in schools.

Kolb (2014) explained that verbal learning style refers to a method that guides learners to understand and retain information out of spoken and written explanations. The scholar held that verbal learners tend to write summaries and outlines of information materials in their own words. Similarly, they prefer working in groups and gain understanding of concepts by hearing explanations from their classmates. Most verbal learners get a better understanding of the given information when they try to explain it to others (Kolb 2014). Baykan and Naçar (2007) defined verbal learning as a method that triggers the tendency of students to read out loud, repeat information and ask various questions for purposes of clarification. To some extent, verbal learners achieve more through verbal instructions, online forums and webinar lectures.

Ideally, verbal learners properly acquire and retain information through spoken or written materials. The learners prefer to be involved in activities, which are founded on language reasoning at the expense of visual information. For instance, verbal learners prefer math word problems instead of solving equations. Additionally, the earners enjoy writing projects, doing speeches and engaging in class debates. Observably, the learners have problems with hand-eye coordination. At times, they find it difficult to interpret visual presentations. For instance, some of the learners might find it difficult to interpret charts, maps or even graphs because they are used to written and spoken information.

2.2.4   Sequential Learning

Sequential learning style is a method that enhances understanding of concepts and information in linear steps (Nuzhat et al. 2011). The steps follow each other logically from previous one to the next. On the same note, sequential learners keep to logical step-like paths when finding effective and efficient solutions to numeroust environmental problems. According to Willingham, Hughes and Dobolyi (2015), sequential learning style involves organization of information in a linear and order orderly fashion. Sequential learners understand and retain information in logical sequence. Additionally, they work with information in systematic and organized ways (Willingham, Hughes, & Dobolyi 2015).

Alkhasawneh et al. (2008) indicated that sequential learning style involves procedural organization of information in such a way that the first stage of understanding leads to the next level. Therefore, learners have the obligation to successfully undergo a stage before they move to the next (Alkhasawneh et al. 2008). According to Pham (2012), sequential learners have particular procedural patterns in which they use informational stimuli. Karthigeyan and Nirmala (2013) defined sequential learning as a systematic learning style. The scholars held that

sequential learners look at information in a systematic way and perform well when information is given to them in a logical way. According to Kolb (2014), sequential learning is a systematic learning style that encourages students to handle informational challenges in parts. Since information is dealt with in logical steps, learners can solve parts of the problem even when they don't completely understand the entire problem. Akers and Jensen (2006) defined sequential learning as a learning style that breaks down information and organizes it systematically. Learners then put the details together to understand how the big picture emerges.

Sequential learners achieve their academic objectives by understanding details of information as well as slowly creating an image of the bigger picture. The students work properly with details, however, they tend to have challenges in understanding larger ideas and concepts. As such, teachers and instructors provide them with an outline for the presentation of new ideas. Similarly, the instructors build their presentation of new information in steps, which lead to the main idea or concepts. Most importantly, the instructors design and present the information in the way that learners first meet simpler concepts, as they advance to the complicated ones.

2.2.5   Academic Performance

Hann et al. (2007) defined academic performance as the outcome of education. The researchers indicate that academic performance is the extent to which institutions, students, and teachers achieve their educational objectives. Performance is largely characterised by achievement on tests related to coursework as well as student performance on other examinations. According to Rudolph and Popp (2007), academic performance is the level of achievement of academic goals by students and teachers. The researchers categorised academic goals into short term and long term classes. Jonassen (2006) defined academic performance as a

measure of how well individuals achieve their objectives in educational settings. The researchers explained that high school report cards show performance of learners at that level of education.

Akers and Jensen (2006) showed that academic performance is defined as the total score or grade that is attained by students in the final year in academic institutions. According to this definition, the grades point at the average GPA, this is also a convenient summary of students' achievements in examinations. The researchers also explained that academic performance is a measure because it offers greater insight on achievement levels of students, teachers and institutions at large.

According to Kolb (2014), academic performance refer to the outcomes which show the extent to which individuals have accomplished specific goals which were the main focus of the activities within an instructional environment. The researcher explained that academic performance is perceived to be a multi-faced construct that is made of various learning domains. Since the field of academic performance is wide and involves a broad variety of educational outcomes, Kolb (2014) indicated that the definition depends on the indicators that are used to measure it such as GPA of learners and mean grades attained by learning institutions among others.

Karthigeyan and Nirmala (2013) outlined that academic performance refers to the level of schooling that is successfully completed by an individual as well as their ability to achieve high scores in their studies. As such, the definition implies that academic performance is fundamentally concerned with educational accomplishments achieved by an individual, particularly in schools and higher learning institutions. The researchers demonstrated that academic performance could be measured through grading and successful completion of a course in college, school or university. In his research on leadership and academic performance, Pham

(2012), showed that the definition of academic performance varies among different stakeholders including educators and policymakers. In his study, academic performance was defined as the measure of level of success of learners in academic institutions. The researcher indicated that success is largely measured through achievement of course objectives.

Various factors affect students' academic performance in their learning institutions. While the factors can be classified into school based, home based, learner based and resource based, available literature indicates that learning styles play a significant role in motivation of learners to process and retain information. Notably, motivation is a fundamental aspect in the academic success of learners. It includes both external and internal factors, which stimulate the energy and desire continuously to remain committed and interested to achieve educational goals. Motivation explains why people perform tasks, how hard they pursue tasks and how long they will sustain the activity.

2.3   Critical Review of Learning Style Models

2.3.1   Kolb Model

Kolb's model of learning style was published by David Kolb in 1984, after which the scholar developed the learning style inventory (Joy & Kolb 2009). The model largely works on two levels namely; four stage cycle of learning and the four separate learning styles. Ideally, the better part of Kolb's model deals with the internal cognitive processes of the learner. The researcher indicates that learning involves the attainment of abstract concepts, which are flexibly applicable in a wide range of situations (Joy & Kolb 2009). In this model, the impetus for the development of new concepts is suggested by new experiences. On the same note, the scholar defined learning as a process through which knowledge is created based on transformation of experiences. The model denotes that various people prefer specific single learning styles and that

different factors affect preference of the learners (Joy & Kolb 2009). Some of the influential factors identified in the model include social environment, educational experience and basic cognitive structures of individuals.

Kolb's model assumes that academic performance is achieved through four stages. The immediate and concrete experience forms the basis of observation. Learners then reflect on the observations and start to establish a general theory what the information implies (Platsidou & Metallidou 2009). The learners then form abstract concepts together with generalizations depending on their hypotheses. Finally, learners test implications of the concepts in new situations that confront them. Secondly, the model holds that factors influencing choice of learning styles are products of two variables, which can be presented as axes in a Cartesian plane. Kolb presented the two continuums in the east-west axis and termed it as a processing continuum, as well as in the north-south axis, termed as perception continuum (Platsidou & Metallidou 2009). The processing continuum shows how people approach tasks, whereas the perception continuum indicates emotional responses, or the ways how people think and feel about tasks.

The main strength of Kolb's model helps learners and instructors to understand learning styles hence making easily transition to higher levels of cognitive and personal functioning (Platsidou & Metallidou 2009). Secondly, the models enables teachers to cover materials in ways that best fit the diversity of classrooms. Regardless of the wide acceptance of Kolb's model, it can be observed that theory only offers limited factors that affect learning (Platsidou & Metallidou 2009). Unfortunately, the model fails to explain psychodynamic, social as well as institutional aspects, which influence academic performance in the long run. It is vital to remember that people have different learning style preference depending on their situations.

Therefore, various approaches may be required even for the same person under different circumstances. Summarily, the main limitation of Kolb's model is its generalizability since it has been used in a fairly limited range of cultures.

2.3.2   Dunn and Dunn Model

The model was published by professors Rita and Kenneth Dunn in the 1979 after research had been performed on the same for approximately 30 years (Hawk & Shah 2007). The model holds that each peson has a unique set of biological and developmental traits. The model anticipates observable improvements in academic performance and student behaviours when a match is achieved between learning styles and the instructional environment (Hawk & Shah 2007). The model was developed for use in all learning levels with the objective of improving instructional effectiveness for learners who hardly demonstrate appropriate progress (Hawk & Shah 2007).

Dunn and Dunn model is founded on the assumption that academic performance of students improves when appropriate environment, resources and strategies are given and learners develop a positive attitude towards learning (Honigsfeld & Dunn 2009). The model holds that learning styles are made up of five fundamental stimuli namely; environmental, sociological, psychological, emotional and physiological elements. Notably, the stimulants elicit various impacts on academic performance of students. The environmental stimuli are largely concerned with where learners study. Such environments could be quite, warm or noisy. Emotional stimuli deal with issues such as motivation, structures, task persistence and responsibilities. Sociological preferences include learning individually or in groups, having specific routines or engagement in peer learning groups (Honigsfeld & Dunn 2009). The model identifies psychological processing inclinations such as global and impulsive factors to be influential on academic performance.

Physiological preferences such as time of the day, perceptual strengths, need for intake and mobility during learning have also been identified by the model to influence academic achievement (Honigsfeld & Dunn 2009). The model is also built under the assumption that students who are exposed to empowering environments and have adequate resources can be successful in their learning.

The main strength of the model is the fact that it identifies that everybody has unique biological and developmental characteristics. As such, the model acknowledges that students learn differently (Kavale & LeFever 2007). Therefore, every student has a unique learning style with strengths and weaknesses that conform to their biological and developmental characteristics. Secondly, the model is applicable in a wide range of learning levels including secondary schools, colleges and universities among others (Kavale & LeFever 2007). Thirdly, the model affirms students' preferences instead of focusing on weaknesses of the learners. However, the model has been largely challenged by critiques because of the fact that it does not outline the measures of remedying weaknesses that negatively influence the choice of learning styles and thus academic performance.

2.3.3   Honey and Munford model

Honey and Munford's model of learning styles was published by Peter Honey and Alan Mumford in 1986 (Moreno 2012). The model is based upon the Kolb's model of learning styles after researchers argued that latter lacked validity. The researchers argued that most people hardly consider how they really learn. To be an effective learner, people need to understand their preferences on learning styles and attain ways through which they can learn from the methods. The model categorizes learners into four groups (Javier & Bruno 2010). First, the activities are people who learn by doing things and prefer to make their hands filthy. Activists have a

receptive method of handling learning. Mostly, their learning activities involve brainstorming, group discussion, problem solving, competitions and puzzles (Moreno 2012). The theorists get a kick out of the chance to understand the hypotheses behind things. They want facts, models and ideas that have specific goals to engage in the learning process. The theorists prefer learning through statistics, quotes, stories, background information and theoretical application of concepts. The group of pragmatists have the ability to perceive how practice learning in their daily activities. Their main mode of action is experiment with new ideas, methods and speculations to ascertain whether they work. Pragmatists learn best by taking their time to figure out how to apply concepts in legality. Finally, reflectors learn through watching and contemplation of events (Javier & Bruno 2010). They do not like to be involved in activities but instead learn by watching from the sidelines. The reflectors majorly learn through observation of activities, coaching, paired discussions and self-analysis.

The model assumes that learning can be easier, more effective and enjoyable if students establish a better fit between their learning styles and the available learning opportunities (Moreno 2012). As such, the model holds that learners who know their learning styles are likely to perform better than those who do not know their preferences (Javier & Bruno 2010). Secondly, the theory holds that expansion of bandwidth of experiences makes learners versatile and enables them to learn from a range of experiences. In addition, the model holds that increasing awareness of how students learn opens the entire process for self-scrutiny and improvement.

The main strength of model is high level of validity. The model was developed on the foundation of Kolb's model, which was perceived by various critics to be very low on validity. As such, Honey and Mumford developed their model to improve on the validity weakness

observed on the Kolb's theory (Javier & Bruno 2010). Secondly, the model appreciates the fact

that individuals naturally gravitate towards specific learning styles. As such, everybody needs to

identify their natural learning styles, understand them and find learning ways that complement

their styles. The major limitation of the model is the fact that it does not incorporate the

institutional factors influencing choice of learning style (Moreno 2012). Notably, the model is

only concerned with personal influential factors affecting choice of learning styles.

2.3.4   Felder and Silverman Model

This learning style model was developed by Felder and Silverman in 1996 (Dourado,

Leite, & Soares 2010). The model has four main dimensions, which express different learning

aspects with a linguistic variable. The first dimension shows that learners can be modelled as

sensing or intuitive depending on how they perceive information. Secondly, learners can be

modelled as either visual or verbal depending on how they receive information. Thirdly, learners

can be distinguished as active or reflective depending on how they process information. Finally,

learners can either be categorized as sequential or global based on how the comprehend new

information. Felder and Silverman model of learning styles can be shown as a Cartesian product

of various incorporated dimensions (Graf, Viola, & Kinshuk 2006). For example, a learner can

be active, intuitive, verbal and sequential, while others could be reflective, sensing, verbal and

sequential. Summarily, the model represents all learners with regard to their tendencies through

classification into the two poles of dimensions.

The model was developed on various assumptions. First, Felder and Silverman assumed

that the model is can only be applied on engineering students. Secondly, the researchers assumed

that the reliability and validity of the index of learning styles scales used in the model are in a

mature state (Graf, Viola, & Kinshuk 2007). Also, the model is based on the assumptions that

learners adapt to new challenges as they develop in the learning process (Sangvigit, Mungsing, & Theeraroungchaisri 2012). Notably, low levels of learning are less challenging as compared to the higher levels. However, students develop tenacity to overcome the challenges as they go through the process of learning. Finally, the model assumes that the learning styles of students indicate strengths and potential tendencies, which lead to difficulties in academic setting (Hsieh, Jang, Hwang, & Chen 2011).

One of the strengths of this model is based on the fact that it focuses on students' strengths and weaknesses. As such, the model aims to enhance success and fulfilment by providing light on how to use strengths to overcome the weaknesses. The model encourages adoption of strategies which maximize strengths and minimize impacts of weaknesses (Graf, Viola, & Kinshuk 2006). Secondly, the model is recommended specifically for engineers. Therefore, its principles focus particularly on engineering students thus encouraging maximization of benefits of the model to the group. However, the biggest weakness of the model is the fact that it only focuses on a particular group of learners. Ideally, the model should be universal to an extent that it covers a vast majority of learners across different fields.

2.4   Empirical Studies in Global Context

In their study on the relationship between learning styles and academic achievement of high school girls in Iran, Hamayoni and Abdolahi (2003) showed a direct relationship between the abstractive conceptualization of learning styles and academic success in foreign languages and mathematics (Hamayoni & Abdolahi 2003). The main strength of the study was that it focused on a particular gender and subjects. However, it is difficult to establish whether the study findings could be applicable to general academic performance and to the male gender. In Turkey, Emamepur and Shams (2003) performed a research on impact of learning styles on

binary and single language students' academic performance. The study revealed that students whose languages were Persian and Turkish preferred sensing and verbal learning styles while those who only communicated through the Persian language preferred intuitive and visual learning styles (Emamepur & Shams 2003). The main strength of the study was its ability to assess students with different languages hence indicating that languages have influence on preferred learning styles. However, the research was limited to two languages yet several other languages exist in the world. In a different study involving University students, Emamepur and Shams (2004) discovered that students who majored in Architecture were visual and sequential learners, and there was significant relationship their choice of learning styles and academic performance. The study exploited the role of course on choice of learning style as well as ultimate impact on academic performance. However, the study failed to underline why architects preferred visual and sequential learning at the expense of the other learning style combinations. Rahmanpur, Palezeyan and Zamane (2008) investigated the learning styles of engineering students against other learners. The study revealed that engineering students differed from learners whose courses were speculative (Rahmanpur, Palezeyan, & Zamane 2008). The study demonstrated how unique learning styles could be particular groups of learners against their counterparts. However, the research did not specify the particular learning styles that were preferred by the respective engineering and speculative students.

Felder and Silverman (1988) performed a study on the learning styles of chemistry and architect students. The study revealed that chemistry students are more sensing, active, sequential and verbal. The major strength of the study was its focus on post high school students. However, it left gaps on academic performance of the students based on the learning styles that they preferred. Felder (1993) researched on the relationship between learning styles, instructional

methods and academic performance. The researcher concluded that students whose learning styles matched instructional methods performed well in academics. The major strength of the research was based on its ability to relate the three variables of learning style, instructional method and academic performance. However, study did not specify an academic level for which the relationship works.

Dunn, Burke and Whitely (2000) studied the effect of learning style on academic performance of boys and girls. The researchers showed that boys are preferred kinesthetic and visual learning styles while girls prefer auditory learning styles (Dunn, Burke, & Whitely 2000). The strength of the study draws to the fact that the research considered the different abilities between boys and girls during the investigation. However, the study did not specify why boys prefer kinesthetic and visual learning styles while girls prefer auditory styles. Cassidy (2004) assessed the learning styles of both context dependent and independent students. The research revealed that context independent learners preferred active styles since they had inner motivation whereas the context dependent students required auditory learning styles (Cassidy 2004). The main strength of the study was the fact that it incorporated the element of motivation, which is huge performance determinant. However, the study failed to specify why context dependent students prefer an auditory learning style.

Pashler, Daniel, Rohrer and Bejork (2008), discovered that students perform better when their learning styles are accordant with their personal characteristics. The study employed the significance of personal characteristics in choice of learning styles. However, the study did not outline the particular characteristics which lead to better performance. In his research on the learning styles and academic success, Hargadon (2010 established that teachers need to pay attention to the students' learning differences since the differences influence the appropriate

teaching methods necessary for the learners. The research considers how individual differences affect choice of learning style as well as teaching method. However, study did not show the differences and teaching methods affect academic performance of students in the long run.

2.5   Empirical Studies in Malaysia

Abidin, Rezaee, Abdullah and Singh (2011) researched on learning styles and overall academic performance. The study showed that prefer the visual, auditory and kinaesthetic learning styles. Students who understood their preferred learning styles had better performance compared those who did not (Abidin, Rezaee, Abdullah, & Singh 2011). The major strength of the study draws from the fact that it considered general performance of learners. However, the study failed to ascertain how various combinations of learning styles affect academic performance. In his research on self-regulated learning style and academic achievement, Kosnin (2007), discovered that high university achievers used the style while low achievers did not use it. The study narrowed down to a single learning style element hence increasing chances of obtaining specific results. However, the established relationship cannot be used in other learning style elements that were not tested in the study.

Wong (2004) assessed whether learning styles of international students were cultural or context based. The study found that learning styles are context based since international students could adapt to the Malaysian student-centred learning styles (Wong 2004). The strength of the study is based on the ground that it considered students from different cultural backgrounds thus introducing diversity in the research. However, the findings of the study could not be related to the local students of Malaysia. Manochehr (2006)conducted the research on the effect of learning styles on e-learning. The study revealed that learning styles were significant for knowledge performance. The study's main strength comes from the fact that it incorporated the element of

technology in learning styles and performance. Unfortunately, the study did not indicate whether the findings could be applicable in traditional classrooms.

Othman and Amiruddin (2010) investigated the different perspectives of learning styles in Malaysia. The study revealed that VARK learning styles create fascinating environments for learning hence stimulating student senses and boosting their academic performance. The main strength of the study was its ability to address the different learning styles under the VARK model and relate them to academic performance. The study, however, failed to incorporate other learning theories, such as Dunn and Dunn model among others. Al-Tamimi and Shuib (2016) investigated the learning style preference of ESL students in Malaysia. The findings of the study showed that English majors in the University Sains Malaysia had specific learning styles that their teachers needed to incorporate in the teaching methods. The research was keen to identify the various learning styles preferred by the learners. However, the findings of the study could not be easily applied in other study fields hence calling for a research on general academic performance.

Koh and Chua (2012) investigated the learning styles among mechanical engineering students. Findings showed that most engineering students prefer kinaesthetic and visual learning styles. The research covered different learning institutions in Malaysia hence increasing reliability of findings as a representation of all institutions. On the other hand, the study did not indicate the importance of the learning styles on students' academic achievements. In his research on perceptual learning styles, Yong (2010) discovered that students have particular learning styles that contribute to their academic performance as opposed to others. Teachers need to use different teaching methods to avoid side-lining learners who do not use a specific learning style (Yong 2010). The researcher identified various psychological characteristics that influence

perception on learning styles. However, the study did not outline causes for preference of particular learning styles at the expense of others.

According to Balakrishnan and Gan (2016), students learning styles influences their need to use social media for learning. The research considered the need to assess learning style with regard to social media technology, which is largely witnessed in the modern learning methods. However, it did not specify why learners with similar learning styles would prefer different social media platforms to access the same information. Kassim (2013) investigated the relationship between learning styles, creative thinking performance and multimedia learning materials. The study findings indicate that there is no significant effect of learning style on creative thinking (Kassim 2013). The study involved participation of students from different institutions hence increasing representation level of the findings. However, the research did not identify whether creative thinking affected students achievement in the long run.

2.6   Conceptual Framework
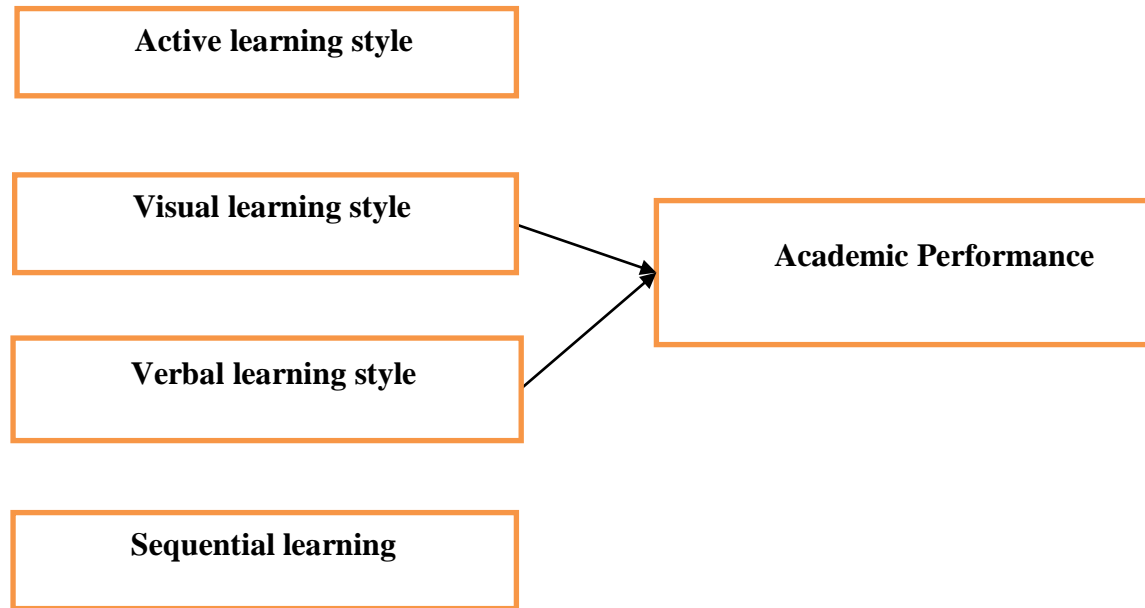
Figure 1 Conceptual Framework

2.6.1   Active Learning Style

Gappi (2013) investigated the question of the learning style impact on academic performance. According to the research results, there is a close relationship between these aspects and the choice of the wrong style, which is detrimental to the students' performance and learning outcomes. Hence, an active learning style enables the learners to enjoy the process of learning through doing. Moreover, it requires that students do not only such activities as listening, as reading, writing, and discussing, but also engaging in various processes (Shaaruddin & Mohamad 2017). This makes students involved in critical thinking, analyzing, assessing, and evaluating, as well as contributes to their overall development. The benefits of the active learning style have been emphasized by Močinić (2012), Freeman et al. (2014), and Tedesco-Schneck

(2013). The researchers emphasised the application of the active learning strategies, the promotion of the learners' involvement, feedback, peer evaluation, and assessment that improve learning outcomes. This style enables students to engage in a greater number of practices and discussions, thus stimulating their peers to reflect and collaborating with each other. Tedesco-Schneck (2013) considered that the introduction of active learning results in critical thinking. The interaction with the peers and teachers enables students to gain better knowledge and retain what they have learnt. Active learners are not afraid of asking questions and speaking up their opinion in class (Rahmani & Azali 2012). Moreover, they usually experience high academic performance. Finally, active learning makes classes more interesting, creates a positive learning environment, enhances interaction and collaboration between the learners and lecturers, contributes to the promotion of open-minded ideology, enhances communication skills, and encourages participation.

Despite a variety of strengths, the active learning style is associated with some weaknesses. One of them is the inability of some educational institutions to provide spaces and training that allow students to get the most of this learning style. In addition, some learners may find it difficult to concentrate on the complicated and lengthy tasks or may miss or misunderstand the information presented orally. This learning style is not effective for the students who are not used to it. However, studies prove that this learning style has a positive impact on students' performance, as it deals with cooperative learning, debates, participating in a variety of activities, and performing multiple tasks.

2.6.2 Visual Learning Style

This style of learning presupposes the application of images that seem to be enjoying for learners. It enables students to visualize events and imagine situations. The students can

implement visual strategies to remember or memorize information. Visual learners better memorize or understand the material when they see a picture, a chart, or a diagram (Ling, Basit, & Hassan 2017). In his research, Gokalp (2013) indicated that a good memory and a proper understating of learning material enable students to achieve high academic performance. The students who apply this style prefer to sit at the front row and make own notes, as they organize the information using tables and diagrams. Moreover, they benefit from being good observers and looking into details, as well as learning from body language. According to Norasyikin, Mohamad, and Paimin (2015), the students who use visual learning style visualize the whole picture before doing a project, which is one of the main aspects of their success.

The main weakness of the visual learning style is the need to have more time to complete tasks, as such students may be more interested in providing the answer rather than its actual value. Although this weakness may be beneficial in some situations, it is still considered a drawback, as less time is left for details. In addition, such learners may find it difficult to focus if there is no suitable environment or they have no ability to visualize (Ling, Basit, & Hassan 2017). However, the use of this learning style improves academic performance and enables students to acquire valuable knowledge and skills.

2.6.3 Verbal Learning Style

Verbal learners get information better when it is presented in the oral form. Hence, oral messages are beneficial, as they enable students to get more explanation in the class. The verbal learning style makes students become involved in debates, discussions, and arguments, as it is a good opportunity to learn more through conversations with others (Smith 2018). This learning style is closely related to the successful academic performance of students (Felder & Spurlin 2005). Such learners are not afraid of speaking in public and find presentations very engaging

and informative. As a rule, verbal style students have splendid memories of the orally presented information (Ling, Basit, & Hassan 2017). Moreover, they tend to read out aloud for themselves to remember necessary data. A good memory also contributes to the achievement of high academic performance.

However, the students who follow verbal learning styles may experience the disadvantage of being unable to learn easily with only audio instructions, as they should receive much information from the written sources. The work with writing materials is an inevitable constituent of the learning process (Smith 2018). Moreover, in many cases such learners fail to understand and explain a complicated diagram, chart, or graph. It is evident that learners tend to have their own preferences in learning style that suit their personal characteristics (Hardy 2010). Hence, one learning style that one student can apply effectively may affect the learning process of other students. Mathematics and science are not the first choice of the verbal learners, as they prefer to use language creatively, through poetry and fiction. Activities preferred and practiced by verbal learners are usually based on language and reason, and are opposed to visual objects and physical tings.

2.6.4 Sequential Learning Style

There is a positive impact of the sequential learning style on academic performance, as it enables students to define the emphasis on the connection of the received information, thus providing them with the opportunity to gain necessary knowledge. The sequential learning style students usually prefer well-organized input to get good academic performance (Ling, Basit, & Hassan 2017). Also, they often follow the instruction step by step to get as much information as possible. If something is missing in the information provided by a teacher, it makes them feel lost (Rogowsky, Calhoun, & Tallal 2015). Sequential learners prefer to organize information in

an orderly manner, learn in logically sequenced steps, respond to a problem with logic rather than emotion, and work with information in a systematic way (Fleming 2017). Planning, making labelled and divided notes, categorising things, and having good time management skills are the main characteristics of the learners who use a sequential learning style. Finally, sequential learners tend to feel the need to properly understand each piece of information they come across. It is difficult for the sequential learners to continue if there is a big skip in a topic, as the teachers should provide them with information in the chronological order and step and step (Ling, Basit, & Hassan 2017). The presentation in the logical ways and the connection of every detail enable them to understand and learn better. A proper understanding of the details is required before moving on. In addition, frustration may come with the understanding that people do not comprehend things as quickly as they do. However, the weaknesses associated with the sequential learning styles do not prevent it from being an effective style that contributes to the academic performance of students.

3   Methodology

3.1   Introduction

Any research is grounded on some philosophical assumptions regarding what entails a 'valid' research, as well as what appropriate research methods should be applied to develop knowledge related to research questions (Creswell 2014). Therefore, it is imperative to understand these assumptions in order to conduct and assess any study. This chapter outlines the procedures that the researcher will apply while conducting this research. Consistent with the aim of the research, the chapter will also present the description of the research philosophy, research method / design, research strategy, data collection methods, research population, sampling technique, data instruments, ethical considerations and accessibility, and data analysis plan.

3.1 Research Philosophy

A research philosophy is considered the first essential layer of the Research Onion model (Saunders, Lewis, & Thornhill 2015). Creswell (2014) defined research philosophy as an idea or a belief about the collection, analysis and interpretation of the research data. The pragmatic paradigm or view will be suitable for explicating the impact of a learning style on students' academic performance. A research paradigm reflects the beliefs of a researcher about the desired world (Jackson 2011). In other words, a paradigm reflects philosophical assumptions held by a researcher about the world. The pragmatic research paradigm holds that research objectives and questions are the key determinants of ontology, epistemology, and axiology (Flick 2009; Saunders, Lewis, & Thornhill 2015). Therefore, a mixed methods choice (quantitative and qualitative) is appropriate for this study. Thus, the researcher will apply both archival and case study strategies.

3.2   Research Design / Methods

A research method refers to the adopted strategy of enquiry, which covers the underlying assumptions, research design, data collection, and data analysis (Kothari 2014). Despite the fact that there are numerous modes of research, the primary research methods are quantitative research and qualitative research. Extant literature categorizes research methods into quantitative, qualitative and mixed-methods (Bryman & Bell 2015; Creswell 2014). The determination of the appropriate method depends on the nature of the research topic, questions, and objective. Since research methods vary from one researcher or context to another, it is imperative that the researcher should consider research aim and objectives while choosing a specific method and design for the following research. The researcher will apply mixed-methods, which make emphasis on the quantitative aspects of the research, in this research. The essence of qualitative research is explanation and description (Saunders, Lewis, & Thornhill 2015). Creswell (2014) argued that correlational quantitative research is the most suitable design for examining relationships between research variables.

The primary distinction between quantitative and qualitative research methods is the form of data collection, data analysis, and data presentation (Flick 2009; McMillan & Schumacher 2014). While the former present statistics results after the analysis of statistical or numerical data, the latter present descriptive narration using textual data (Collis & Hussey 2013; Harrison 2013; Silverman 2013). Quantitative research will make use of a questionnaire to collect the data, which will be tabulated in the numerical form. Therefore, the following measure will allow the researcher to characterize the data applying statistical analysis techniques, such as one-way ANOVA, as well as multiple regression analysis. In the same line, quantitative researches measure variables from a research sample and then express the connection between the variables

through effect statistics, such as relative frequencies and correlations (Ott & Longnecker, 2015). The motivation behind the adoption of a mixed-methods choice is the need for a comprehensive understanding of the research conceptual model and the shortcomings of the quantitative approach

3.3   Research Strategy

A hybrid of a case study and an archival research strategy will be suitable for this study. The former will support the qualitative review of extant research and the corroboration of the research finding and other studies. Saunders, Lewis and Thornhill (2015) define a research strategy as an action plan that outlines the direction to the researcher's thinking and effort. In line with the research design, the strategy enables the researcher to systematically conduct a high quality research and deliver it within the predefined timeline. A research design can be viewed as the master plan or logic that shades light on the manner in which a research will be done (Collis & Hussey 2013). In that respect, a research design shows how the key parts of the proposed research – research sample and variables – connect with the goal of addressing the research questions (Kothari 2014). In simple terms, a research design is synonymous with an architectural drawing. In addition, a research design provides the direction on how to execute a research with the intention of optimizing the validity of its results. In this research, the researcher will utilize a case study research design. According to Creswell (2014), case studies are detailed studies of a specific research problem instead of a comprehensive or sweeping comparative enquiry. A case study is also viewed as an empirical investigation of research questions seeking an array of various pieces of evidence from a specific case. Typically, a design is used when a researcher wants to narrow down an extensive domain of research into a researchable example (Collis & Hussey 2013). In addition, the case study research design is ideal for testing whether a specific

model or theory applies to the subject under study in the real world. The case study design is also valuable where there is a gap in what is known about the phenomenon under study (Mills, Durepos, & Wiebe 2010). One of the advantages of the case study design is that the research can employ various methodologies, as well as rely on multiple sources to explore the research problem. A design will also help the researcher understand the research questions through a detailed contextual analysis of researchable relationships. Moreover, a case study research design also provides a systematic approach to the data collection, the analysis of information, and the presentation of results. Thus, the researcher will have a deep understanding of the research questions (Saunders, Lewis, & Thornhill 2015). Despite its numerous strengths, one of the challenges with the design is that it fails to facilitate the assessment of causal relationships (Russell, Greenhalgh, & Kushner 2015). However, the researcher gives weight to quantitative research method, because it limits the subjectivity innate in qualitative researches. In other words, the method limits the researcher's bias in the study design and data collection. Therefore, given the positivist stance adopted in this proposal and the nature of the research topic, the researcher considers that a case study is an ideal research strategy.

3.4   Data Collection Method

Preparation is critical to the success of any research. In this regard, the researcher will carry out the actual data collection after getting authorization from the University and clearance from the institution where the research will be conducted. Within the same line, it is essential to have a predefined data collection procedure in order to ensure that the collected data is reliable and valid (Johnson & Christensen 2010). For instance, potential respondents must grant consent to their participation in this research by sending back the consent form attached to the introductory letter mailed to them. The consent letter will outline detailed information regarding

the purpose and significance of the research, as well as instructions regarding the role and rights

of the participants. The primary data sources will comprise the students enrolled for the research.

Within the same context, the primary data collection techniques to be applied include

questionnaires and literature review. The key advantage of the questionnaires is that the

researcher can send it to a large audience if compared to interviews (Creswell 2014; Jackson

2011).

This research will employ a customized questionnaire derived from the extant studies and

the Barsch's Learning Style Inventory (BLSI). Participants in both pilot and actual studies will

take the self-evaluation survey. The questionnaire will collect demographic data about the

participants, including gender, age and nationality. The questionnaires will be mailed and

completed online.

3.5   Target Population, Sample Size, and Sampling Method

Population refers to the specific number of individuals chosen to be evaluated as the

sample of the research (Saunders, Lewis, & Thornhill 2015). Sampling is the process aimed at

selecting the subset of the targeted population. It is evident that people learn through different

learning styles and that a significant demographic group that spends a huge part of their time

acquiring knowledge comprises students (Gokalp 2013; Wilkinson, Boohan, & Stevenson 2014).

Therefore, this research targets undergraduate students studying at Financial Training &

Management Services (FTMS) College in Malaysia. Typically, undergraduate students come

from diversified background, including country, ethnicity, and religion; hence, representative of

the students from different backgrounds. The research also targets all students at FTMS because

correlational studies require a large sample size. Using the sample size below, a population of

N=400 students, a 5% margin of error and confidence level of 95% gives sample size of 197

students.

$$\frac{\dfrac{z^2 \times p\,(1-p)}{e^2}}{1 + \left(\dfrac{z^2 \times p\,(1-p)}{e^2 N}\right)}$$

Where N is the size of the targeted population, e is the margin of error, and z is the z-score.

According to Johnson and Christensen (2010), a sample is the subset of research participants that

represent the study population. A sample of 50 MBA students randomly chosen will provide a

researchable sample. In defence of random sampling, Creswell (2014) highlights that the

technique eliminates bias. Most importantly, random sampling provides all potential participants

with equal chances to be included in research (Bryman & Bell 2015; Silverman 2013). To recap,

the participants in this research will be MBA students.

3.6 Data Instruments

The adopted quantitative research method will entail two sections: demographic data and

Licker-scale-type questions. The first section is aimed at collecting demographic data, including

age, gender, and the level of education. On the other hand, the second section will be dedicated

to collecting information about various learning styles and students' academic performance. The

following steps will be used to develop the research questionnaire:

1. Specification of the information to be collected;

2. Determination of the ideal form of response;

3. Determination of the wording and sequence of questions;

4. Re-examination of the above-indicated steps;

5. Pre-testing of the questionnaire.

Traditionally, the credibility of research data in empirical or scientific studies is ensured by means of the reliability, validity and objectivity criteria, as they are relatively straightforward and based on standardized instruments (Johnson & Christensen 2010). Research findings are externally valid – can be generalized or transferable – if they fit in the external context of the actual study. For instance, the research findings will be valid if they fit outside the case study context. The problem of validity or bias will be addressed through both triangulation – the application of multiple sources and methods (Jackson 2011). The use of random sampling will ensure that the research sample is representative of the target population and the findings are valid. Reliability is analogous to dependability – consistency of observing the research findings under similar conditions (Kothari 2014). The results of the research will be deemed reliable if they can be replicated in a similar context using similar participants. Reliability is virtually impossible, because human behaviour is contextual and highly dynamic, depending different factors (Cozby & Bates 2012; Crowder 2017). Therefore, the researcher will focus on the reliability of the data collection instruments. The first measure will entail conducting a pilot study, which will include 20 participants. Experts in the domain will also review the questionnaire. Beyond validity and reliability, the researcher will cultivate the trustworthiness of the findings by maintaining objectivity or confirmability. This gaol will be achieved by corroborating research findings obtained by other researchers.

3.7   Ethical Considerations

The researcher will seek clearance from the University and consent from potential participants before starting the actual research. It is not only ethical but also professional to consider the University's code of ethics (Bryman & Bell 2015; Vainio 2013). Within the same context, the researcher will ensure that the participant's privacy and confidentiality are

maintained. One of the measures that the researcher will take is the application of alphanumeric codes in order to conceal participants' identity instead of the indication of their real names. Furthermore, the collected data will also be stored in a secured electronic vault and used only for the purpose stated in the consent letter.

3.8   Data Analysis Plan

The essence of data analysis and presentation is to ensure that the collected research data is organised and structured in a way that generates a certain meaning (Bryman & Bell 2015). To achieve this goal, the data collected will be entered and analysed utilizing IBM's SPSS version 21.0. The numerical data will be computed statistically in order to generate frequencies, percentages, means, as well as standard deviations. Charts and tables will be used to present data, and the responses provided by the participants will be analysed and interpreted to draw specific findings or conclusions.

4   Data Analysis: Results and Findings

The previous chapter described the methodology employed for the present study and the profile for FTMS College in Malaysia, while the current chapter presents a statistical analysis of the research data and findings. After data collection, SPSS 21.0 statistical software was used to process the data and compute various variables and attributes of the learning styles and academic performance. The adopted statistical techniques include normality test, reliability test, mean, standard deviation, chi-square, variance, correlation, and regression analysis. This was achieved after obtaining 342 questionnaires from FTMS College. The aim of the study is to investigate and analyse the impact of learning style on students' academic performance. Relevant conclusions are based on the collected data. It entails reasonability and suitability of the statistical instruments, descriptive statistics of the variables and regression analysis.

4.1 Demographic Results

4.1.1   Gender

As illustrated in Table 1, out of the 342 respondents 42.1 (n=144) were female and 57.9 were male (n=198).

Table 1 Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	144	42.1	42.1	42.1
	Male	198	57.9	57.9	100.0
	Total	342	100.0	100.0	

4.1.2 Age

Table 2 shows that majority of the respondents (45%, n=154) were aged between 26 and

30 years.

Table 2 Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	26 to 30	154	45.0	45.0	45.0
	31 to 35	59	17.3	17.3	62.3
	36 to 40	27	7.9	7.9	70.2
	41 and Above	16	4.7	4.7	74.9
	Below 25	86	25.1	25.1	100.0
	Total	342	100.0	100.0	

4.1.3 Marital Status

Expectedly, most respondents (62.6%, n=214) were single. Married respondents

accounted for 33% (n=113) of the total respondents. Only one respondent was a widow, and the

remaining 14 (4.1%) were divorced.

Table 3 Marital Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Divorced	14	4.1	4.1	4.1
	Married	113	33.0	33.0	37.1
	Single	214	62.6	62.6	99.7
	Widow/Widower	1	.3	.3	100.0
	Total	342	100.0	100.0	

4.1.4 Academic Result

Table 4 Academic Result for Anyone of the Semester Average Score

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	40 to 49 (Passed)	16	4.7	4.7	4.7
	50 to 69 (Merit)	123	36.0	36.0	40.6
	70 to 79 (Distinction)	146	42.7	42.7	83.3
	80 and above (High Distinction)	48	14.0	14.0	97.4
	Below 40 (Failed)	9	2.6	2.6	100.0
	Total	342	100.0	100.0	

Academically, most students averagely scored merit (n=123. 36%) and distinction

(n=147, 42.7%).

4.2 Normality Test

One essential assumption is that the normal distribution, also known as referred to as the

Gaussian distribution of a data set should be followed by error terms (Das & Imon 2016;

Mellinger & Hanson 2017). Hence, the normality test was utilized to test whether the results

were normally distributed or not, as well as to demonstrate the validity of the results. Skewness

and Kurtosis test were used for checking normality distribution for 342 respondents. Kurtosis

illustrates the peak of the bell curve, whereas Skewness predicts if the data is balanced (Das &

Imon 2016). Typically, data must be within the ±1.00 range to limit excessive variation from the

expected normal distribution. Consistent with Table 2, skewness values range between -1.399

and -0.849. This is beyond the standard range (Totton & White 2011). In the same line, Kurtosis

values are greater than the ±1.00 range for AL2 (1.397), SL2 (1.077) and AP4 (1.270).

Table 5 Skewness and Kurtosis

	Descriptive Statistics						
	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
AL1	342	4.15	1.178	-1.266	.132	.499	.263
AL2	342	4.17	1.020	-1.335	.132	**1.397**	.263
AL3	342	4.13	1.126	-1.198	.132	.489	.263
AL4	342	4.10	1.163	-1.246	.132	.651	.263
AL5	342	4.04	1.163	-1.227	.132	.671	.263
VL1	342	4.00	1.170	-1.022	.132	.095	.263
VL2	342	4.04	1.144	-1.174	.132	.601	.263
VL3	342	4.07	1.141	-1.185	.132	.603	.263
VL4	342	3.99	1.181	-1.094	.132	.309	.263
VL5	342	4.04	1.156	-1.124	.132	.400	.263
VEL1	342	4.01	1.142	-1.110	.132	.480	.263
VEL2	342	3.99	1.199	-1.191	.132	.555	.263
VEL3	342	4.02	1.110	-1.031	.132	.343	.263
VEL4	342	4.01	1.179	-1.135	.132	.402	.263
VEL5	342	3.81	1.265	**-.849**	.132	-.337	.263
SL1	342	4.00	1.168	-1.151	.132	.447	.263
SL2	342	4.09	1.111	-1.321	.132	**1.077**	.263
SL3	342	4.05	1.111	-1.214	.132	.790	.263
SL4	342	4.07	1.102	-1.065	.132	.296	.263
SL5	342	3.96	1.158	-.979	.132	.073	.263
AP1	342	4.01	1.160	-1.128	.132	.377	.263
AP2	342	4.06	1.091	-1.173	.132	.786	.263
AP3	342	3.92	1.244	-1.095	.132	.133	.263
AP4	342	4.18	1.088	**-1.399**	.132	**1.270**	.263
Valid N (listwise)	342						

Lack of pointiness (kurtosis) and symmetry (skewness) are predominant ways in which a study distribution can deviate from normal distribution. In normal distributions, the values of

skewness and kurtosis should be zero. It is observed the Kurtosis values for some variables are higher than others variable for a normal distribution. That is to say, the presence of high Kurtosis lead to variance from normality. To improve the trustworthiness of the results, a reliability test is conducted in the next section.

4.3 Reliability Test

Reliability test entails the degree to which research measurements are repeatable by the same researcher using different metrics of the same attributes (Creswell 2014). Reliability is also defined as the ability of metric to generate consistent results using the same entities but under different conditions (Field 2012). In other words, reliability is an index of an instrument's effectiveness. Cronbach's alpha – reliability coefficient – was utilized to estimate the reliability of the questionnaire based on the average correlation of test items (Kothari 2014; Leech, Barrett & Morgan 2013). The corresponding values for the learning style variables are given in Table 6.

Table 6 Reliability Test

Learning Style/Academic performance	Cronbach's Alpha	N of Items
Active learning	.815	5
Visual learning	.804	5
Verbal learning	.760	5
Sequential learning	.752	5
Academic performance	.676	4

Using Cronbach's alpha to test the reliability of present study show that the values for all learning styles above 0.6. Some researchers also use cut-off range of .7<= alpha<.8 (Garson 2012). Consistent with Creswell (2014), a variable or construct is deemed reliable of it has a Cronbach Alpha value above 0.6. Therefore, the reliability of the questionnaire is was found to be high. The coefficient assesses the reliability – internal consistency of set of test items or scale (Crowder 2017). The corresponding Cronbach alpha values for active, visual, verbal and sequential learning style came as 0.8, 0.8, 0.76 and 0.75 in that order. Therefore, the questionnaire was considered reliable for the research.

4.4 Data Distribution Graphs

Consistent with the conceptual framework presented in the literature review chapter, additional normality diagnostics were conducted visually using Histogram, P-Plot and Scatter Plot. The essence of these normality tests is to establish the existence of relationships between the dependent variable (academic performance) and independent variables (learning styles), and that valid results will be generated after analysis. The research model entails four independent variables (i) active learning – AL, (ii) visual learning – VL, (iii)verbal learning – VEL, and (iv) sequential learning – SL. The ensuing histogram and plots illustrates the impact of the above independent variables on academic performance.

4.4.1 Histogram

Normal distribution is displayed in a bell-shaped curve (Das & Imon 2016; Park 2015). Figure 1 illustrates an acceptable asymmetrical bell shape for the research results returned by plotting the values of dependent variable. From the observation, the results present an almost bell-shaped curve, implying that the data is normally distributed (Garson 2012; Leech, Barrett & Morgan 2013).
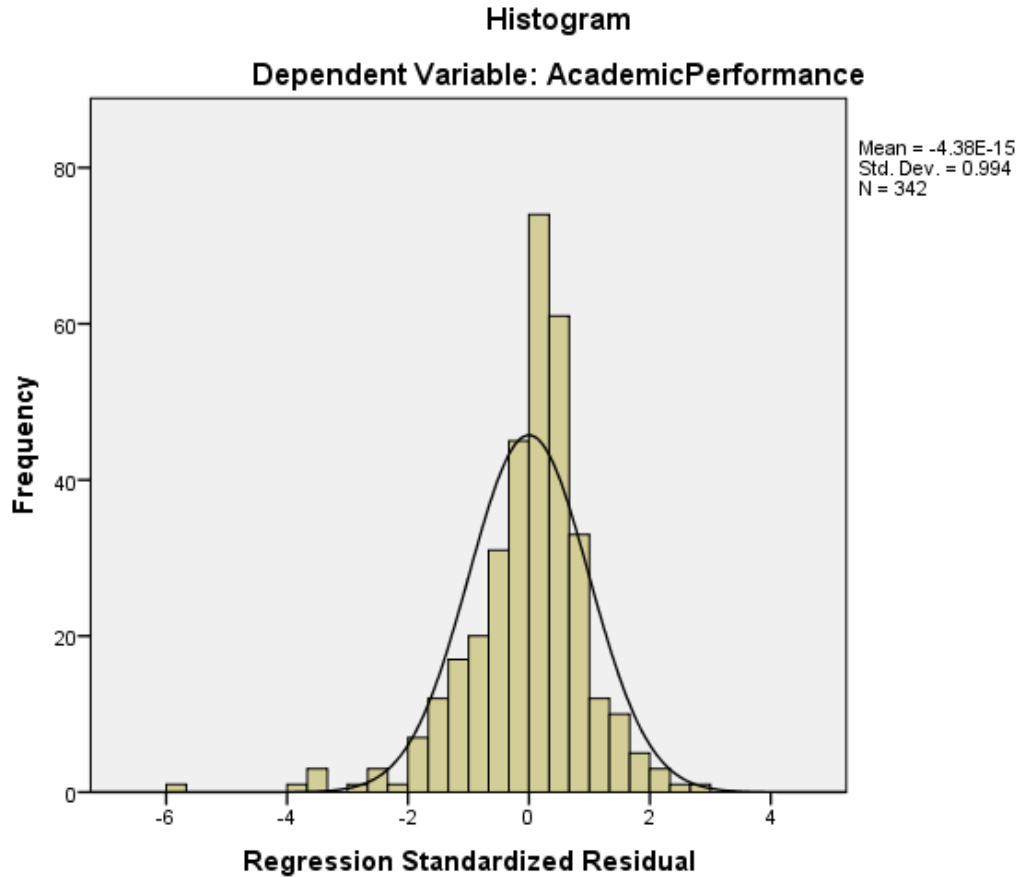
Figure 2 Histogram (Source: SPSS)

4.4.2 Percent-Percent (P-Plot)

Percent-percent or probability-probability plots (P-P plots) are normally used to display linearity in research variables, whereby changes in one variable induce a change in other variables (Das & Imon 2016; Ghasemi & Zahediasl 2012). Normality is observed in P-Plots when residual plots are close to diagonal lines of a normal distribution line (Field 2012). Figure 2 illustrates a small departure from the diagonal normal distribution line but the residual plots are close to the diagonal line. Therefore, the results illustrate data normality consistent with the normality test and histogram diagnostic above.
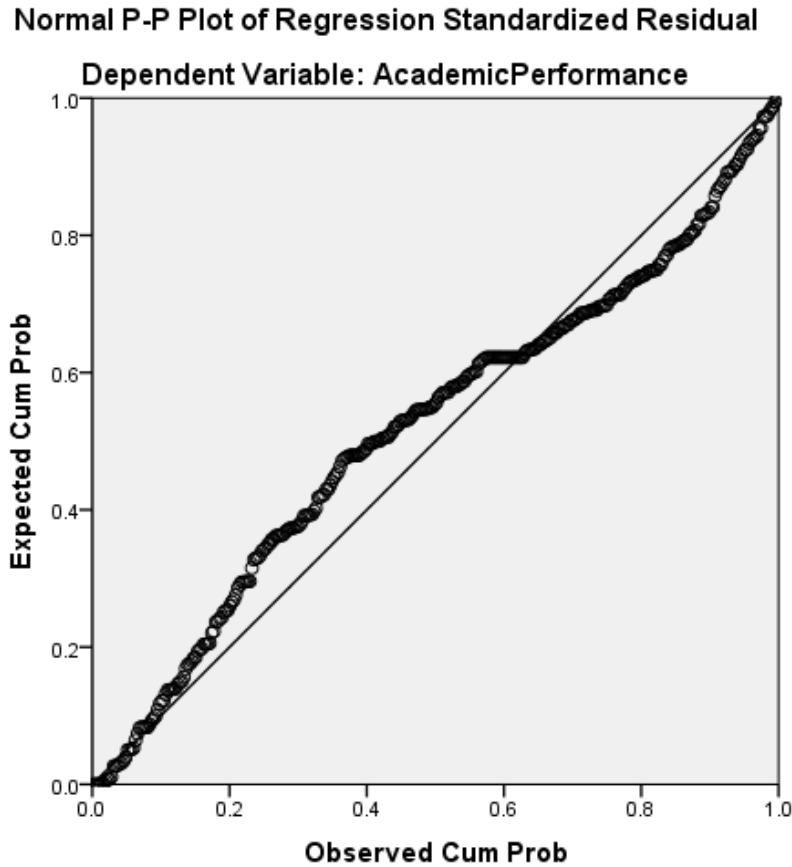
Figure 3 P-Plot (Source: SPSS)

4.4.3 Scatter Plot and Regression Plots

A scatterplot is a valuable tool for exploring linearity so that regression analysis or correlation coefficients are appropriate tools for analyzing statistical data (Mellinger & Hanson 2017).
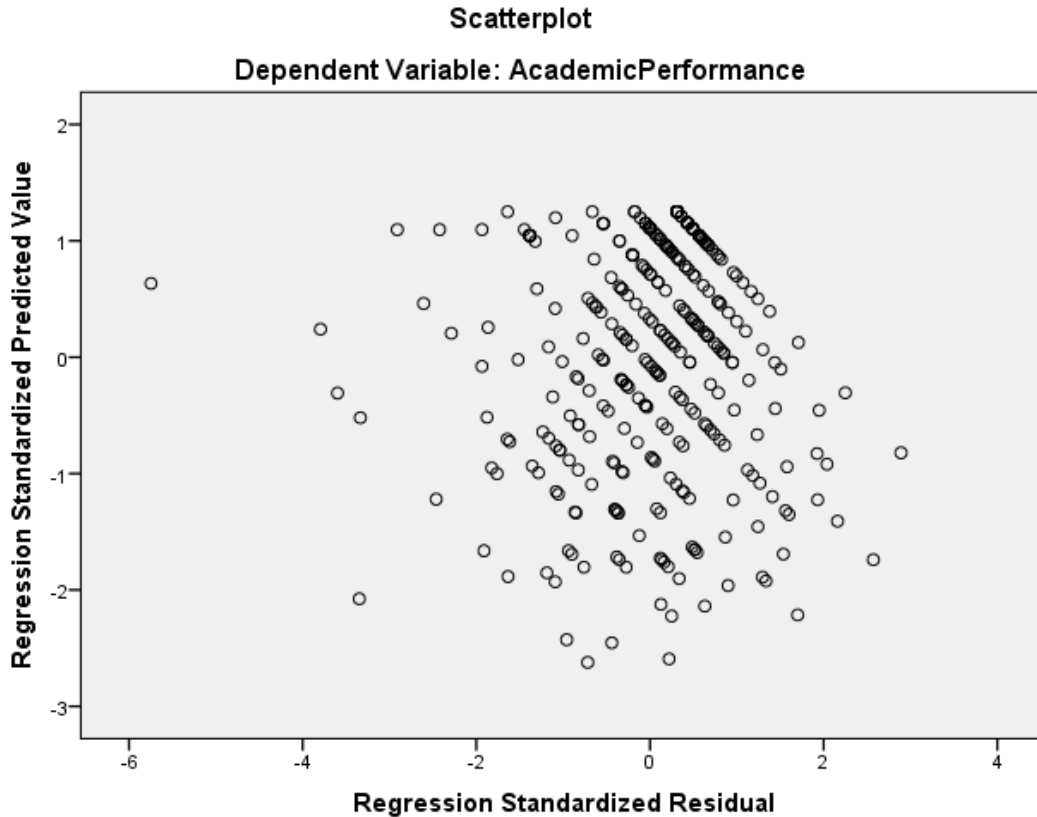
Figure 4 Scatter Plot

The scatter plot in Figure 3 illustrates the consistency of the connections between variables. It is evident that the variables are near to the standardized plot of value 0 (zero). With most plots above zero, it is obvious that there is a positive relation between learning style and academic performance.

Figure 4 visually illustrates the linearity of partial plot of individual learning styles against academic performance. All the four regression plots show a strong positive relations academic performance and the corresponding learning styles.
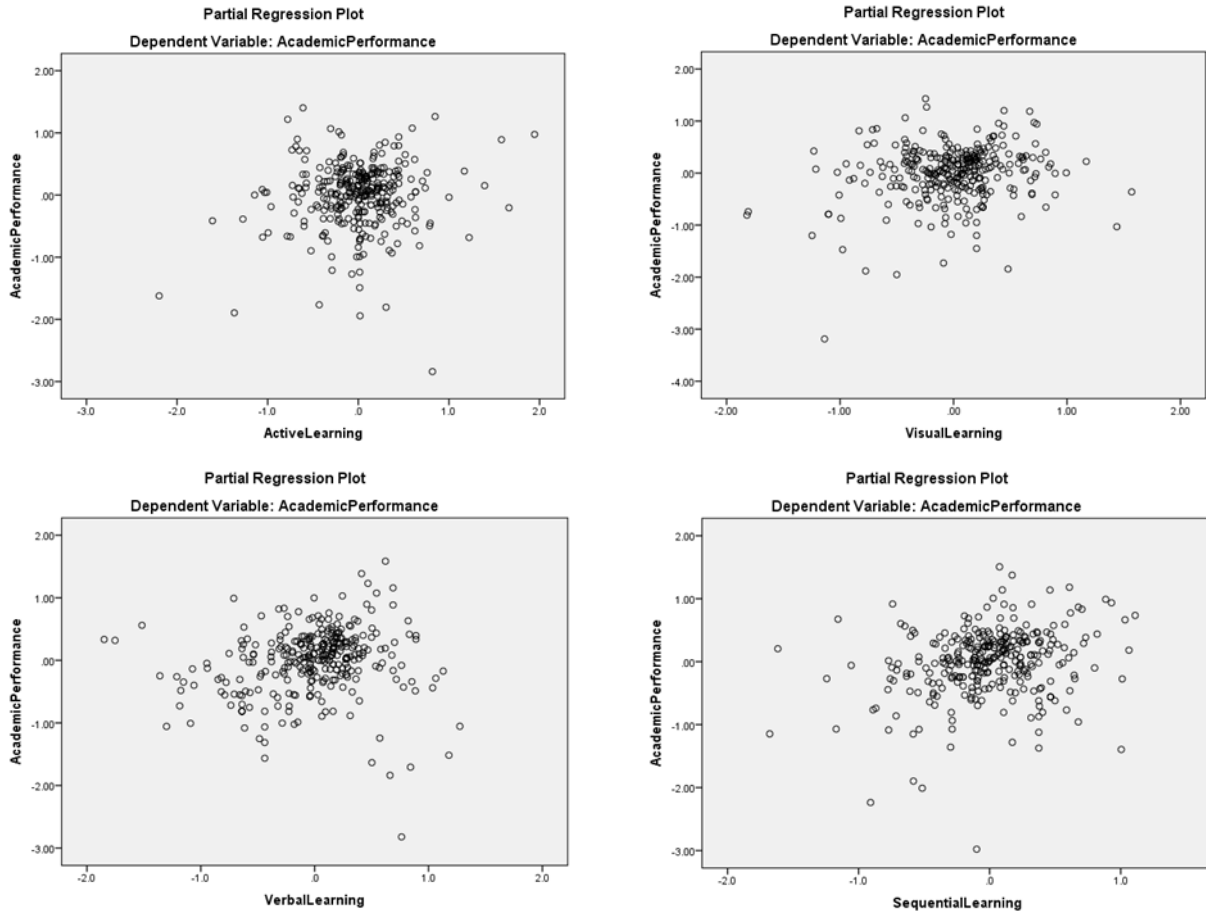
Figure 5 Regression Plots for Learning Styles

4.5 Descriptive Analysis: Mean and Standard Deviation

Descriptive statistics are valuable in describing the fundamental feature of research data, such as the summary for the measures of data and questionnaire variables. Additionally, these statistics help researchers to mange a large data set by presenting its summary (Collis & Hussey 2013). Within the same context, the validity of the research sample is presented. SPSS 21.0 statistical software was used to generate the descriptive statistics for the research data. Table 7 presents the overview of both dependent and independent variables.

Table 7 Descriptive Statistics for Active Learning, Visual Learning, Verbal Learning, Sequential Learning and Academic Performance

	N	Minimum	Maximum	Mean	Std. Deviation
Active Learning	342	1.0	5.0	4.119	.8575
Visual Learning	342	1.25	5.00	4.0278	.89063
Verbal Learning	342	1.4	5.0	3.970	.8427
Sequential Learning	342	1.6	5.0	4.037	.8010
Academic Performance	342	1.00	5.00	4.0424	.81704
Valid N (listwise)	342				

Standard deviation shows data variance, whereas the mean is a metric for central tendency (Johnson & Christensen 2010). From the dependent variable perspective (academic performance), the mean is approximately 4.04, with a minimum, maximum and standard deviation of 1.0, 5.0, and 0.82 respectively. In terms of independent variables, verbal learning stands out as having the smallest mean of 3.97. Active learning had the largest mean value of 4.12. The high mean score mirrors major learning styles for active learning, sequential learning, visual learning and verbal learning in descending order of preference. The results showed that most students adopted multiple learning styles.

4.6 Correlation Analysis

Pearson correlation measures the strength of any linear relationship between variables. Similar to the coefficient used in linear regression, the Pearson coefficient ranges between -1 to +1 (Jackson 2011). A positive one (+1) values means that there is perfect positive relationship between the correlated values. On the other hand, a negative one (-1) values indicates a perfect negative correlation between the variable. In the same context, a coefficient of zero (0) shows that there is no relationship between the variables. This study employed an independent t-test –

inferential statistical test – to determine whether there was any statistically difference between the means of two distinct groups.

Table 8 Correlations

		Academic Performance	Active Learning	Visual Learning	Verbal Learning	Sequential Learning
Academic Performance	Pearson Correlation	1	.693**	.718**	.699**	.738**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	342	342	342	342	342
Active Learning	Pearson Correlation	.693**	1	.831**	.714**	.776**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	342	342	342	342	342
Visual Learning	Pearson Correlation	.718**	.831**	1	.763**	.779**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	342	342	342	342	342
Verbal Learning	Pearson Correlation	.699**	.714**	.763**	1	.814**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	342	342	342	342	342
Sequential Learning	Pearson Correlation	.738**	.776**	.779**	.814**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	342	342	342	342	342
**. Correlation is significant at the 0.01 level (2-tailed).						

As shown in Table 8, there is a significant correlation between active learning and academic performance. Active learning is also positively correlated with academic performance

(.693, p<0.05), which is a depiction of a strong relation between the variables. In other words, academic performance improves with the degree of active learning. There is also a strong and positive correlation between academic performance and other learning styles; visual learning (.718, p<0.05); verbal learning (.699, p<0.05), and sequential learning (.738, p<0.05). The above results suggest that sequential learning, visual learning, verbal learning and active learning are strongly related to academic performance in descending order. There are also significant correlations between visual and active learning (.831, p<0.05), as well as between verbal and sequential learning (.814, p<0.05). These results suggest that effective learning style at FTMS College will improve the academic performance of students.

4.7 Regression Analysis

Regression analysis estimates are valuable in explaining or describing the relationship between a dependent variable (DV) and independent variables (IV) in a quantitative study (Bryman & Bell 2015; Ott & Longnecker 2015). In this context, academic performance is the dependent variable, whereas learning styles are the independent variables. While the above Pearson's correlation concentrates on the strength of the relationship between academic performance and learning styles, regression analysis assumes a causal or dependence relationship between DV and IVs. Considering this imperative, linear regression was conducted to explore the impact of learning styles (AL, VL, VEL, SL) on academic performance (AP).

Table 9 Model Summary

Model Summary[b]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.781[a]	.611	.606	.51277	1.772
a. Predictors: (Constant), Sequential Learning, Active Learning, Verbal Learning, Visual Learning					

b. Dependent Variable: Academic Performance

Table 9 presents a summary of the model for the linear regression of learning style and academic performance. As illustrated in Table 9, R square is 0.611, which implies that 61.1% of Table 9 presents a summary of the model for the linear regression of learning style and academic performance. As illustrated in Table 9, R square is 0.611, which implies that 61.1% of the DV (academic performance) can be predicted from the IVs. Additionally, the adjusted values of R squared (0.606) shows that the model is fit. The Durbin Watson value of 1.722 shows that the there is no autocorrelation among the selected student participants in the research.

Table 10 Model Coefficients

Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	.708	.149		4.738	.000
Active Learning	.130	.063	.136	2.072	.039
Visual Learning	.213	.063	.232	3.361	.001
Verbal Learning	.164	.061	.169	2.697	.007
Sequential Learning	.320	.069	.314	4.633	.000
a. Dependent Variable: Academic Performance					

Findings from Table 9 and Table 10 revealed that learning style has a positive predictive value in the academic performance of students at the FTMS College. The results also show that learning style makes 61.1% contribution in predicting academic performance. For the B value of

.708, it can be noted that for every unit increase in learning style score, there is a 61.1% increase in academic performance.

According to the table, no active learning beta value is .136 with a significant value of .039 which is lower than the rule of thumb applied in this research. The results indicate that active learning positively relates with academic performance. These results are consistent with a previous research that examined the infleunce of active learning on academic achievement motivation in Karaj High Schools (Soltanzadeh, Hashemi, & Shahi 2013). Using the independent t test, the results showed a significant difference between the students that adopted an active learning style and those who studied following traditional approaches. In her study, Hightower (2011) found that one of the challenges linked to an active learning style is that the educators are sometimes unsure of how to promote the style for their students (Hightower 2011). This finding could explain a slightly low correlation between an active learning style and academic performance compared to other types of the learning styles. Active learning can contribute to a positive and significant social change when students with the ability think critically and solve problems in the participatory settings, which bring valued expertise and experience to the real world environments. A more recent longitudinal empirical investigation on student academic performance and perception about the impact of active learning classrooms showed that ACLs are effective for nurturing innovation among students, irrespective of their academic capability (Chiu & Cheng 2017). Research has also shown that students with an assimilator style of learning get higher scores than those with a converger learning style (Sen & Yilmaz 2012). In agreement with other studies on the efficacy of active learning (Aksit 2011; Ali & Mousa 2016; Choi, Yu, & Loquias 2014), these results illustrated that an active learning style is valuable,

because it has a positive effect not only on the quality of students' learning processes, but also on the achievement of their motivation.

Table 10 also shows that visual learning has a positive impact on academic performance as illustrated by a beta value is .232 with a significant value of .001. In their study on the impact of the *ATTTCSE Digital Video Project* on the academic achievement of students, Figg and McCartney (2010) reported similar results to those obtained in this research. . However, it should be noted that the adopted digital storytelling model has descriptive, photo essay, narrative, sequential and interactive aspects. In other words, the approach was a combination of different learning styles. In agreement with Omar, Mohamad and Paimin (2015), learning styles are not the only determinant factor for academic performance, but the educators can utilize them to identify the effect of the learning styles preferred by students.

According to Table 10, verbal learning style has a positive effect on the academic achievement of students at FTMS college as illustrated by a beta value is .169 with a significant value of .007. This result is in line with a previous study by Pallapu (2007). The researcher proved that verbal learners had lower academic success rates than visuals learners had.

Lastly, Table 10 also demonstrates that that academic performance is positively (significant value of 0.0) influenced by the sequential learning style by a beta value of .314. This observation is in contrast with Omar, Mohamad and Paimin's (2015) assertion that learning styles lack a significant relation with the academic performance of students. However, the underlying results compliment the research conducted by Veselinovska (2014). The researcher showed that academic excellence in scientific lessons commenced with a slide demonstration or an experiment, was higher than in the lessons started with lecture methods. Typically, traditional lectures largely employ a verbal learning style.

Consistent with the above findings, the research model is summarized as follows:

$$AP = 0.136\ (AL) + 0.232\ (VL) + 0.169\ (VEL) + 0.314\ (SL)$$

Collectively, Table 11 gives a summary of the hypothesis testing. The alternative hypothesis is accepted or the null hypothesis is rejected where there is significant level.

Table 11 Summary of Hypothesis Testing

Alternative Hypothesis (H_{1n})	Beta Coefficient	Sig. Value	Result
H_{11}: Active Learning has a positive correlation with academic performance	.136	.039	Accepted
H_{12}: Visual Learning has a positive correlation with academic performance	.232	.001	Accepted
H_{13}: Verbal Learning has a positive correlation with academic performance	.169	.007	Accepted
H_{14}: Sequential Learning has a positive correlation with academic performance	.314	.000	Accepted

4.8 Chapter Summary

Chapter 4 analysed and presented the results of the study developed in the introduction, literature review and methodology chapters. This was accomplished by testing the reliability of the research instrument, correlation analysis and regression analysis. The ensuing chapter will discuss the computed results in detail.

5   Conclusion and Recommendations

This study contributes to the great number of researches on the impact of learning styles on the college students' academic performance. The research objectives were achieved by following the chosen conceptual model. The chapter includes sections present the conclusions and recommendations corresponding to each research objective. It also comprises research limitations, suggestions for further research, and research implications.

5.1 Conclusions

This research described the impact of learning styles on the academic performance of college students. The researcher observed that most participants were multimodal learners, which is valuable from both teaching and learning perspectives. This section uses research objectives to discuss and conclude research findings. The following are conclusions from the research findings:

5.1.1 Objective 1: To determine the impact of active learning on student's academic performance

The correlation analysis done in this research demonstrated that active learning is positively correlated with academic performance (.693, $p<0.05$), which is an illustration of a strong relation between an active learning style and students' academic performance.

5.1.2 Objective 2: To determine the impact of visual learning on student's academic performance

The regression analysis of the visual learning variable showed that it has a causation relationship with academic achievement. Correlation analysis results also showed that there is a strong correlation between academic performance and visual learning (.718, $p<0.05$).

5.1.3 Objective 3: To determine the impact of verbal learning on student's academic

performance

Similar to the above, learning styles, verbal learning has a significant impact on the academic performance of students. In the same line, a learning style has a positive relationship with academic performance (.699, $p < 0.05$). Therefore, this finding reinforces the significance of addressing individual learners' needs by the educators in the educational settings, as well as chances of enhancing a curriculum.

5.1.4 Objective 4: To determine the effect of sequential learning on student's academic

performance

Results showed that sequential learning has a positive relation and a significant impact on the academic performance of college students (.738, $p < 0.05$). This finding stresses the significance of sequential learning in colleges. In summary, sequential, verbal, visual and active learning styles have a significant effect on the academic achievement of college students in Malaysia. A combination of four learning styles has a better outcome than that when one style is used independently. Although a sequential pattern was a dominant style in this research, it is imperative that college students practice and apply other learning styles (John, Shahzadi, & Khan 2016). Therefore, the application of different learning styles is needed to improve college students' academic performance in the current era of information and technological advancements.

5.2 Recommendations

This research provides some essential and valuable insights into the impact of learning styles on the academic performance of college students. Consistent with the above findings, the following recommendations are provided:

Firstly, colleges and educators should employ a combination of learning styles with emphasis on active participation in order to increase motivation and greater awareness of the future opportunities for students. According to research results, as there is a correlation between learning styles and academic performance, the learners that adopt a pragmatic (multiple learning styles) approach are successful in their academic studying (Ling, Basit, & Hassan 2017; Polat et al. 2015). In other words, educators and institutions should incorporate various learning styles and efficient teaching methods.

Secondly, since learning styles are not the sole determinant of student's academic performance (Omar, Mohamad, & Paimin 2015; Nzesei 2015), educators should also take into account the learning environment, teacher-related factors, students' background, and government policies in order to improve the academic achievement and motivation of their students.

Thirdly, educators should design and implement efficient academic programs in order to improve learning strategies and styles in all learning levels so that both learning and teaching processes could be more effective. According to Gokalp (2013), the course design should also be flexible to combine as many learning styles as possible. Sen and Yilmaz (2012) also stressed that educators should structure their curriculum considering different learning styles.

Lastly, educators should adequately guide and encourage their students to select those learning styles that are both applicable and appropriate to their changing learning environment in order to achieve their academic objectives. In other words, students should only adopt those learning styles that suit their goals.

A similar research should be conducted using a longitudinal empirical design in more than one academic institution in Malaysia.

5.3 Implications of the Findings

This research provides valuable knowledge for educators and academic institutions that are yet customize or planning to adopt a combination of learning styles to effectively teach their students. The underlying theoretical implications include:

    i.   Educators and institutions that are using the minimum of two learning styles should be encouraged by education policy makers or the government in a bid to induce innovation and boost motivation while improving academic performance, regardless of a student's ability.

    ii.   The fact that students are multimodal, educators should guide and encourage students to choose the most suitable learning style for them in order to achieve their academic goals.

    iii.   Policy makers and the government should introduce and implement the policies that allocate resources for curriculum enhancements possibilities in line with the changing informational needs and technological advancements.

5.4 Limitations of the Research

The first limitation of the research relates to the size of the sample employed, because it was drawn from only one college in Malaysia. The small sample from the large population of college students in Malaysia hinders the generalizability of the research findings. However, the sample generated reliable results. Ideally, the sample size should have randomly included students from the randomly chosen colleges across the country to improve its external validity (Creswell 2014). Since the researcher focused on the quantitative aspect of the research to collect primary data, other researchers should consider collecting the qualitative data using the interviews in order to provide the quantitative findings (Flick 2009; Leedy & Ormrod 2015;

McMillan & Schumacher 2014). As argued by John, Shahzadi and Khan (2016), the focus on only a quantitative approach fails to identify the reasons for preferences.

5.5 Future Research Direction

This research indicates that a sequential learning style has the most significant impact on the academic performance of students at FTMS College. Least research has been done in this domain in Malaysia; hence, the scope of research within the same line in different academic institutions will be of great significance. To ascertain these findings, future research should investigate the effects of sequential learning using a pretest-posttest experimental design with both control and experimental groups. While sequential learning techniques are adopted for the experimental group, the control group should use traditional learning techniques. Future mixed methods research should also consider a longitudinal time horizon and the application of the interviews to improve the data credibility and acceptability of the research findings. Lastly, although the researcher focused on students at FTMS College, other researcher should randomly recruit participants from randomly selected colleges globally in order to improve the validity of the research findings. The underlying rationale is that a large sample size in future studies could help researcher monitor the impact of demographical factors on learning styles.