



LEARNING STYLES AND ATTITUDE TOWARDS E-LEARNING AMONG
UNIVERSITY UNDERGRADUATE STUDENTS IN INTERNATIONAL PROGRAMS
IN BANGKOK THAILAND

Shannel Lee Faderogaya

A Thesis Submitted in Partial Fulfillment
of the Requirements for the Degree of
Master of Science in Counseling Psychology

Graduate School of Psychology
Assumption University of Thailand
Thailand

2018

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ABSTRACT

The emergence of technology in education trends changed the way classroom instructions are delivered and acquired. Since then e-learning has been widely used in the academic system to fill in the gaps where traditional classroom setting has reached its limit. Progressively institutions from all over the world have provided various e-learning programs to accommodate the demand for more online based educational platforms.

This study attempted to investigate the relationship between learning styles in terms of instructional preference, social interaction, information processing and personality in learning style in terms of visual, auditory and tactile; and attitude towards e-learning among university undergraduate students' in international programs in Bangkok Thailand. This study utilized the Learning Style Scale, Learning Style Inventory-Likert and E-learning Acceptance Scale in the form of demographic questionnaire to 300 university undergraduate students in selected universities in Bangkok Thailand to test the hypothesis and for data collection. Reliability test and regression analysis were also employed for data analysis.

The result of the current study revealed that there is a significant relationship between learning style in terms of instructional preference and information processing; and attitude towards e-learning among university undergraduate students in international programs in Bangkok Thailand. Moreover, the current study also finds that there is a significant relationship between personality in learning style in terms of visual and tactile; and students' attitude towards e-learning.

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CHAPTER I

INTRODUCTION

Background of the Study

E-learning is the use of telecommunication technology to acquire and deliver learning in training and education. It is currently emerging as a new paradigm in modern education. Thus, the use of e-learning in education has presented advantages for educators and learners. It liberates them from the limitations of space and time constraints and provides digital communication where learners are at liberty to use and access educational materials and resources anytime and anywhere they are (Sun, Tsai, Finger, Chen and Downing, 2008).

With the emergence of technology and the global speed of communication, e-learning has been widely used to pursue a higher demand in education advancement. The use of E-learning in the classrooms provides the students with flexible communication system and a faster way to communicate with other educators, students, as well as access to useful information from around the world. In their study, Dhiman, Saha and Mondal (2014) stated that the three main system of e-learning are to improve access to training and education, to enhance the quality of teaching and learning. They also added that by the acquired knowledge, e-learning provides a strategic opportunity so that institutions will be able to advance to a new field of education. Also e-learning base networking promotes knowledge sharing which improves learning efficiency, further learning innovations, as well as develops the core competitiveness in groups (Dhiman et al., 2014).

In a study Al- Adwan, Al- Adwan and Smedley (2013) added that the role and influence of technology on today's rapid changing world creates an impact to learning. In the

developing western countries, higher education believes that these developments in technology will pave the way to educational innovation in the learning environment.

Therefore, current trends in education impelled institutions from all over the world to provide online based instructions to students across the globe. For instance web conducted experiments such as the ‘electronic experiential educations’, and telecommunication or internet based education are currently taking place which employ interactive simulation and communication to students so that they can participate in an online classroom surmounting the boundaries of distance and space (Raaij and Schepers, 2006).

In Thailand, a study by Suanpang & Petocz (2006) cited that e-learning has been part of the educational reform which encouraged a “self-centered” way of learning. It is the goal of the education reform to use e-learning in a wider sense to promote quality and accessible education across the country. Moreover, Rueangpratum & Philuek W. (2009) on their study on “*E-learning in Thailand – a Survey on Current situation and trend*” they stated that ICT or Information Communication Technology has been widely utilized by the Ministry of Education and has been adopted into the education system. Since then it has brought positive outcomes in both private and public institutions. The newly developed system had provided access to the internet so that more education sectors can utilize e-learning based activities and deliver educational information to a large number of students at a lower cost. (Reaungpathum et al., 2009).

However, previous studies not only acclaimed the benefits of e-learning but also noted the deficiencies that exist and added that students drop out and non-completion of e-learning programs still needs to be addressed. For example a study in Sri Lanka found that although e-learning system is widely used among university students, it is still not considered a proper tool towards obtaining education (Andersson 2008). Thus, supported the impression mentioned by Pei-Chun Sun (2007) that although e-learning usage has been widely accepted,

there are still a number of students who discontinue the use of the system from their initial experience.

In an article published by The Nation, an online publication in Thailand stated that since Thailand had launched its Cyber University Project the higher-educational institute had organized a full set of online programs where students can have a full access to e-learning programs outside of their classroom. However study shows that only few of these institutes have focused on the e-learning programs. Professor Pavich Tongroach of the Ministry of Education stated that although several universities in Asia have shown development in specializing e-learning, little enthusiasm has been showed among prestigious state universities in Thailand when it comes to developing a full e-learning system (www.nationmultimedia.com). Thus studies claim that students' use of the e-learning system still remains an alternative to non-significant means of acquiring learning. Consequently, the current study intends to look into what factors influenced success in the use of e-learning system.

Accordingly, in a study on e-learning acceptance, Odeshi (2014) argued that attitude plays an important role in understanding success in e-learning usage. The study also added that in terms of e-learning, students tend to develop positive attitude towards the system if it is designed to adhere to their specific needs and characteristics. However, studies on attitude, barriers and motivation pointed out that it is assumed that attitudinal predisposition and institutional barriers plays a great role in delivering effective e-learning education training. Thus attitudes such as techno-phobia and unfamiliarity with technology generate skepticism, caution and resistance among other users (Pand & Mishra, 2007). In an investigation in the use of e-learning in Business Statistics where students provided feedback on their experience with using e-learning as the source of information report shows that students reflected that the course was boring and blame it to way it was delivered. However, a number of students found

it interesting and enjoyable if they were allowed to conduct hands on experiments to apply the methods they learn. Findings also concluded that interaction is important in e-learning where students benefit from synchronous and asynchronous method of online communication. It is also concluded in their research that students find e-learning useful if the course is focus on specific information that can be applied to real life situation (Suanpang & Petocz , 2016). Hence, students' attitude towards e-learning is indicative of their interest in e-learning related task. It can also be implied that students attained their learning goals efficiently if pedagogical procedures were reformed to their individual differences (Federico, 2000). So, it can be argued that it is imperative to identify students' individual difference in learning style which accordingly is the foundation of e-learning system (Robert & Dyer, 2005). In addition, study also revealed that the challenge in the education system towards creating an effective e-learning system lies on the fact that there has been a limited access to technology and materials as well as the lack of knowledge about the e-learning situation in the academic setting and the fact that students' are not aware of the academic benefits of using the system (Ngampornchai and Adams, 2016). Likewise, students may tend to discontinue using the e-learning system if it does not meet their preferred learning style (Huang, Lin and Huang, 2012).

Therefore, research suggested that before addressing required learning it is important that learners are engaged in the learning process and this can be done by determining their response towards the system (Quinn 2006). To determine students differences in learning style, Brown et al. (2005) presented a model based on Curry's Onion Model to represent the learners' taxonomy in learning style preference. The model consisted of instructional preference, social interaction, and information processing and personaliy in learning style in terms of auditory, visual and tactile. These constructs were investigated to determine their influence in student's attitude towards e-learning.

Moreover, this research identifies specific sample groups of university undergraduate students in International Programs in Universities in Bangkok Thailand with assumption that innovations in the classrooms such as the use of technology in content delivery have already been utilized. The assumption is based on the premise by (Baker, 2012) assuming that the selected group has experience cultural and education exchanges through the use of technology and internet tools such as webchats, emails, social networking sites and forums which supports social interaction and learning. Also, international programs in Thailand have become an essential part of the education system as Thailand moves towards cooperation in a global perspective. The higher education aims to produce graduates skilled for the international economy putting more effort for students to communicate in an international perspective (Sinhanet & Fu, 2015). Therefore the success of the educational system and its aims towards it globalization lies in the implementation of an effective e-learning which has a potential to provide new and alternative ways of communication and for students to acquire new skills (Deerajviset, 2014). Research shows that there are 1044 higher education programs in Thailand of which 80 are public and 71 are private universities which are fully taught in English participated by more than 20, 309 students. This is to prepare Thai students for the ASEAN community and the introduction of international based programs (Sinhanet & Fu, 2015). Thus access in learning, capability, connectivity, content and cultural awareness calls for an e-learning system to be effective (Saekow, 2011).

Statement of the Problem

The present research investigated the relationship between learning styles in terms of information processing, social interaction, instructional preference and personality in learning style in terms of auditory, visual and tactile and attitude towards e-learning among undergraduate university students in international programs in Bangkok Thailand. This study was based on a general observation that many undergraduate students experienced isolation and reluctance to engage in an e-learning system which results to academic difficulty in forms of anxiety, avoidance, stress and depression which consequently leads to dropping out or low performance.

Moreover, a review of literature revealed that there was a limited study on the underlying factors of what causes the acceptance of e-learning and how to engage students into an efficient and meaningful learning. It was also indicated that there was a need for online instructors, school counselors, educators and e-learning provider to require more knowledge and methods on online teaching. For this reason, the current research aimed to contribute descriptive data to raise importance that there was a need to determine the psychological aspects of creating an efficient e-learning system which caters to the individual differences of the students.

This current research believed that as the sophistication of technology is changing the way students learn, more students are grasping the potential of independent learning other than the tradition way. Therefore, in order to prepare for this educational transformation, it is the responsibility of competent, educators, school counsellors and e-learning institutions to look into the relationship between learning styles and students attitude towards e-learning.

Therefore this paper will investigate the relationship between learning styles in terms of instructional preference, social interaction, information processing and personality in terms

of auditory, visual and tactile; and attitude towards e-learning among undergraduate university students in Bangkok Thailand.

Purpose of the Study

This study examined the relationship between learning styles in terms of instructional preference, social interaction, information processing, personality in learning style in terms of auditory, visual and tactile; and attitude towards e-learning among university undergraduate students in international programs Bangkok Thailand.

Thus, this study determined four independent or predictor variables in terms of instructional preference, social interaction, and information processing, auditory, visual and tactile. A dependent or criterion variable in terms of students attitude towards e-learning was also presented.

In addition, these variables were selected given that these are observable in nature and sufficient enough to understand the influenced of learning style in terms of students attitude towards e-learning (Gordon and Bull (2004).

Significance of the Study

The present study attempted to determine the factors that influenced attitude towards e-learning in order to assist educators and institutions impose and create an efficient e-learning system that would best fit the students' interest. Thus, the outcome of this investigation will contribute to an understanding of student's attitude towards e-learning influenced by their learning style in terms of instructional preference, social interaction, and information processing and personality in learning style in terms of auditory, visual and tactile. Moreover, this study attempted to look into the psychological aspect of students'

attitude towards e-learning so that students are provided with mental support on how to regulate independent learning and become responsible in their own learning process. It was expected that this study will give insight of what influence positive attitude towards e-learning and the influence of learning style so that educators, e-learning provider, teachers and school counselors can effectively apply a psychological based e-learning program, create student centered e-learning activities and adapt an e-learning management systems to cope with the technical advancement in educational trends.

Lastly, this study determined the psychological aspects of attitude towards e-learning to help school counselors understand the psychological and emotional issues students face with the use of e-learning and develop intervention that will help students face academic difficulty and address challenges that hinders them from engaging in an active e-learning experience.

Definitions of Terms

- Auditory – Felder and Silverman (1988) identify auditory as a kind of learning modality where learners learn more from what they hear. Auditory learning style will be measured by means of the *Learning Style Inventory-Likert* (LSI-Likert). A Likert scale version of the learning style inventory originally developed by Kolb (1970). It will be reflected in part III items 9-16 in the questionnaire.
- E-learning – Is considered as an innovative approach which delivers interactive, learner centered, well designed and facilitated learning environment which uses digital technology resources and other forms of learning materials suited to flexible and open learning environments anytime, anywhere in the world (Alabdullaziz, Alanazy, M., Alyahya and Gall 2011).
- Information Processing - Is the change in the student's mental performance. In e-learning, information processing is considered to be influenced by human-computer interaction as well as animations (Zhang, Zhang, Yanqing, Zetian and Yanwei, 2010).

In this study, information processing will be measured by means of information processing subscale by the *Learning Style Scale* (LSS) developed by Abdollahimohammad and Jaafar (2014). It will be reflected in part II items 15-22 in the questionnaire.

- Instructional Preference - is how students obtain, sort, store and apply information. It is how individuals gather and process information base on the knowledge they acquired (Cox, 2008). In this study, it will be measured by means of the instructional preference subscale by the *Learning Style Scale* (LSS) developed by Abdollahimohammad and Jaafar (2014). It will be reflected in part II items 1-9 in the questionnaire.
- International Program – In the context of this study, International Programs are classes offered by Thai private and government universities which are fully taught in English participated by international students. At present the Thai higher institutes are preparing Thai students for ASEAN community by delivering special courses in English for special purposes as well as research and communication (Sinhanet and Fu, 2015).
- Learning Style – is defined as a coherent whole employed in the individuals' learning process and their orientation which may differ depending on their personality and cognitive functioning (McLoughlin, 1999). Learning style will be measured by the *Learning Style Scale* (LSS) developed by Abdollahimohammad and Jaafar (2014) with subscales Instructional preference, social interaction and information processing. It will be reflected in part II items 1-22 in the questionnaire.
- Personality Style – is a consistent thought, emotion and behavior pattern in an individual (Arockiam and Selvaraj, 2013). In this study, Social Interaction - is considered as the way students share information among others within and outside the

classroom (Bartomeus, 2003). It is a community where students share knowledge and support in a network activity based environment (Langley, 2007). This study, social interaction will be measure by means of the social interaction subscale by the *Learning Style Scale* (LSS) develop by Abdollahimohammad and Jaafar (2014). It will be reflected by items 10-14 part II in the questionnaire.

- Students Attitude towards e-learning- is influenced by how it is perceived through its advantage and disadvantages. It its form of education fits the students characteristics and needs, their attitude can be positive. However, if the students cannot adapt to the system due to their lack of interest and needs it require, their attitude can be negative (Bertea 2009). This study measures attitude towards e-learning by means of the E-learning Acceptance Scale developed by –Chan Lee, Yoon and Lee (2009). It will be reflected in part IV items 1-22 in the questionnaire.
- Tactile – Tactile in learning style is defined as a kind of modality where students learn more from an environment where they can touch or be physically involved with (Kratzig and Arbuthnott, 2006). In this study tactile learning style will be measured by means of the *Learning Style Inventory-Likert* (LSI-Likert). A Likert scale version of the learning style inventory originally developed by Kolb (1970). It will be reflected in part III items 17-24 in the questionnaire.
- Visual – Vincent and Ross (2001) identify visual in learning style as a kind of modality where learners most learn through visual sense. It is when learners must see in order to learn. In this study tactile learning style will be measured by means of the *Learning Style Inventory-Likert* (LSI-Likert). A Likert scale version of the learning style inventory originally developed by Kolb (1970). It will be reflected in part III items 17-24 in the questionnaire.

CHAPTER II

LITERATURE REVIEW

The present study investigates the relationship between learning styles and students attitude towards e-learning. This chapter includes discussion of theoretical perspective and related studies in the following sequence: (1) Learning style (2) Instructional preference (3) Social interaction (4) Information processing (5) Auditory (6) Visual (7) tactile (8) Attitude towards e-learning. This chapter also includes findings of the related studies showing the hypothesized relationship shown in the regression model (see figure 9) predictors and criterion variables. In consideration of the theoretical perspective and the empirical findings, the research questions and hypothesis of the present investigation are presented towards the end of this chapter

Theoretical Perspective

Learning Styles

Researchers such as Witkin (1971) and Riding (1991) defined learning style as a coherent whole based on the students learning orientation which varies in their difference in cognitive functioning and personality. In Psychology, learning style was defined as a preferred mental set and strategies each individuals use to approach cognitive tasks (McLoughlin, 1999). Moreover, learning style was defined as an individual's general tendency to approach learning and the different approaches they use in learning and acquiring knowledge. It was also mentioned that the most important development in education is to determined individuals learning differences (Cox, 2008). Studies revealed that learning style

includes cognitive, affective and psychological factors which are an indicator of how students perceive, interact and responds to their learning environment (Popescu, 2010).

Although past and other research showed contradictions on the role of learning styles and its effectiveness on the learning process (Popescu, 2010) evidence showed that learning style has greatly influenced the education field which led to optimized and tailored learning instructions (Pashler, McDaniel, Rohrer, and Bjork, 2009). According to Felder and Spurlin (2004), students have different ways and strength to process information. Some students prefer to work with facts and experimental data while others prefer to work with symbols, pictures, diagram and schematics.

In a study, Brown, Cristea, Stewart and Brailsford (2005) presented the taxonomy of learning style based on Curry's Onion model which includes instructional preference, social interaction, information processing and personality style. The figure below shows the extended Onion Model learning theory as proposed by Brown et al. (2005).

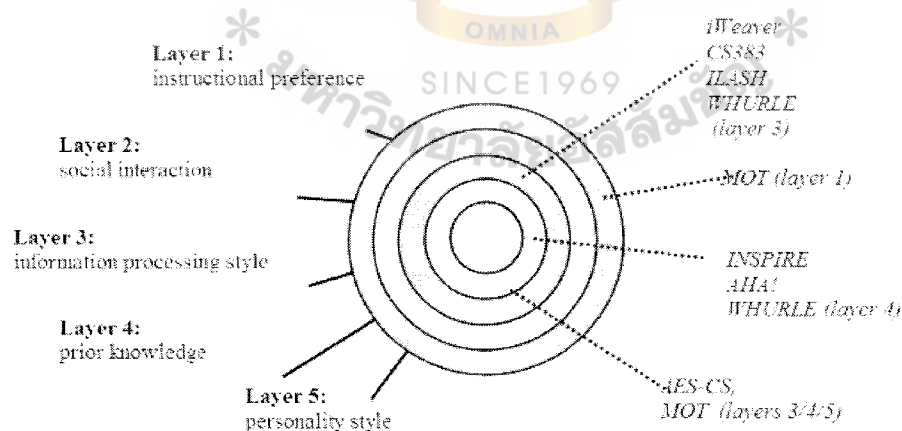


Figure 1 Curry's Onion Model Adapted for Hypermedia. Brown et al. (2005).

In their study, they proposed that students have diverse abilities and background. Hence it is important to develop a highly individualized technology-based learning design for students and avoid a “one size fits all” mentality (Brailsford, 2005).

Moreover, added that students will achieve their learning goals effectively if learning procedures and pedagogy are adapted to their learning styles. Thus in a study Federico (2000) presented Hickcox (1995) learning style inventory framework which consist of instructional and environmental preference, information processing, and personality related preference. Accordingly, when these learning preferences are understood, it improves planning, producing and implementing of educational experience (Federico, 2000). Also a similar study Cassidy (2004) proposed a four layers constructs to illustrate a layer-like model of learning which includes instructional preference, social interaction, information processing and personality style.

In contrast, a research by Roberts and Dyer (2005) mentioned that learning styles and its influence in determining students’ attitude towards e-learning is inconclusive and that learning styles has no influence on attitude. Correspondingly, some research on learning styles and its influence on e-learning also claimed it to be contradictory and indicated that it shows no significant improvement in the learning process.

However in e-learning context, a study by Alabdullaziz et al. (2011) argued that learning styles is one of the factors that influence students to continue the use of e-learning system and indicated that the way students are inclined to approach different learning situations has an impact on their learning achievement.

This study aims to investigate in influence of learning style in e-learning context by looking into the learning style constructs presented by Gordon and Bull (2004) where they introduced the Curry Onion model as a standard classification of learning style. In their study they stated that each layer consisted of different aspects of the students and how they learn.

This model also focuses on the observable traits of the students such as sociological, emotional and environmental preferences.

In a study on the Adaptation on Provisioning with respect to Learning Styles in a Web-based Educational System, Pospescu (2010) presented experiments which show that there are contradictory results in terms learning styles and its influenced on students attitude towards e-learning. However, there are also evidences that learning style has a positive influence on adapted learning environment in terms of achievement and satisfaction. A study by Pospescu (2010) recommended that although learning styles were designed for traditional setting and there is no clear indication what type of learning style is the best model, it is essential that learning style be used and adapted in a technology-based learning environment.

Moreover, research showed that the increase in the individuals learning success depended on how learning styles are determined and arranged so that it matches with the students' preference and needs (Caliskan and Kilinc, 2012). Also, Brown and Zoghi (2009) added that learning styles has an effect on students' performance in e-learning. They further discussed that to appropriately design and develop educational programs through e-learning, it is essential that preferred students learning style is evaluated. In a study on the effect of learning styles on the internet and web-based learning Liegle and Janicki (2006) found that learners with different learning styles differ in their performance in the e-learning system. Researchers also agree that learning styles conclusively influenced e-learning and is considered a valid predictor of e-learning success (K.H. Wang, T.H. Wang, W.L. Wang, and Huang 2006).

Therefore, the significance of learning style towards e-learning success is to approach it as if in the face to face classroom setting. Thus, e-learning programs should incorporate various learning activities to address different learning styles. To emphasize, study showed that there is a good reason for including technology in the learning environment and be used

to encourage students to participate in e-learning tasks in the way they prefer to learn (Cox, 2008).

Learning style in terms of instructional preference

Riding and Smith (1999) defined Instructional preference as the individual's tendency to choose and show favorable attitude towards a certain instructional method. They further suggested that individuals have specific learning styles and learning is effective if instructions are based on the preferred sensory modality students' use to process information. In their study, Pakkala, Ganashree, and Raghavendra (2014) that although learning may vary over time, it is significant to determine students' learning preference. In a research by Raines, Brabham and Aycock (2007) they mentioned that although students are the important component in the learning process, their learning preferences are not usually considered. Thus they contended that it is important that learning instructions are based on the interests of the students.

Furthermore, Cools (2011) added that at present "one-size-fits-all" paradigm is no longer effective and there is a need for educators to use a diverse method for delivering instructions to cater to the different learning preference of the students (Cools and Belens, 2011). It was also implied that a mismatch of teaching and learning preference will result to students getting bored and inattentive which may result to dropping out of the program (Yusop and Sumari, 2015). Likewise the belief that students' preference should be considered is supported by researchers such as Prosser and Trigwell (1998), Biggs (2003), Ramsden (2003) and Sadler-Smith & Smith (2004) who argued that there is a need to stress interest in the learning preference of the students and provide appropriate assistance to help them achieve their learning goals (Bambacas and Sanderson, 2011).

Learning style in terms of social Interaction

Social interaction was defined by Langley (2008) as the way students interact and engaged with others in the community. It is a process of sharing information and knowledge and providing support among others. Social Learning theory promotes that effective learning is achieved when students develop a sense of community and are encouraged to share their understanding and learning experience. Accordingly, Lehtinen and Vaurus (1995) stated that to cope with learning difficulties, students would often seek for advice and feedback from their peers and teachers before they proceed to complete a given task.

In like manner, Kreijns, Kirschner and Jochems (2003) stated that learning through social process is the natural way for individuals to learn. It is where they development understanding through interaction. Moreover, it builds effective relationships which play a significant role in the development of skills. This team-based and peer assisted learning has gain popularity over the traditional course designs and embodies a concept of active and interactive learning (Jaques and Salmon, 2007).

However, Soller (2001) stated that assigning students in groups doesn't always ensure interaction. She further stressed that students should be able to learn effectively by encouraging each other participate in an active and well-functioning groups. In a study by Hurst, Wallace and Nixon (2013) they presented that social interaction encourages students to read, think, question, and make conclusions. It also encourages them to achieve more and work faster which indicated they have a tendency to learn effectively if they learn with others (Hurst et al., 2013).

Learning style in terms of information Processing

Information processing was defined as the process of obtaining, sorting and utilizing information (Cox 2008). Leonard, Scholl and Kowalski (1999) also defined information processing as a way individuals' make decisions and process information base on their characteristics and differences. It was stated that the way individuals absorb, retain and process information may differ in their sense of modality and how well information is processed depends on whether the individual receives it in the learning modality they preferred For example, visual learner learns through visual stimuli whereas an auditory learner best learns through with spoken stimuli. Given that, researchers believe that an individual's intelligence depends on how they learn (Kratzig and Arbuthnott, 2016).

The assumption of designing learning materials is that learners learn in the same way. However, Riding & Sadler-Smith (1997) argued that the belief in this approach ignores the significant importance in individual differences. In another study, Leonard and Scholl et al. (1999) stated that information processing also called cognitive style is a way individuals' make decisions and process information base on their characteristics and difference. It when individuals create conclusion base on how they process information, organize information as well as their observation (Leonard and Scholl et al., 1999).

Furthermore, according to Klasnja-Milicevi and Vesin et al. (2011) there are different domains in processing information such as information processing (active and reflective learners), information perception (sensing and intuitive learners), information reception (visual and verbal learners) and information understanding (sequential and global learners). Hence this support the obvious that individual has different preference when it comes to their

learning needs and their approach to learning (Klasnja-Milicevic, Vesin , Ivanovic, and Budimac, 2011). To emphasize, Cassidy (2004) noted that the manner of how individuals prefers or inclined to approach learning has a significant impact on individual's performance and achievement.

Learning style in terms of personality

Personality was defined as a combination of individual's characteristics and experience which makes them unique (Ibrahimoglu, Unaldi, Samancioglu and Baglibel 2013). Burger (2008) also defined personality as the psychological functioning and characteristics which affect the way an individual feels, behaves and thinks. Research also suggested that personality is link to how individuals learn and their learning style formulation can be classified through identifying their individual personality (Jackson and Lawty-Jones, 1996).

Moreover, Sadeghi, Mohd Kasim, Tan and Abdullah (2012) also define personality is as an organized, dynamic and unique characteristic that each individual possesses which influenced and motivate behavior and cognition in different situations. In a study by Kaewkatorn and Lynch (2003), they cited that the way an individual prefers to learn is influenced by their personality. Thus research found that there is a significant relationship between students' personality and learning styles. Accordingly, learning style is influenced by the individual's personality which then affects their learning strategy resulting to a particular learning outcome (Kaewkatorn and Lynch, 2003).

Furthermore, studies indicated that personality has been widely accepted to have a decisive effect on learning and academic achievement. They further discussed that an individual's decision to abandon or pursue a learning task depends on the influence of their personality in learning style (Ibrahimoglu et. al., 2013). For instance in another study, Fariba,

(2013) indicated that learning style is a collection of individuals' preference and beliefs which is distinctive to different situations. The study reported that there is a high correlation between personality in learning styles and students' academic success.

Personality in learning style in terms of auditory, visual and tactile.

Study shows that an understanding of the various modalities of learning not only benefits educators but also the students. Using the knowledge of how students learn helps educators manage and develop teaching methods and materials that provide information across the learning style spectrum. In their study, Vincent and Ross (2001) presented a learning style modality which was derived from Kanar (1995) that describes a learning style which is associated with the learners' personality style. These factors are identified as auditory, visual and tactile. According to the learning style theory presented in a study by Felder and Silverman (1988), auditory and visual learning style are determined on how much students remember from what they hear and see whereas tactile learning style is determined on how much students can physically involve themselves in the learning process.

In a study on Learning Style Awareness by Vincent and Ross (2001), they presented characteristics which define the personality in learning styles (1) Visual learners – are those who prefer visual sense and have vivid imaginations and think in pictures and images. They are generally quiet and need to see visual representations in order to learn. These types of learners generally adapt to classroom settings and have good organization skills (2) Auditory learners – they understand better if they hear. They usually enjoy listening and talking. These types of learners don't create images in their minds but rather learn better by filtering incoming information by repeating new information. They are generally good in telling stories and their speech patterns exactly how they think. Although they become easily

distracted, these types of learners are good in classroom discussion and can repeat statements accurately (3) Tactile Learners - learn better by engaging in the learning process. They understand better if they can feel and touch what they are learning. They usually restless are disorganized and have no sense of time which makes it difficult of them to adapt in the classroom setting. Generally these types of learners have poor listening skills and can't focus on the task. However, tactile learners are outgoing and tend to express their emotions physically.

Attitude Towards E-learning

According to the study by Rema and Miliszewska (2014) the determinants of future success in e-learning rely on students' attitude with using the e-learning system. Moreover, Berteau (2009) in her study also mentioned that the efficiency of the e-learning program is influenced by factors such as how students perceive the system and their attitudes towards using these tools. Accordingly, these factors have a direct impact in students' attitude towards e-learning. Thus neglect to meet student need in terms of emotional support will diminish learning efficiency in the use of e-learning system.

Research stated that attitude is reflected through the individuals affect, behavior and beliefs towards a certain stimuli. Thus their attitude either positive or negative determines whether they refuse or engages in any activities relating to it (Ajzen and Fishbein, 1977).

Moreover, Caliskan and Kilinc (2012) added that attitude has a direct influence on the individuals' learning process. They stated that attitude is how individual learn to negatively or positively respond to certain situations, institutions, object or other people shaping their lives and their future as individuals.

Research also indicated that attitudes cannot be observe but instead can only be infer from individuals self-reports. In a study Schwarz and Bohmer (2001) cited that attitude influences individual response to a situation or object through a neural and mental state, experience, readiness and organization (Schwarz and Bohner, 2002).

Related Study on the main variables

Instructional preference and students' attitude towards e-learning.

Research indicated that it is important to consider student centered and guided learning when creating an effective learning environment. It was mentioned that one of the challenges for e-learning designers is how to create a system that is easy for the students to use (Moore, 1997).

Thus, Quinn (2006) implied that students' emotion towards the use of e-learning system is important. He further added that students use the e-learning system when they are motivated and are not anxious towards it and react differently when they are engaged through their emotional response and are encouraged to see the benefits of using the system.

Moreover, Alenezi, Karim and Malek, (2010) added that student enjoyment is one of the important factors to consider in defining students' attitude towards e-learning. He implies that students who suffer less anxiety in the use of e-learning show more intent to use it thus showing positive attitude towards e-learning (Alenezi et al., 2010). In a study, Raaij and Schepers (2008) defined computer anxiety as the feeling of emotional distress, uneasy or phobic attitude towards the use of computer and it is also one of the factors that affect the use of e-learning. Thus, negative attitude towards e-learning as a result of anxiety will reduce computer usage. Furthermore, Shen and Wang (2009) stated that students are engaged in their intellectual task if they are emotionally involved in e-learning. Evidence shows that students

learn best when their emotion is at a moderate optimal arousal. These findings indicate that there are important emotions that occurred during learning such as engagement, interest, frustrations, confusion, boredom, disappointment, satisfaction and hopefulness. Moreover, O'Regan (2003) acknowledged that there are different kinds of emotions student's experience in e-learning. These emotions are frustration, fear, anxiety and apprehension, shame or embarrassment, enthusiasm or excitement and pride. These emotions are fostered through the students' e-learning experience. They further added that students are embarrassed and ashamed if they feel that they lack competence thus they avoid taking part in e-learning task. However, if they are able to accomplish their task without difficulty, they tend to feel proud and excited thus resulting to success in e-learning. Therefore indicated that emotion plays an important role in the learning process of the students are considerably significant in student e-learning experience (O'Regan, 2003).

In contrast, Kirkwood (2009) stated that even when students use technology it doesn't mean that their behavior towards e-learning is positive. Often students show disappointment because the use of technology in formal learning is limited. When e-learning is applied in teaching, they found out that there is a difference between what e-learning promotes and the actual learning and usage of the system. Thus e-learning activities should provide a significant learning experience so that meaningful learning outcome will be achieved (Kirkwood, 2009). Also, Zhang, Zhao, Zhou, and Nunamaker (2004) cited that indeed e-learning allows students to independently review concepts and information. However, if they don't fully understand it, they may find it boring and intimidating especially when using the computer (Zhang et al., 2004).

Furthermore, Wu, Tennyson and Hsia (2016) also added that student will perceived system usefulness and increase behavior intent to use the system if students have confidence

in using the computer. Also, Cantoni, Cellario and Porta (2004) stated that the students should have an active and rewarding experience towards their learning goals without possible frustrations (Cantoni et al., 2004).

To add, Lee (2010) stated that students will have a strong tendency to adopt the e-learning system if they have a strong positive attitude towards it. Factors such as attention, focus, intrinsic and interest are given importance to the e-learning experience so that students become focused and maintain their concentration towards their task (Lee, 2010). As a result, students are motivated to accomplish e-learning task if they believe that it is beneficial for in terms of personal interest or its content application (Smart and Cappel, 2006).

According to Carmona (2007) students vary in their learning preference and that allows them to choose what they believe is useful to them. It is further discussed in the study made by Saade and Kira (2009) that students' attitude is affected by their perception of enhance performance which means that when they believe that the system is easy to use, they develop a positive attitude towards it. Likewise, Kim and Park (2015) stated that people tend to do activities which they believe are easy for them to handle and tends to avoid those that they believe are difficult. This beliefs influence how much effort they put into the act which determines the outcome. In their study, they mentioned the importance of self- efficacy that Bandura defines as belief of ones capability to produce an amount of performance to certain events and outcomes that affects their lives.

In addition, Cooze (2007) emphasized the importance of providing students with clear understanding of the learning task and the learning process as well as to ensure that the learning is relevant to the students so that they can make connections between their previous and present learning. It is also imperative that the learning process enables students to connect with their environment and find their participation meaningful (Cooze and Barbour

2007). Furthermore, Johnson (2014) also added that individuals who believe in their capabilities tend to foster motivation, engagement, and persistence and adopt coping skills to face challenging task. These beliefs give way to the development of students belief that they can complete their task and have the ability which gives them confidence to accomplish the task at any given level and generality and allow them to connect the given task to any other domains (deNoyelles et al., 2014).

In e-learning context, a study by Cox (2008) stated that Information processing is how students are able to obtain, sort, store and utilize information. Researchers have also stated that there is no definite learning style and that it is recommended that a variety of learning styles be used to create an effective e-learning environment. Moreover in a study on the influence of learning style on e-learning indicates that students instructional preference vary according to their preferred learning style (Cox, 2008). In a study by Seyal and Rahman (2015) they indicated that students with Assimilator learning style who learns through papers, lectures and analogies and those with Converger Learning Styles who learns through observations, lab and field work shows positive results with using the e-learning system. In like manner, Carmona, Castillo and Millán (2007) pointed out that learning resources can be presented using different learning activities in a diverse multi-media format to match students' learning preference. Thus, to match learning styles and students' learning preference, several educational hypermedia have adapted several models such as the (1) Witkin's Field Dependent/Field Independent Model which is a "program vs. learner" system to employ instructional support, assessment questions and navigational tools and feedback (2) Honey and Mumford Model which adapts the method and the order of educational resources and how they are presented within the educational pages (3) Dunn & Dunn Model which a content and navigation content presented in the hypermedia system (4) Felder and Silverman Model which modifies content presentation suited for the students (Carmona et al., 2007).

In study on E-learning Personalization based on Dynamic Learner's Preference, Bachari, Abdelwahed and Adnani (2011) stated that although implementing a learning concept can be difficult due to various learning preferences, the learner's prior knowledge and intelligence can be resolved in e-learning by presenting a variety of learning modes which is more suitable to their learning preference. They further presented that the internet offers a better understanding on how students prefer to receive instructions since it is a more individualized environment. It is where students can be uniquely identified, content are specifically personalized, and students can be assessed, monitored and supported. In their study, they proposed a Learnfit framework which is an-add on to the Moodle Learning Management which provides adaptability in the students learning experience. Its purpose is to provide and recommend appropriate, useful and interesting materials based on the students preference (Bachari et al., 2011)

The model consists of three domain system (1) Domain model which includes concepts, course outline, chapters, highlight and summary of the course. (2) A Learner model which represents the learner's preference, ability and other characteristics which can then be used to create teaching strategy and activities to adapt to the learner's preference. It includes the user's profile and information so that a customized instruction can be delivered to a specific learning preference (3) A Pedagogical Model includes various strategies for teachers that will allow them to deliver the same concept using different strategies. Moreover, the system also follows a set of teaching strategies to address different students' instructional preference. It categorizes teaching strategies based on student's characteristics and their preference (El et al., 2011) Likewise, Kolb's Inventory was also adapted by Honey and Mumford (1986) and is later used to design an effective learning system to cater to different individual needs and their learning style.

To conclude, Bambacas and Sanderson (2011) stated that researchers believe that it is essential to understand students' instructional preference and their approach to learning. Researcher like Prosser and Smith (1998), Biggs (2003), Ramsden (2003) and Sandler & Smith (2004) had expressed that individuals have different learning preference and not addressing to these needs can reduced their interest and motivation to engaged in the learning process. Thus it is important to understand and address students' instructional preference so that they can be assisted and provided with appropriate instructional design to help them meet learning goals and objectives (Bambacas and Sanderson. 2011).

Social interaction and students' attitude towards e-learning.

Williams and Duray (2006) indicated that collaboration and cooperative learning in the use of technology through online interaction enhances student learning. It is also stated that individuals who participate in online group work are more likely to interact more often, and share their understanding and emotions. Langley (2007) also cited that the reason why students do not engaged in e-learning activities is because of the lack of engagement in social interaction.

Accordingly, factors in learning environment such as lack of interactivity and feelings of social isolation have a significant effect on students' decision to participate in online learning activities (Williams and Duray, 2006). Moreover, decrease of social interaction in online learning activity may lead to students lowered satisfaction, disillusionment and increased feeling of isolation (Coxton, 2014). Furthermore, Tung and Deng (2007) also stated that social interaction is an important factor that reduces the feeling of isolation. Also, El Deghaidy and Nouby (2008) mention in their research the importance of introducing the use of small groups to maximize students learning. They further discuss that cooperation through

collaboration encourages students to support each other and make an effort to learn and accomplish goals (EL-Deghaidy and Nouby, 2008). In another study, Alonso, López, Manrique and Viñes (2005) considers the e-learning process as an interaction that involves personal communication, course content and collaboration between students through interaction, creating questions and discussions. This is to encourage students achieve learning outcome, share resource, support, critique and evaluate each other work (Alonso et al., 2005).

Likewise, Essam and Al-Ammary (2013) introduced in their study stating that interaction between students to instructors and students to students is the key to successful e-learning. Their statement concludes that interaction is essential because it provides emotional support, encourages students to learn, as well as increase their interest in learning. Moreover, their research also indicated that students may feel comfortable learning in online setting because they feel that they have to complete the task and find answers and resources by themselves. They further discuss that these types of interactions are key to an effective e-learning system. Thus through these social interactions, the students are able to gain feedback, deliver and receive information, as well as receive motivation and encouragement (Essam and Al-Ammary, 2013).

Social interactions such as working in small groups are beneficial to the students since it provides socio-emotional support which encourages students to perform better in an e-learning environment (So and Brush, 2008). Likewise, Paechter, Maier and Macher (2009) specified that student benefit from interaction with peers because it provides a learning environment where they can share understanding, gain social and emotional support and encourage team work.

Moreover, Kreijns et al. (2003) stated in their study that students without a sense of community and are on their own are likely to become anxious, defensive and have the tendency to not participate and take risk on activities which involve e-learning. Similarly,

Sabah (2013) in his study also stresses the importance of frequent communication between students and instructors to decrease the feeling of isolation. Accordingly, human interactions influence student performance and learning efficiency. The study also mentioned the effectiveness of blended learning which increases learning outcome and student satisfaction (Sabah, 2013). Also, Liaw et al. (2006) presented that when there is an increase in interaction between learners-learners and learner-instructors, construction of mutual understanding will develop and students are encouraged to improve their knowledge.

In addition, it was also implied that virtual communities and social network are essential to the students' e-learning experience. So while students develop social network related to their course, it will also allow them to contribute to the developing knowledge of the group (Chakraborty and Nafukho, 2015). In their study, Shi and Cristea (2013) introduced a social adaptive e-learning system known as Topolor. This system was designed to increase system usability by creating a more familiarize environment for the students. The system introduces tools for social interaction and encourages collaboration and informal communication such as showing favors on learning tools, sharing and commenting. Their experimental study reveals that there is a common pattern in the system usage by different students such that students start with social interaction first between switching to other action and would switch back to social interaction often. Their study concluded that social interaction is a popular feature and is necessary to provide more social interaction tools to enhance the e-learning system (Shi et al., 2013). This theory was also supported by Anderson (2008) by stating that social interaction in forms of learning communities assure belongingness whereby encourage students to support each other create knowledge structure and develop online participation. Furthermore, Kozuh (2015) stated that social interaction is characterized as social translucent where students experience visibility, accountability and

awareness. By allowing students interact and share their activities with each other, it is more likely that they perceive learning to be realistic.

In a study by Hurst, Wallace and Nixon (2013) revealed that students believe that social interaction helps improve their knowledge in critical thinking and problem solving skills. They also added that students learn more if they are actively involved in social interaction such as talking and sharing with each other (Hurst et al., 2013). Also, Cheung and Lee (2011) on the study on why students use face book, they presented the significance of We-Intention which they define as an individuals' commitment to participate in a collaborative action and involvement in an agreement whether explicit or implicit with the other participants of the joint action (Cheung, Lee and Chiu2011). It signifies the person's belief to be part of a social group. In fact, Fritzche and Salas (2011) in their study stated that collaboration in e-learning programs increase students engagement, hence communication among students should be emphasized. They also pointed out two communication tools which are currently use to increase communication namely; synchronous and asynchronous communication. Synchronous communication refers to a tread of discussion such as chat rooms to allow real time conversation among the students. Asynchronous communication is the use of message boards where students can leave messages, comments and questions which can be accessed anytime. To add, Yang and Tsai (2008) stated that e-learning is influence by the asynchronous interactions with peers and instructions.

Also, Hayashi, Chen, Ryan and Wu (2016) added that students in a synchronous and asynchronous e-learning environment perform better because they believe that they have social support in terms of feedback and confirmation. Following the study by Chiu, Hsu and Wang (2006), people believe that using e-learning doesn't only mean getting information and knowledge but also they believe that it is a place where they can interact socially, gain a sense of belongingness, support and friendship. They further added that social interaction has

a positive effect on its members thus promote knowledge sharing and encourage participation. Moreover, the study reflects that if the students believe that they belong in a community it enhance their contribution and participation in an e-learning environment (Chiu et al., 2006). Moreover, Williams and Duray (2009) noted that willingness to work as a team in a virtual community is essential. In their study they presented that workers who view themselves as a member of a team are more likely to support learning. Hence they added that teamwork, collaboration and interaction between the members support sharing of knowledge. Also they indicated the importance of cohesive group which is a desire for members to stay in a team. It implicates that when a member believes that there is cohesion and trusts in the group, interaction will motivate them to develop their skills and abilities (Williams and Duray, 2006).

Moreover, Essam and Al-Ammary (2013) also indicated that isolation is one of the factors that may cause from lack of interaction. It is also indicated in their study that students believe that e-learning will reduce relationship between student-student and student-instructor and create a negative feeling towards it. In their study, they argue that social interaction is an important factor that promotes an effective learning environment. They further added that without social interaction, students cannot be able to develop and acquire knowledge. Furthermore, they argue that students will find e-learning effective and useful if there is a sense of community, trust and interdependence among members of the e-learning community (Essam and Al-Ammary, 2013).

Comparatively, Graff (2003) added that educational advantages are perceived as a result in collaboration and interaction. He further added that in a face to face interaction an immediate feedback can be presented immediately, whereas online support system cannot provide an immediate face to face interaction. The study proposed to investigate further the

important factors that are pertinent to students' interaction and how it influenced their acceptance of the e-learning system (Graff, 2003).

In e-learning context, social interaction refers to the way students share their work and get feedback from one another. This system is called "social presence" where individuals perceived each other in a more "realistic" sense by getting feedback and support (Langley 2008). Furthermore, a study on Learning through Social Interaction of Online communities, Nichani (2000) stated that in order to build a successful e-learning environment it is essential to find means and mechanism in order to foster social interaction which enables students' to create a strong relationships. In a study, Kozuh, et al. (2015) stated that although some studies have indicated that there is no connection between social presence and grades, social presence has does have a positive relationship to students perceive satisfaction in an e-learning environment. However, they also added that there has been no appropriate methodology on how to adapt social interaction into e-learning (Kožuh, Jeremić, Sarjaš, Bele, Devedžić, and Debevc 2014).

Moreover, Nichani (2000) emphasized that learning is a social process and social groups will help and provide students with resources and encourage learning. Accordingly, Wang (2005) agrees that social communication is an important part in education. Students should be able to socialize in an online environment the same way they can congregate face to face in a classroom setting. The same study also found that emotional and psychological pressure my occurred for students who sit in front of a computer which cause them feel overwhelmed. Therefore, social interaction provides online learners opportunity to bond, share and collaborate. Additionally, lack of interaction in online learning may hinder the development of a support system and the preservation of the groups' well-being (Wang, 2005).

Comparatively, in a study on Social E-learning Using the Topolor System, Shi, Al Qudah and Cristea (2013) presented social e-learning as a system where students' achieve their learning goals through social interaction. It is achieved by sharing knowledge, resources, ability and skills. Likewise they also present that although learning is a social process, to develop an online social learning environment remains a challenge. Therefore communication tools such as chat, rating and commenting and tagging tools have been develop and integrated to adapt educational hypertext to the different learning needs of students (Shi et al., 2013).

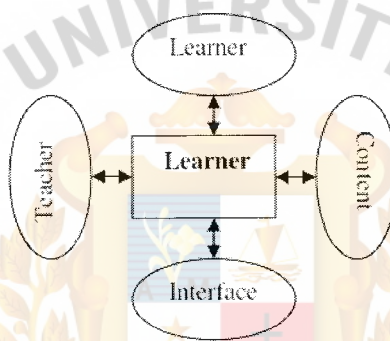


Figure 2. Types of Social Interaction presented in a study on “How the use of Second Life Affects E-learners’ (2009).

On their study, Baird and Fisher (2005) stated that e-learning devoid students with human interaction therefore it is important that they are provided with opportunities where they can connect with their peers, classmates and instructors. They also emphasized that in order for e-learning to be effective, students should be able to find ways to connect with other students. Moreover, students should be introduced to social media tools that support learning and provides communication in both asynchronous and synchronous environment (Baird and Fisher, 2005).

Information Processing and students’ attitude towards e-learning.

In a study, Liaw (2008) presented the significance and effectivity of the constructivist theory of learning. The theory stated that students are active and would rather take part in the

learning process rather than being passive. However it is also mentioned that learning online takes place if students are allowed to discover things by themselves and learn on their own pace. Therefore, they suggested that it is important to encourage self-directed learning to have an effective online learning outcome. So instead of relying on textbook, instructors and lectures, a rich e-learning environment can be designed to keep the students engaged. The study hypothesized that the effectiveness of e-learning is influenced by the students' ability to engage in self-directed activities, interactive communication and multimedia learning materials (Liaw, 2008). Hence, Tseng (2008) said that understanding students' e-learning behavior is important in order to provide an effective e-learning environment.

In a study Ouellette and Wood (1998) stated that behavior can be determined by an individual's intent to engage in an act and shows favorability of the consequences and the importance of its effect. Thus their intent to behave positively or negatively towards a stimulus depends on their ability, motivation and opportunity.

Thus in his study, Mayer and Moreno (2003) concluded that students tends to perform and understand better when e-learning system is presented and carefully weeded or selected to generate interest.

In fact, Harteis, Gruber and Hertrampf (2010) introduced the epistemic beliefs where individuals' beliefs and attributes influence the way they perceive learning opportunities and how they select and develop learning strategies. In his study, Schommers (1990) mentioned five multidimensional constructs of epistemic beliefs namely; simplicity of knowledge, authority of knowledge, certainty of knowledge, innate ability and learning speed.

Accordingly, students who shows less epistemic beliefs tends to believe that knowledge happens quickly, that knowledge is certain, that it is provided by the authority and believes that capability to learn is innate. These students will show tendencies to superficially read information without comprehension. They will not make an effort to challenge and validate

information they receive, and show less enthusiasm if learning requires them to involve in a challenging and complex task. Hence they have a tendency to fail. Whereas students with complex epistemic beliefs tend to believe that knowledge by nature is complex, that it is specifically design for a specific community and is always an argument. This means that the more complex their epistemic beliefs are, the more they have a wider understanding of the environment as a source for learning. They are likely to connect prior understanding with new knowledge acquired from various situations and context. Thus they tend to have better learning performance (Harteis et al., 2010). Therefore, following Alfred Rovai's (2007) study, it is implicated that students have the tendency to be more involve in e-learning if they believe that knowledge acquisition is enjoyable and important rather than externally motivated.

Gagne's Learning theory found that students cognitive structuring and perception is influenced by Human-Computer Interaction as well as animations integrated in e-learning (Zhang et al., 2010).

Consequently, not only that learning requires different conditions to initiate learning but also it yields different learning outcomes. Additionally, there are five categories of learning base on their learning outcomes (Gagne, 1977). In their research Zhang et al., (2010) emphasized that the cognitive process is influenced by the event of instructions. In the same manner presented that learning is an interactive and adaptive process.

E-learning is complex and it requires administrators of the e-learning system to process information base on students' preference. Thus, a most appropriate content that would fit for every user or students should be modified. Course content, structure and navigation should be based on the information usage of the students (Romero, Ventura and Garcı 2008). Correspondingly, Popescu (2009) added that it is important to observe student behavior and their response to a stimulus in an e-learning environment. In e-learning

students' do not experience a face to face learning factor which makes obtaining information difficult. However it is suggested that it can be enhanced by designing an interface that would collect observable behavior and available information about the student's preference (Popescu, 2010).

Finally, Mast (2015) defines that the role of multimedia in e-learning is to fit learning styles and learning pedagogy. And although integrating multimedia into e-learning does not always result to success, a careful selection of multimedia tools determines successful e-learning. It is however concluded that multimedia activities sets an authentic learning environment can provide tools for learning constructed to fit the students 'existing knowledge and their perception of the world around them (Mast, 2017).

Personality style and students' attitude towards e-learning.

According to the study of Kurt and Amichai-Hamburger (2008), personality style is a determinant factor of students' attitude towards e-learning. Quinn (2006) also stated that students have the capabilities to learn better if motivation and the cause of their anxiety are determined in the use of e-learning system. He also signifies that it is important to recognize what keeps them motivated and engaged as well as their emotional response before addressing required learning (Quinn, 2006). Moreover, Cassidy (2004) implicated that personality trait is the strongest factor that determines students' e-learning success.

Likewise, Al Dujaiday, Jieun and Rahman (2013) also stated that personality style is an indicator of understanding e-learning outcomes. They added that the motivation to learn doesn't only include the external factor but also from the self which gives importance to the intrinsic nature of the human mind. They stated that personality determines emotion and behavioral adjustments to the learning environment by coordinating mental processes and

identifying the dynamic of mental structures. They argue that the reasoning process is dependent on personality. Furthermore, they stated that students engage themselves if they manifest a particular intrinsic motivation, however disengaged if none. Accordingly, research finds out that those students who show a high trait achievement and motivation has a tendency to accomplish demanding task by persistently making effort to complete the task (Al Dujaiday et al., 2013).

According to their study, Van Raaij and Schepers (2008) cited that positive attitude towards e-learning is influenced by the students' personality trait. They also discussed that personal innovativeness and computer anxiety are relevant to the use and disused of e-learning system. They argue that although participants in an e-learning environment are aware that the use of technology is unavoidable; their motivation to participate is influenced by their attitude towards using the technology (van Raaij and Schepers, 2008).

Furthermore, Lee, Yoon and Lee, (2009) emphasized that personification of e-learning is important. In a study by Smith (1996) he presented that personality style is an individual's distinct attribute. And by attending to the personality styles of the students an effective learning environment will be achieve. In another study, Graff (2003) stated that e-learning will be an advantage to the students if they feel that they can advance at their own pace and are given the responsibility for their own learning.

To emphasize, Ibrahimoglu et al. (2013) stated that personality is an important factor in learning because it affects the stimulation of the mental process. In particular, van Raaij and Schepers (2006) mention that computer anxiety is considered a personality trait. This is when an individual has a tendency to emotional distress, anxious and phobic towards the use of computer. Furthermore, Straub (2009) indicated that individual characteristics and differences in their personality will determine whether they will used the system or avoid it.

Moreover, Muntean (2011) stated that it is important to design an e-learning system that would impact the users on a more effective level. The study further introduces the concept of Fogs Behavior Model which indicates the factors that generates a certain behavior. This model consisted of three elements such as ability, motivation and triggers. To apply this to an e-learning system, the students must be capable, motivated and triggered to effectively engage in the course and accomplished a desired target behavior or action.

Thus, in a study Fariba (2013) indicated that determining students' personality important to understand students' behavior towards e-learning. Research suggested that students are highly motivated if their educational result can be related to an internal factor if they believe that they can be able to effectively use the outcome to reach their goals rather than just getting good grades. So it is further presented to investigate students characteristic and their beliefs towards the learning process (Cools, Vanderheyden and Backhaus, 2014).

Furthermore, Fariba, (2013) in another study indicated that learning style is a collection of individuals' preference and beliefs which is distinctive to different situations. The study also reported that there is a high correlation between learning styles and students' success in e learning and that satisfaction correlates with different personality styles (Fariba, 2013). In addition, Al-Dujaily (2013) implied that individuals' passive or involvement towards e-learning is influenced by their personality trait. In a study, Baeten M. (2010) added that perceived usefulness and relevance of the course will influenced their motivation to participate in a deeper approach to learning.

In e-learning context, a number of researches that advocates the importance of determining students' personality on learning outcome strongly believe that learning will result to positive outcome if instructions and concepts are delivered to their personality styles (Denphaisarn, 2014). In another study by El Bachari et al. (2011) they stated that learning

instructions based on the learners' personality is beneficial and affects the learners' ability and experience to be active in the learning process.

Notably, Al-Dujaily, Jieun and Rahman (2015) considered that personality is indicative of students' learning preference. However, they also expressed in their study that issues still arise when it comes to e-learning customization due to the fact that e-learning designers and providers find it difficult to comprehend the difference between learners and how it affects learner styles. To address these issues, a user model to adapt e-learning system was introduced. The model is used to match learners' goals with their prior knowledge. However the way it can be implemented is still elusive and still requires constant monitoring. But despite the fact that studies have shown contradicting theories about personality trait and its influence on the learning process, the motivation for students to learn still comes from themselves which is considered the human mind's intrinsic nature (Al Dujaiday et al., 2013).

In a study, Fariba (2013) stated that students' success in e-learning is analyzed through their personality trait and learning styles. However, Manochehr (2006) stated that there is a lack of documentation which shows that e-learning can be an effective means to deliver learning to individuals. Nevertheless, it is indicated that giving importance to the students' personality attributes in the delivery of instructions which influenced the learning process (Manochehr, 2006). Furthermore in their study on User Interface Design for Effective E-learning based on Personality traits, Arockiam and Selvaraj (2013) agreed that designing an e-learning system is significantly influenced by how individuals learn and perform task.

Personality Style in terms of Auditory, Visual and Tactile and students' attitude towards e-learning.

Studies stated that instruction delivered through media is more effective than live or actual face to face instruction. Research stated that the primary function of multimedia and

internet based learning is to promote interest and motivate students to engage in learning rather than to only provide information. However they also argued that although multimedia and online instructions may present interesting and attractive activities which may interest the students, it appears that it does not result in significant learning compared to a face to face learning instruction. So how does multimedia and online learning produce more learning? The same study suggested that a variety of learning interactivity can be presented to students to provide students with different instructional method equivalent to their personality and learning preference. For instance it was suggested that students' learn efficiently if learning concepts are presented in both aural and visual description (Clark and Feldon, 2005).

In addition, Mustafa and Mohamed Sharif (2011) conducted a study where they use media as an attribute using the values of text, audio, visual and tactile. This attribute was used to trace the media preference of the students and how concepts are represented. The use of this attribute is to provide students with different modes of learning representation to match their personality in learning style. Results found that the experimental group who were subject to online learning shows significant difference from the control group which they attributed to the adaptation of learning styles. Moreover, their study also concluded that the experimental group shows better performance than the control group. Thus it can be argued that personality in learning style influence attitude towards e-learning which improves students' performance and achievement.

In another study, an integration of the Multiple Representation Approach (Samson and Karagiannidis, 2002) was developed to present various multimedia objects such as pictures, audio and animations. This method was not only used to develop a multimedia interface which delivered various forms of interaction to suit the goals of the educational framework but also provides learners with domain contents to suit their individual learning preference. Although they also argues that this system may cause cognitive overload, by

providing a tailored presentation of information and presenting a set amount recommendation can allow students to choose from difference modes; this will allow them to explore different learning modalities within a structured educational framework. The same study also stated that the most important factor in online learning is students' knowledge of subject being presented and taught. If students are presented with an exact form of learning modality learning differences may not be accommodated. Thus there is a need to provide navigational help to guide them through the hyperspace so that they are provided with browsing strategies and which results to efficient learning

Current Investigation Research Framework

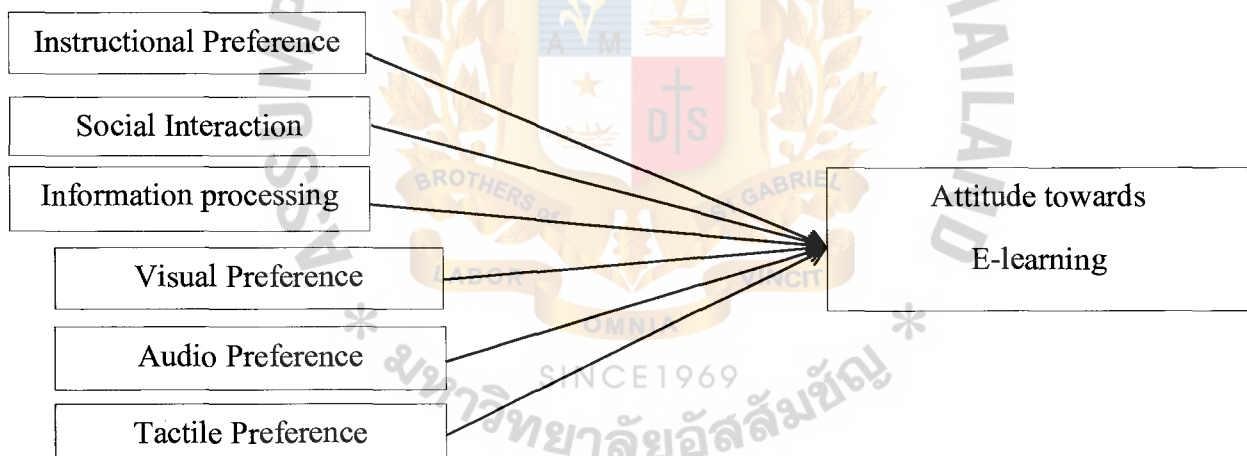


Figure 3. The conceptual framework of the study.

Research Questions

1. Is there a relationship between learning styles in terms of instructional preference, social interaction, information processing and visual, audio and tactile personality styles; and attitude towards e-learning among undergraduate students in international programs in Bangkok Thailand? Such that the more students show instructional preference, social

interaction, information processing visual, audio and tactile preference in their personality style, their attitude towards e-learning is positive?

Research Hypothesis

H1: There is a relationship between learning styles in terms of instructional preference, social interaction, information processing and personality style in terms of visual, audio and tactile personality styles and attitude towards e-learning among undergraduate students in international programs in Bangkok Thailand. Such that the more students show instructional preference, social interaction, information processing, visual, audio and tactile personality style, their attitude towards e-learning is positive.



CHAPTER III

METHODOLOGY

This chapter contains background information which describes the processes done to conduct this study. The sequence of the background information is as follows: research design, participants of the study, research instrumentation, and data collection procedure and data analysis.

Research Design

This research is a regression model which allows the testing of the correlation against two or more models and to determine the relationship of the variables (Garson, 2008). It also utilizes the multiple regression statistical technique to analyze the relationship between the variables (Ho, 2006). Also this study is constructed on the participants' responses through a survey questionnaire which utilizes valid and reliable scales.

Participants of the Study

The participants of the study included students enrolled in selected International Programs in Universities in Bangkok Thailand School Year 2017. The research covered four selected universities in Bangkok Metropolis and actual data was gathered by means of a questionnaire.

Furthermore, Convenient Sampling was utilized due to convenience where survey can be conducted in school premises within the classroom, geographical location where the selected universities participating in the survey are accessible and respondents use English as

their standard instruction (Etikan, Musa and Alkassim 2016). Also, respondents are selected given that they (1) are students which are currently enrolled in the International Program in the selected universities, (2) use online materials for academic purposes, (3) are able to use technology and the internet for school and academic task, (4) receive course content and instruction through the internet on topics related to their field of study, (5) use and receive English Language as a medium of communication and instruction, (6) use technology and various multimedia platforms to communicate with other students and teachers on topics related to their field of study. The parameter estimation calculation as per ratio of 10:1 was used to determine the sample size of participants (Ho, 2006). The parameter of the conceptual framework indicated that the number of participants needed is 190. However, to enhance the stability of the research findings sample size was increased to 300 participants.

Research Instrumentation

The research instrument in this study utilized a self-administered English survey questionnaire which consisted of a 3 part questionnaire adapted from standard scales due to its reliability and validity.

Part I. Personal Information

The first part of the questionnaire is a researcher-constructed set of questions to derived information based on the participants' demographic characteristics in terms of (1) gender; (2) age; (3) Education Level; (4) faculty (5) time spent on internet

Part II. Learning Style Scale

The Learning Style Scale was utilized to measure (1) instructional preference (2) social interaction and (3) information processing. The scale was developed by Abdollahimohammad and Jaafar (2014) which they include the application of the Curry's Model in the development of the scale. It consists of 22 items on a 6-point Likert Scale being 6=strongly agree, 5=moderately agree, 4=agree a little, 3=disagree a little, 2=moderately disagree, 1=strongly disagree. Factor analysis was conducted on the 22 items. The internal consistency and reliability of the Learning Style Scale and its subscale is considered adequate. The LSS lowest accepted Cronbach's Alpha was .70 which was considered a valid and reliable scale to measure learning preference. The construct validity of the LSS was analyzed with exploratory factor analysis. A primary criterion cut-off point of 0.30 for factor loading and eigenvalues greater than 1 were used for factor selection. It is considered that item loading over 0.30 are considered significant and loading over 0.40 are considered important and 0.50 are considered very significant. Moreover, content and face validity, readability and user-friendliness of the LSS were approved by a panel of experts which led to the elimination of ambiguous and overlapping items (Abdollahimohammad and Jaafar 2014).

Part III. Learning Style Inventory-Likert

The Learning Style Inventory which was developed by Kolb is one of the most influential and widely distributed scale to measure learning style and preference. Since it was developed in 1970's it has undergone revisions to improve its psychometric properties. The LSI is self-report self-scoring instruments that measure individual preference. (Kayes, 2005). In this study, a normative version LSI-Likert will be utilized to measure personality style. The LSI-Likert is a 24 item Likert scale with scores of 3=often, 2=sometimes and 1=seldom. In addition, each item in the scale represents the different learning styles in terms of VSP=visual preference, APS=audio preference, TSP=tactile preference. Then the total scores are

calculated to determine the learning style of each individual. Moreover, the internal reliability of the LSI-Likert scale was found to be relatively high (Pickworth and Shoeman, 2000).

Part IV. E-learning Acceptance Scale

The e-learning acceptance scale was developed by Lee, Yoon and Lee (2009) to measure students attitude towards e-learning. It is a 22 item five point Likert Scale with 5 being 5=strongly agree, 4=agree, 3=undecided, 2=disagree and 1=strongly disagree. Confirmatory and exploratory factor analysis was utilized to achieve the scale validation. Moreover, the test used Cronbach alpha coefficient to test internal consistency of the items. Research suggests that a Cronbach alpha of .70 confirmatory and .60 exploratory researches is considered acceptable. The reliable values of the test range are 0.634-0.903 thus suggesting that the overall construct of the scale is reliable (-Chan Lee et al., 2009)

Data Collection Procedure

Following the approval of the study data collection procedure is as follows:

1. A pre-test survey in a form of questionnaire was conducted to determine the internal and external validity of the measurement as well as its readability and comprehensibility. Then the data collected will be subjected to a reliability test to obtain Cronbach Alpha value. Any inconsistency resulting from the pre-test and reliability test will be corrected accordingly.
2. After the questionnaire and item statements are corrected and its validity and reliability is verified the researcher will send an introduction letter to the President of the selected Universities to ask permission to administer the survey in the class. After permission is granted, a convenient sampling procedure was employed to a group of students recruited

from universities in Bangkok Thailand. The survey will be conducted in designated classrooms within 2 weeks after approval and permission is granted.

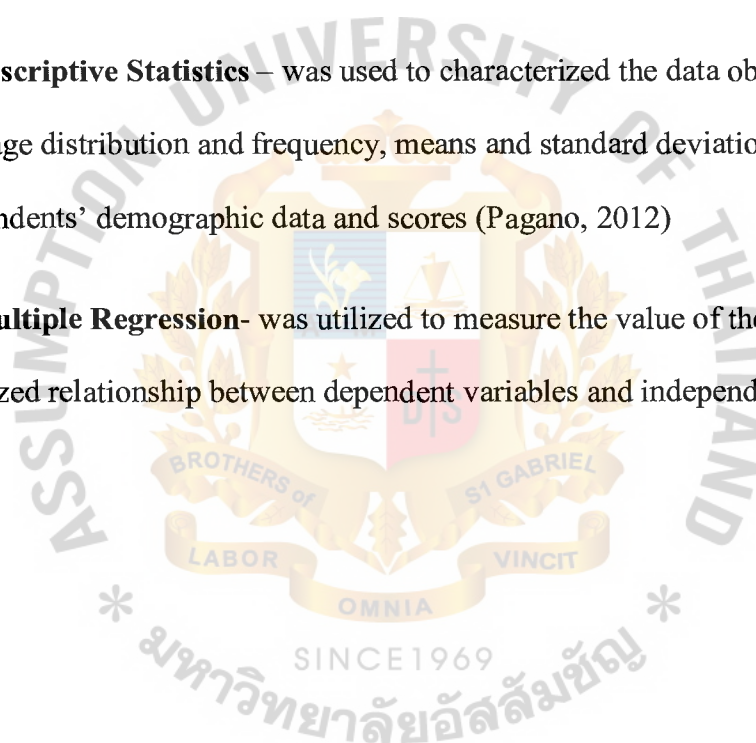
3. After the completion of the survey, gathered data will be respectively inspected for possible errors before subjected it to statistical analysis.

Data Analysis

After the data collection process was completed, the obtained data was subjected to data analysis.

Descriptive Statistics – was used to characterized the data obtain in the study such that percentage distribution and frequency, means and standard deviation was used to analyze the respondents' demographic data and scores (Pagano, 2012)

Multiple Regression- was utilized to measure the value of the variables and test the hypothesized relationship between dependent variables and independent variables (Weiner, 2003).



CHAPTER IV

Results

This chapter presents the results of the conducted analysis to test the hypothesis generated from the regression model presented in chapter II. In this chapter, information regarding the characteristics of the demographic is also presented such as gender, age, education level, faculty and time spent in the internet for school and academic purposes in a week. The analysis conducted are presented in the following sequence (1) demographic profile (2) Reliability test of items the represented the factors in terms of instructional preference, social interaction, information processing, personality and attitude towards e-learning (3) means and standard deviations of the independent variables such as of instructional preference, social interaction, information processing, personality (4) Regression analysis to test the hypothesized relationship of the independent variable and dependent variable.

Respondents Demographic Profile

The current study was conducted to 300 students of whom 96 (32%) are male and 204 (68%) are female. Their age ranges from 18-26 years old which shows a mean age of 16.1 years (medial =20 years). Their education level ranges from 1st year-4th year which out of 300 hundred students 5% (n=15) are 1st years, 4.7% (n=14) are 2nd years, 55% (n=165) are 3rd years and 35.5% (n=106) are 4th years. In terms of faculty 41% (n=123) are from the faculty of business, 33.3% (n=100) are from the faculty of marketing and 25.7% (n=77) are from

other faculty. Moreover, in terms of time spend online for academic purposes, 54.7% (n=164) spend 0-7 hours online, 27% (n=81) spend 8-14 hours online, 10.7% (n=32) spend 15-21 hours online, 5.7% (n=17) spend 22-29 hours online and 2% (n=6) spend 20 hours and above online.

Readability of the Scales Employed

The items which represent each of the 5 factors namely: instructional preference, social interaction, information processing, personality and e-learning were item analyzed to determine readability and comprehensibility of the items used.

Table 1

Scale items with their corrected Item-Total Correlation and Cronbach's Alphas.

<u>Instructional Preference</u>	<u>Corrected Item-Total Correlation</u>	<u>Cronbach's Alpha if Item Deleted</u>
• Learn better when someone represents information in a pictorial (e.g., picture, flowchart) way.	.570	.784
• Learn practical task better than theoretical ones.	.596	.781
• Learn better when I study with other students.	.310	.817
• Learn better when someone uses visual aids.	.656	.773
• Learn better when I am involved in a task.	.642	.776
• Learn better when I watch an educational program.	.513	.791
• Learn better when I watch a demonstration.	.651	.773
• Learn better when I study alone.	.164	.845
• Learn better when studying practical, job-related, subject.	.644	.774

Cronbach's Alpha = 0.8

<u>Social Interaction</u>	<u>Corrected Item-Total Correlation</u>	<u>Cronbach's Alpha if Item Deleted</u>
• Enjoy competing.	.544	.719
• Prefer to study with other students.	.232	.518
• Compete to get the highest grade.	.558	.661
• Compete with other students.	.584	.514
<u>Cronbach's Alpha = 0.71</u>		

<u>Information Processing</u>	<u>Corrected Item-Total Correlation</u>	<u>Cronbach's Alpha if Item Deleted</u>
• Create a mental picture of what I study.	.614	.864
• Create a mental picture of what I see.	.680	.857
• Create a mental picture of what I read.	.685	.857
• Focus more on the details of the subject.	.661	.860
• Consider the details of the subject more than its whole.	.497	.876
• Create a mental picture of what I hear.	.682	.857
• Remembers the details of a subject.	.661	.859
• Remember specific details of subjects.	.619	.864

Cronbach's Alpha = 0.87

<u>Visual Personality in Learning Style</u>	<u>Corrected Item-Total Correlation</u>	<u>Cronbach's Alpha if Item Deleted</u>
• I prefer to see information written on a chalkboard and supplemented by visual aids and assigned readings.	.343	.584
• I like to write things down or to take notes for visual review.	.298	.582

• I am skillful with and enjoy developing and making graphs and charts.	.448	.564
• I can easily understand and follow directions on a map.	.370	.560
• I can understand a news article better by reading about it in a newspaper than by listening to a report about it on the radio.	.328	.578
• I think the best way to remember something is to picture it in your head.	.239	.579
• I am good at working and solving jigsaw puzzles and mazes.	.315	.575
• I prefer obtaining information about an interesting subject by reading about it.	.204	.596

Cronbach's Alpha = .61

<u>Auditory Personality in Learning Style</u>	<u>Corrected Item-Total Correlation</u>	<u>Cronbach's Alpha if Item Deleted</u>
• I can remember best about a subject by listening to a lecture that includes information, explanations and discussions.	.366	.648
• I require explanations of diagrams, graphs, or visual directions.	.382	.652
• I can tell if sounds match when presented with pairs of sounds.	.439	.631
• I do best in academic subjects by listening to lectures and tapes.	.394	.639
• I learn to spell better by repeating words out loud than by writing the words on paper.	.344	.656
• I would rather listen to a good lecture or speech than read about the same material in a textbook.	.358	.650
• I prefer listening to the news on the radio rather than reading the paper.	.284	.663
• I follow oral directions better than written ones.	.346	.653

Cronbach's Alpha = .67

<u>Tactile Personality in Learning Style</u>	<u>Corrected Item-Total Correlation</u>	<u>Cronbach's Alpha if Item Deleted</u>
• I prefer to use posters, models, or actual practice and other activities in class.	.445	.702
• I enjoy working with my hands or making things.	.383	.705
• I can remember best by writing things down.	.337	.721
• I play with coins or keys in my pocket.	.276	.668
• I chew gum, smoke or snack while studying.	.313	.660
• I learn the spelling of words by “finger spelling” them.	.406	.664
• I grip objects in my hands during learning periods.	.426	.649
• I feel very comfortable touching others, hugging, handshaking, etc	.393	.679

Cronbach's Alpha = .71

<u>E-learning</u>	<u>Corrected Item-Total Correlation</u>	<u>Cronbach's Alpha if Item Deleted</u>
•		
• The instructor provides high-quality instruction.	.448	.930
• The instructor provides information on learning progress.	.549	.929
• The instructor delivers instructions clearly.	.553	.929
• The instructor's measurement of student performance is fair Teaching materials.	.512	.930
• E-learning provides me with sufficient teaching materials.	.567	.929
• The level of difficulty of the learning contents is appropriate.	.544	.929
• The delivery schedule of learning contents is flexible.	.511	.930
• E-learning provides individualized learning management.	.555	.929

• E-learning provides a variety of learning methods.	.631	.927
• I feel e-learning helps me improve my creativity.	.676	.927
• I feel e-learning helps me improve my imagination by obtaining information.	.653	.927
• I feel I can have a variety of experiences without any interference.	.571	.929
• I feel e-learning is fun regardless of usage purposes.	.655	.927
• E-learning improves my learning outcomes.	.623	.928
• E-learning helps me accomplish my learning effectively.	.659	.927
• E-learning study methods are easy to understand	.662	.927
• E-learning is easy to use.	.613	.928
• I prefer e-learning to traditional learning.	.660	.927
• I am willing to participate in other e-learning opportunities.	.723	.926
• I think e-learning should be implemented in other classes.	.671	.927
• I will recommend e-learning classes to other students.	.614	.928

Cronbach's Alpha = 0.93

As it can be seen in the table above (Table 1) the lowering of the corrected item-total correlations may be due to readability and comprehensibility. Readability is defined as the estimate of probability of comprehension by a specific group. It can be affected by the difficulty of the sentence and format, text features such as the difficulty of words and sentences. Moreover, comprehensibility can also be related to the individuals' proficiency to read in English (Thompson, Johnstone, and Thurlow, 2002).

Furthermore computed Cronbach Alpha for all five scales was acceptable ranging from 0.61-0.93 respectively. Given the acceptable Cronbach coefficient is .6 which indicates

that items in the scale have good internal consistency. The internal consistency of the scale is computed as the sum of all the items and not as an individual item). Thus items resulting to the increase of the Cronbach Alpha were deleted (Gliem and Gliem, 2003).

Means and Standard Deviation of the Main Variables

The following data presents the means and standard deviations for the seven computed factors.

Table 2

Means and Standard Deviation for the computed variables of instructional preference, social interaction, information processing, and personality in learning style in terms of visual, auditory, tactile and e-learning.

	<u>Mean</u>	<u>SD</u>	<u>Midpoint</u>
Instructional Preference	4.57	.32	5.0
Social Interaction	4.08	.49	4.0
Information Processing	4.40	.32	4.5
Visual	2.33	.19	2.0
Auditory	2.28	.18	2.0
Tactile	2.16	.24	2.0
E-learning	3.81	.21	4.0

As indicated in the table above (table 2) social interaction was rated above the midpoint (mean=4.57) (midpoint=3) on its scale. Visual (mean=2.33) (midpoint=2.0), auditory (mean=2.28) (midpoint=2.0) and tactile (mean=2.16) (midpoint=2.0) was also rated above the midpoint (2) on its scale. This means that overall; the students were more likely to prefer social, visual, auditory, and tactile personality in terms of learning style. However, instructional preference (mean=4.57) (midpoint=5.0) and information processing (mean=4.40) (midpoint=4.5) was rated below the midpoint. This means that students prefer

instructional preference and auditory to a lesser degree. In terms of their attitude towards e-learning, the students rated their attitude towards e-learning below the midpoint (mean=3.81) (midpoint=4.0) on the scale. Thus indicates that the students' attitude towards e-learning is less positive.

Regression Analysis

To test the hypothesized relationship represented by the regression model in Figure 5, regression analysis was conducted by regressing the dependent variable of attitude towards e-learning on the independent variables of instructional preference, social interaction, information processing and personality. (See appendix for the result of the regressions Analysis).

The result of the current study shows that .568 of Information Processing correlates with attitude towards e-learning. Information processing accounted for 32% of attitude towards e-learning. Moreover, 32.3% of the additional entry of information processing accounted for the variance of attitude towards e-learning. The entry of information processing $f(1, 298)=141.91, p=.00$ resulted in a significant amount of variance accounted for in attitude towards e-learning. Also .601 of Visual correlates with attitude towards e-learning and visual accounted for 35.7 % of attitude towards e-learning. Furthermore, 3.9% of the additional entry of visual accounted for the variance of attitude towards e-learning. The entry of visual $f(2,297) =84.07, p=.00$ resulted in the significant amount of variance accounted for in attitude towards e-learning. Result of the study further shows that .623 of Instructional Preference correlates with attitude towards e-learning as well as it for 38.2 % of attitude towards e-learning. Also 2.6 % of the additional entry of Instructional Preference accounted for the variance of attitude towards e-learning. The entry of Instructional Preference $f(3,296) =62.50, p=.00$ resulted in the significant amount of variance accounted for in attitude towards

e-learning. Likewise, .632 of Tactile correlates with attitude towards e-learning. It also accounted for 39.2 % of attitude towards e-learning. In addition, 1.2 % of the additional entry of Tactile account for the variance of attitude towards e-learning. The entry of Tactile $f(4, 295) = 49.18, p = .00$ resulted in a significant amount of variance accounted for in attitude towards e-learning. Finally the predictor model that contains Information Processing, Visual, Instructional preference and Tactile is a significant prediction model.

Regression Analysis for hypothesis testing

Regression analysis was conducted to test the hypothesized relationship represented by the regression model shown in figure 6. The analysis involved regression of the dependent variable of students' attitude towards e-learning on the predictor variables of instructional preference, social interaction, information processing, visual, auditory and tactile personality in learning style.

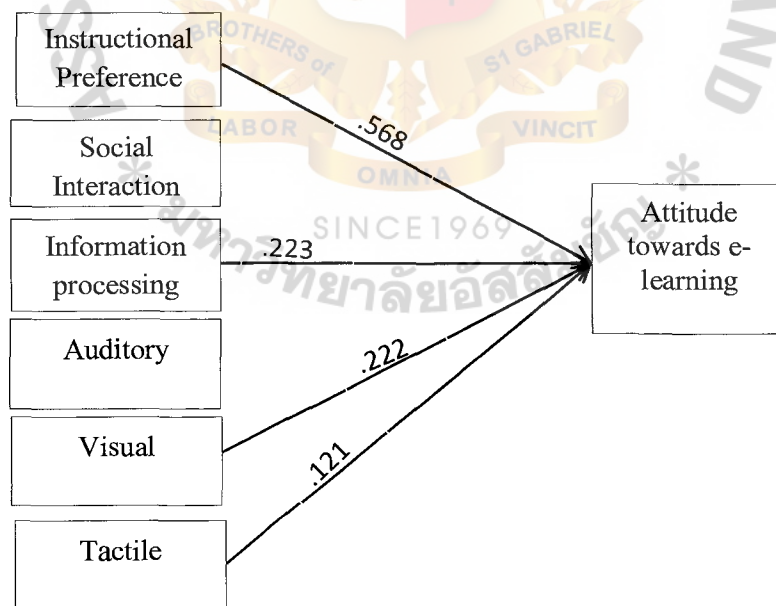
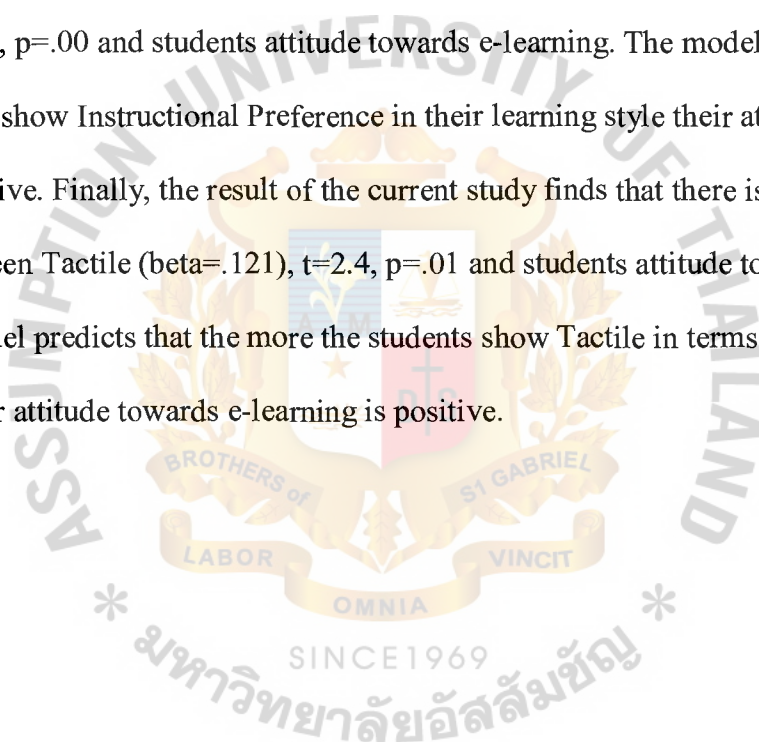


Figure 4. Regression Model Together with the Standardized Regression Coefficient between the predictor and the Dependent Variable.

The result of the study indicated that there is a positive relationship between learning style in terms of Information Processing ($\beta=.568$), $t=11.9$, $p=.00$ and students attitude towards e-learning. The model predicts that the more the students' shows information processing in their learning style their attitude towards e-learning is positive. Also the result shows that there is a positive relationship between Visual ($\beta=.222$), $t=4.3$, $p=.00$ and students attitude towards e-learning. The model predicts that the more students show visual in terms of personality in learning style, their attitude towards e-learning is positive. Findings of the study also shows that there is a positive relationship between Instructional Preference ($\beta=.223$), $t=3.6$, $p=.00$ and students attitude towards e-learning. The model predicts that the more students show Instructional Preference in their learning style their attitude towards e-learning is positive. Finally, the result of the current study finds that there is a positive relationship between Tactile ($\beta=.121$), $t=2.4$, $p=.01$ and students attitude towards e-learning. The model predicts that the more the students show Tactile in terms of personality in e-learning, their attitude towards e-learning is positive.



CHAPTER V

Discussion

This study attempted to investigate the relationship between learning styles in terms of instructional preference, social interaction, information processing and personality and attitude towards e-learning among university students in international programs in Bangkok Thailand.

This quantitative research is correlational in design. A total of 300 students enrolled in selected universities in Bangkok Thailand were asked to participate in the study. Parameter estimation calculation was utilized to determine the sample sized of 10:1 ration. The research instrument was a self-administered English Survey questionnaire in four parts namely: personal information, Learning Style Scale, Learning Inventory-Likert and e-learning acceptance scale.

After the data collection process, descriptive statistics was utilized to attain frequency and percentage distribution on participants' demographic data. The means and standard deviation were calculated to describe the participants' responses. Lastly, multiple regression analysis was utilized to accomplish the hypothesis testing.

This chapter composed of (1) summary and discussion of the findings, (2) limitation of the study, (3) conclusion and implication of the study, and (4) recommendations and avenues for further research.

Discussion of Findings

Instructional preference, social interaction and information processing, Visual, Auditory and Tactile personality in learning style.

The findings of the current study indicated that the factor of ‘social interaction’ was rated above the midpoint on its scale while factors of ‘instructional preference’ and information processing were rated below the midpoint on its scale. Thus overall, the students were more likely to prefer social interaction in using the e-learning system while they prefer ‘instructional preference’ and ‘information processing’ to a lesser degree in their use of the e-learning system. These findings reveal the learning style preference of undergraduate in university students in international programs in Bangkok Thailand to prefer ‘social interaction’ rather than ‘instructional preference’ and ‘information processing’ in their use of e-learning. The finding of the current study that students’ prefer ‘social interaction’ in their use of e-learning system is consistent with the study of (Langley, 20017; Williams & Duray 2006) which they stated that the reason why students doesn’t engaged in an e-learning program is because of the lack of social interaction and thus students who learn in groups and have more online interaction tends to have a positive learning experience in their use of the e-learning system. They added that factors such as isolation and the lack of group support in an online environment have a significant effect on the students’ attitude towards participating in e-learning activities. Several studies also suggested that to enhance learning in an e-learning system, an online environment where students can share knowledge and support should be provided and frequent communication between students and instructors is encourage to decrease isolation which affects students’ performance and learning efficiency (e.g., Kreijns et. al., 2003; Paechter et. al., 2009; Sabah, 2013).

Furthermore Al Qudah & Cristea (2013); Baird & Fisher (2005) suggested that e-learning providers adapt a social e-learning called Topolor to enhance social interaction in an e-learning environment which facilitates chats, discussion boards, commenting and tagging tools to integrate interaction in the online learning community. However, the present study shows an interesting findings where students rated 'instructional preference' and information processing' rate below the midpoint. These findings contradicted the study of Brown et. al., (2007) which suggested that 'instructional preference' and 'information processing' are significant factors in students learning style preference which they adapted for hypermedia. The difference in the current finding may be attributed to the cultural differences in academic customs and educational practices of the students.

The result of the present study also revealed that students rated visual, auditory and tactile personality in learning style above the midpoint. These findings are consistent with the study of Samson and Karagiannidis (2002) which they stated that personalized learning in a technological and educational stand point is essential in order to deliver knowledge and experience in the e-learning system. Their study further emphasized that when learning experiences are tailored to the different perspective, skill level, culture and other educational context students' are more likely to gain efficient learning in an online environment.

Regression Analysis

Result of the regression analysis indicated that for the undergraduate university students in international programs in Bangkok Thailand, information processing, visual, and tactile learning style preference has a significant relationship on their attitude towards e-learning. These findings means that the more they show information processing, visual, and tactile in their learning style preference, their attitude towards e-learning is positive. This study is supported by previous study which revealed that students learning preference varies

and they benefit from the learning experience if they are able to choose what is relevant and useful for them (Carmona 20017). Particularly, studies found that students will engaged in an e-learning system if the internet will present a system that better understands the student learning preference. These findings are also consistent with Prosser and Smith (1998), Biggs (2003), Ramsden (2003) and Sandler & Smith (2004) that instructional preference influenced students' use of e-learning. Moreover, the relationship between personality in learning style in terms of visual, auditory is coherent with the study of Mustafa and Mohamed Sharif (2011) that students shows better learning performance in the use of the e-learning system where instructions and activities are design to their individual needs in terms of visual, auditory and tactile. Personalization of e-learning system can be done by using media attributes through text, visual, auditory and tactile values.

However, the findings of the current study found that there is no relationship between learning styles in terms of social interaction and students attitude towards e-learning. This finding contradicts the study of Brown et al. (2005) where they stated that social interaction is one of the important factors which influenced students' attitude toward e-learning. It contradicts their finding where they stated that students' isolation is one of the reasons why students' doesn't engage in an e-learning system. Current study also reveals that there is no relationship between auditory personality in terms of learning style and student attitude towards e-learning which contradicts the argument that auditory is one of the factors that results to e-learning success (Samson and Karagiannidis, 2002; Mustafa and Mohamed Sharif, 2011). Possible reasons for these differences in the finding may due to academic and cultural background of university undergraduate students in international programs in Bangkok Thailand.

Limitations of the study

Limitations of the current study should be noted such as:

1. Respondents of the survey were selected from universities with English programs in Bangkok Thailand. Thus caution is advised in employing the interpretation of the findings since it may not represent the general population.

2. The result in essence is correlational and not causal since it employed regression analysis to test the hypothesized relationship between the independent and dependent variables.

3. The scale used in this study was not well researched to correspond within the Thai context primarily its psychometric properties such as its validity and reliability to non-Western demographics. Thus findings may have external limitations.

4. Lastly, due to the limiting factors that are beyond the scope of this study, it is advised that caution be applied when interpreting the results of this study. However, despite the limitation identified in the current study, it is the intention of the study to provide valuable information and knowledge for further investigation concerning the relationship between the key variables.

Conclusion and Implications

The growth of e-learning as an academic tool to enhance learning prompted this research to investigate the relationship between learning styles in terms of instructional preference, social interaction, information processing and personality in learning styles in terms of visual, auditory and tactile and attitude towards e-learning. The current study concludes that there is a relationship between learning styles in terms of information processing and instructional preference and students' attitude towards e-learning. It means that that more the students' shows information processing and instructional preference in

their use of the e-learning system, their attitude towards is positive. The current study also concluded that there is a positive relationship between personality in learning style in terms of visual and tactile and students attitude towards e-learning. This means that the more the students experience visual and tactile values in their use of the e-learning system, their attitude towards it is positive. Overall, it cannot be over emphasized that the current study was able to accomplish its objectives and its contribution to the understanding of what influence students attitude towards e-learning.

The implication of the current findings suggested that for undergraduate students in international programs in Bangkok Thailand, instructional preference, information processing, visual and tactile learning style preference influenced their attitude towards using the e-learning system. In regards to these implications it is suggested that e-learning providers, school administrators and teachers provides personalize e-learning system to provide students with various learning modules to fit their learning style which encourage student engagement in the system. It is also suggested to identify different learning styles so that mental support can be provided and help students develop individual learning skills and be responsible for their own learning process. The current study also implicated that in order to cope with the technical advancement in educational trends e-learning provider, teachers and school counselors should put more importance in considering a student centered an e-learning system that caters to the individual difference in students' learning styles to foster efficient learning and engagement.

Recommendations and avenues for future research

It is without a doubt that e-learning is the future trend in education. More and more institutions will adapt the system to provide accessible education to individuals all over the world. However, with the rise of technology in education, is it also evident that new

challenges will arise, particularly emotional and learning issues which may affect the academic success of the students. Thus, the current study finds number of suggestions and avenues for future research. First, findings of the current investigation suggest that the study be replicated and be tested to a wider group of respondents in Thailand and other regions in Asia which includes a demographic consisting of students from other faculties, Thai and international universities and from other universities in Asia in order to test the psychometric properties of the scale used in the current study. It is also recommended that more research be conducted on an Asian perspective given into account the psychosocial aspects and learning style of Asian students, academic culture and their attitude towards e-learning. Second, it is suggested that future research investigates the causal implications of the variables since the current study only investigated the relationship of the key variables. Third, researchers interested in the same study may replicate it with other sample groups such as those individual who are home schooled, younger students or wider demographics. Lastly, the research questions were given in English and some students may have only provided and tick the answer without reading or understanding the questions which may not truly reflect their responses. Nevertheless, it was ensured that by informing the respondents on its confidentiality and by explaining the questions that they didn't understand mitigated possible problems that may affect the result of this study.

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APPENDIX A

QUESTIONNAIRE

Dear Students,

I am Shannel Lee Faderogaya. I am currently completing my degree in Masters of Science in Counseling Psychology at Assumption University of Thailand. To complete my graduation requirement, I am conducting a survey on students' attitude towards e-learning. For this reason, I would like to ask for your participation by answering the survey questions provided.

Note that this survey is anonymous and all the details you provided are completely confidential. Your answers will reflect how you feel, respond and believe about e-learning. So please I encourage you to answer as honestly as you can. Thank you and please take your time.

Please write a check mark in the box that indicates your answer.

Part 1: Personal Information

Directions: Please tick the box that corresponds to your personal information.

1. Gender ☐ male ☐ female
2. Age ☐ 18-20 yrs. Old ☐ 21-25 yrs. Old ☐ 26 and above
3. Educational level ☐ 1st year ☐ 2nd year ☐ 3rd year ☐ 4th year
4. Faculty ☐ International Business ☐ Marketing
☐ Communication Art ☐ Others please specify

5. Time spent online for school or academic purposes in a week.

- ☐ 0-7 hours ☐ 8-14 hours ☐ 15-21 hours
☐ 22-29 hours ☐ 30 hours or more please specify

Part II. Learning Style Scale

This questionnaire was designed to help you find your preferred way of learning. There are no wrong or right answers. Please write a check mark in the box that indicates your answer.

	Most if the time, I...	Strongly agree	Moderately agree	Agree a little	Disagree a little	Moderately disagree	Strongly disagree
1	... learn better when someone represents information in a pictorial (e.g., picture, flowchart) way.	6	5	4	3	2	1
2	... learn practical task better than theoretical ones.	6	5	4	3	2	1
3	... learn better when I study with other students.	6	5	4	3	2	1
4	... learn better when someone uses visual aids.	6	5	4	3	2	1
5	... learn better when I am involved in a task.	6	5	4	3	2	1
6	... learn better when I watch an educational program.	6	5	4	3	2	1
7	... learn better when I watch a demonstration.	6	5	4	3	2	1
8	... learn better when I study alone.	6	5	4	3	2	1
9	... learn better when studying practical, job-related, subject.	6	5	4	3	2	1
10	... prefer to study alone.	6	5	4	3	2	1
11	... enjoy competing.	6	5	4	3	2	1
12	... prefer to study with other students.	6	5	4	3	2	1
13	... compete to get the highest grade.	6	5	4	3	2	1
14	... compete with other students.	6	5	4	3	2	1
15	... create a mental picture of what I study.	6	5	4	3	2	1
16	... create a mental picture of what I see.	6	5	4	3	2	1
17	... create a mental picture of what I read.	6	5	4	3	2	1
18	... focus more on the details of the subject.	6	5	4	3	2	1
19	... consider the details of the subject more than its whole.	6	5	4	3	2	1
20	... create a mental picture of what I hear.	6	5	4	3	2	1
21	... remembers the details of a subject.	6	5	4	3	2	1
22	... remember specific details of subjects.	6	5	4	3	2	1

Part III. Learning Inventory-Likert

		Often	Sometimes	Seldom
1	I prefer to see information written on a chalkboard and supplemented by visual aids and assigned readings.	3	2	1
2	I like to write things down or to take notes for visual review.	3	2	1
3	I am skillful with and enjoy developing and making graphs and charts.	3	2	1
4	I can easily understand and follow directions on a map.	3	2	1
5	I can understand a news article better by reading about it in a newspaper than by listening to a report about it on the radio.	3	2	1
6	I think the best way to remember something is to picture it in your head.	3	2	1
7	I am good at working and solving jigsaw puzzles and mazes.	3	2	1
8	I prefer obtaining information about an interesting subject by reading about it.	3	2	1
9	I can remember best about a subject by listening to a lecture that includes information, explanations and discussions.	3	2	1
10	I require explanations of diagrams, graphs, or visual directions.	3	2	1
11	I can tell if sounds match when presented with pairs of sounds.	3	2	1
12	I do best in academic subjects by listening to lectures and tapes.	3	2	1
13	I learn to spell better by repeating words out loud than by writing the words on paper.	3	2	1
14	I would rather listen to a good lecture or speech than read about the same material in a textbook.	3	2	1
15	I prefer listening to the news on the radio rather than reading the paper.	3	2	1
16	I follow oral directions better than written ones.	3	2	1
17	I prefer to use posters, models, or actual practice and other activities in class.	3	2	1
18	I enjoy working with my hands or making things.	3	2	1
19	I can remember best by writing things down.	3	2	1
20	I play with coins or keys in my pocket.	3	2	1
21	I chew gum, smoke or snack while studying.	3	2	1
22	I learn the spelling of words by "finger spelling" them.	3	2	1
23	I grip objects in my hands during learning periods.	3	2	1
24	I feel very comfortable touching others, hugging, handshaking, etc	3	2	1

Part IV. E-Learning Acceptance Scale

		Strongly agree	Agree	Undecided	Disagree	Strongly Disagree
1	The instructor provides high-quality instruction.	5	4	3	2	1
2	The instructor provides information on learning progress.	5	4	3	2	1
3	The instructor delivers instructions clearly.	5	4	3	2	1
4	The instructor's measurement of student performance is fair Teaching materials.	5	4	3	2	1
5	E-learning provides me with sufficient teaching materials.	5	4	3	2	1
6	The level of difficulty of the learning contents is appropriate.	5	4	3	2	1
7	The delivery schedule of learning contents is flexible.	5	4	3	2	1
8	E-learning provides individualized learning management.	5	4	3	2	1
9	E-learning provides a variety of learning methods.	5	4	3	2	1
10	I feel e-learning helps me improve my creativity.	5	4	3	2	1
11	I feel e-learning helps me improve my imagination by obtaining information.	5	4	3	2	1
12	I feel I can have a variety of experiences without any interference.	5	4	3	2	1
13	I feel e-learning is fun regardless of usage purposes.	5	4	3	2	1
14	E-learning improves my learning outcomes.	5	4	3	2	1
15	E-learning helps me accomplish my learning effectively.	5	4	3	2	1
16	E-learning study methods are easy to understand.	5	4	3	2	1
17	E-learning is easy to use.	5	4	3	2	1
18	I prefer e-learning to traditional learning.	5	4	3	2	1
19	I am willing to participate in other e-learning opportunities.	5	4	3	2	1
20	I think e-learning should be implemented in other classes.	5	4	3	2	1
21	I will recommend e-learning classes to other students.	5	4	3	2	1

APPENDIX B

STATISTICAL OUTPUT

DEMOGRAPHICS

Statistics

		Gender	Age	Educllevel	Faculty	TSOAPperweek
N	Valid	300	300	300	300	300
	Missing	0	0	0	0	0
Mean		1.6800	1.6167	3.2067	2.1033	1.7333
Median		2.0000	2.0000	3.0000	2.0000	1.0000
Mode		2.00	2.00	3.00	1.00	1.00
Sum		504.00	485.00	962.00	631.00	520.00

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	96	32.0	32.0	32.0
	female	204	68.0	68.0	100.0
	Total	300	100.0	100.0	

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-20	116	38.7	38.7	38.7
	21-23	183	61.0	61.0	99.7
	26 above	1	.3	.3	100.0
	Total	300	100.0	100.0	

Educllevel

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1st year	15	5.0	5.0	5.0
	2nd year	14	4.7	4.7	9.7
	3rd year	165	55.0	55.0	64.7
	4rth year	106	35.3	35.3	100.0
	Total	300	100.0	100.0	

Faculty

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid international business	123	41.0	41.0	41.0
marketing	100	33.3	33.3	74.3
others	77	25.7	25.7	100.0
Total	300	100.0	100.0	

TIME SPEND ON THE INTERNET FOR ACADEMIC PURPOSES PER WEEK

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 0-7 hours	164	54.7	54.7	54.7
8-14 hours	81	27.0	27.0	81.7
15-21 hours	32	10.7	10.7	92.3
22-29 hours	17	5.7	5.7	98.0
30 hours above	6	2.0	2.0	100.0
Total	300	100.0	100.0	

MEAN AND STANDARD DEVIATIONS

	<u>Mean</u>	<u>SD</u>	<u>Midpoint</u>
Instructional Preference	4.57	.32	5.0
Social Interaction	4.08	.49	4.0
Information Processing	4.40	.32	4.5
Visual	2.33	.19	2.0
Auditory	2.28	.18	2.0
Tactile	2.16	.24	2.0
E-learning	3.81	.21	4.0

a. Multiple modes exist. The smallest value is shown

RELIABILITY

Reliability analysis – (Instructional Preference)

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.810	.826	9

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
... learn better when someone represents information in a pictorial (e.g., picture, flowchart) way.	36.2333	25.725	.570	.424	.784
... learn practical task better than theoretical ones.	36.4967	25.361	.596	.475	.781
... learn better when I study with other students.	36.8567	27.267	.310	.313	.817
... learn better when someone uses visual aids.	36.5000	24.739	.656	.543	.773
... learn better when I am involved in a task.	36.5000	25.154	.642	.475	.776
... learn better when I watch an educational program.	36.7700	26.111	.513	.339	.791
... learn better when I watch a demonstration.	36.5633	24.789	.651	.472	.773
... learn better when I study alone.	36.9833	28.043	.164	.248	.845
... learn better when studying practical, job-related, subject.	36.5100	24.833	.644	.495	.774

Reliability analysis – (Social Interaction)

Reliability Statistics

Cronbach's Alpha	N of Items
.719	4

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
... prefer to study alone.	16.4833	13.361	.137	.175	.719
... enjoy competing.	16.4533	10.356	.544	.316	.518
... prefer to study with other students.	16.1300	13.431	.232	.231	.661
... compete to get the highest grade.	16.2267	10.530	.558	.351	.514
... compete with other students.	16.3867	10.097	.584	.406	.496

Reliability analysis – (Information Processing)

Reliability Statistics

	Cronbach's Alpha Based on	
Cronbach's Alpha	Standardized Items	N of Items
.877	.877	8

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
... create a mental picture of what I study.	30.7600	25.507	.614	.515	.864
... create a mental picture of what I see.	30.7433	24.700	.680	.611	.857
... create a mental picture of what I read.	30.7300	24.713	.685	.566	.857
... focus more on the details of the subject.	30.7700	25.455	.661	.483	.860
...consider the details of the subject more than its whole.	30.9167	26.846	.497	.294	.876
... create a mental picture of what I hear.	30.8100	24.917	.682	.471	.857
... remembers the details of a subject.	31.0033	24.940	.661	.582	.859
... remember specific details of subjects.	30.9233	25.248	.619	.547	.864

Reliability analysis – (Visual Personality)

Reliability Statistics

Reliability Statistics

Cronbach's Alpha	N of Items
.610	8

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
I prefer to see information written on a chalkboard and supplemented by visual aids and assigned readings.	16.4633	4.992	.284	.584
I like to write things down or to take notes for visual review.	16.1867	4.895	.290	.582
I am skillful with and enjoy developing and making graphs and charts.	16.6100	4.533	.351	.564
I can easily understand and follow directions on a map.	16.3633	4.647	.366	.560
I can understand a news article better by reading about it in a newspaper than by listening to a report about it on the radio.	16.4100	4.758	.305	.578
I think the best way to remember something is to picture it in your head.	16.1133	4.910	.302	.579
I am good at working and solving jigsaw puzzles and mazes.	16.4533	4.704	.317	.575
I prefer obtaining information about an interesting subject by reading about it.	16.3233	4.942	.244	.596

Reliability analysis – (Auditory Personality)

Reliability Statistics

Cronbach's Alpha	N of Items
.679	8

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
I can remember best about a subject by listening to a lecture that includes information, explanations and discussions.	15.8533	6.427	.375	.648
I require explanations of diagrams, graphs, or visual directions.	15.9533	6.479	.357	.652
I can tell if sounds match when presented with pairs of sounds.	16.0033	6.244	.448	.631
I do best in academic subjects by listening to lectures and tapes.	15.9900	6.237	.410	.639
I learn to spell better by repeating words out loud than by writing the words on paper.	16.0633	6.367	.340	.656
I would rather listen to a good lecture or speech than read about the same material in a textbook.	15.9433	6.341	.365	.650
I prefer listening to the news on the radio rather than reading the paper.	16.0533	6.512	.311	.663
I follow oral directions better than written ones.	16.0300	6.364	.351	.653

Reliability analysis – (Tactile Personality)

Reliability Statistics

Cronbach's Alpha	N of Items
.711	8

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
I prefer to use posters, models, or actual practice and other activities in class.	15.0000	8.161	.300	.702
I enjoy working with my hands or making things.	14.8733	8.191	.282	.705
I can remember best by writing things down.	14.8033	8.533	.189	.721
I play with coins or keys in my pocket.	15.3633	7.108	.466	.668
I chew gum, smoke or snack while studying.	15.4433	6.789	.496	.660
I learn the spelling of words by “finger spelling” them.	15.3300	7.098	.482	.664
I grip objects in my hands during learning periods.	15.2467	7.103	.557	.649
I feel very comfortable touching others, hugging, handshaking, etc	15.1100	7.429	.417	.679

Reliability analysis – (E-learning)**Reliability Statistics**

Cronbach's Alpha	N of Items
.931	21

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
The instructor provides high-quality instruction.	76.2133	120.389	.448	.930
The instructor provides information on learning progress.	76.2233	119.371	.549	.929
The instructor delivers instructions clearly.	76.2300	117.984	.553	.929
The instructor's measurement of student performance is fair Teaching materials.	76.3033	118.138	.512	.930
E-learning provides me with sufficient teaching materials.	76.3267	117.177	.567	.929
The level of difficulty of the learning contents is appropriate.	76.3167	118.010	.544	.929
The delivery schedule of learning contents is flexible.	76.3500	117.941	.511	.930
E-learning provides individualized learning management.	76.3367	116.906	.555	.929
E-learning provides a variety of learning methods.	76.3333	115.367	.631	.927
I feel e-learning helps me improve my creativity.	76.4767	114.130	.676	.927
I feel e-learning helps me improve my imagination by obtaining information.	76.4167	114.578	.653	.927
I feel I can have a variety of experiences without any interference.	76.4733	116.511	.571	.929
I feel e-learning is fun regardless of usage purposes.	76.5233	115.093	.655	.927
E-learning improves my learning outcomes.	76.4433	116.288	.623	.928

E-learning helps me accomplish my learning effectively.	76.4300	116.018	.659	.927
E-learning study methods are easy to understand	76.3500	115.372	.662	.927
E-learning is easy to use.	76.3133	115.694	.613	.928
I prefer e-learning to traditional learning.	76.5767	114.004	.660	.927
I am willing to participate in other e-learning opportunities.	76.4533	114.262	.723	.926
I think e-learning should be implemented in other classes.	76.4467	114.569	.671	.927
I will recommend e-learning classes to other students.	76.4633	114.979	.614	.928

REGRESSION

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	INFORMAT IONPROCE SSING	.	Forward (Criterion: Probability- of-F-to-enter ≤ .050)
2	VISUAL	.	Forward (Criterion: Probability- of-F-to-enter ≤ .050)
3	INSTRUCT OTALPREF ERENCE	.	Forward (Criterion: Probability- of-F-to-enter ≤ .050)
4	TACTILE	.	Forward (Criterion: Probability- of-F-to-enter ≤ .050)

a. Dependent Variable: ELEARNING

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.568 ^a	.323	.320	9.25997	.323	141.911	1	298	.000
2	.601 ^b	.361	.357	9.00525	.039	18.097	1	297	.000
3	.623 ^c	.388	.382	8.83254	.026	12.729	1	296	.000
4	.632 ^d	.400	.392	8.76081	.012	5.867	1	295	.016

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12168.465	1	12168.465	141.911	.000 ^b
	Residual	25552.615	298	85.747		
	Total	37721.080	299			
2	Regression	13636.008	2	6818.004	84.075	.000 ^c
	Residual	24085.072	297	81.095		
	Total	37721.080	299			
3	Regression	14629.015	3	4876.338	62.506	.000 ^d
	Residual	23092.065	296	78.014		
	Total	37721.080	299			
4	Regression	15079.299	4	3769.825	49.117	.000 ^e
	Residual	22641.781	295	76.752		
	Total	37721.080	299			

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	37.126	3.355		11.067	.000
	Informationprocessing	1.120	.094	.568	11.913	.000
2	(Constant)	25.065	4.322		5.799	.000
	Informationprocessing	.919	.103	.466	8.925	.000
	Visual	1.024	.241	.222	4.254	.000
3	(Constant)	18.438	4.629		3.983	.000
	Informationprocessing	.638	.128	.324	4.989	.000
	Visual	.931	.237	.202	3.920	.000
	Instructotalpreference	.443	.124	.223	3.568	.000
4	(Constant)	15.866	4.712		3.367	.001
	Informationprocessing	.611	.127	.310	4.794	.000
	Visual	.764	.245	.166	3.114	.002
	Instructotalpreference	.419	.124	.211	3.394	.001
	Tactile	.441	.182	.121	2.422	.016

Model		95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	30.524	43.728					
	Informationprocessing	.935	1.305	.568	.568	.568	1.000	1.000
2	(Constant)	16.559	33.571					
	Informationprocessing	.716	1.121	.568	.460	.414	.789	1.268
	Visual	.550	1.498	.436	.240	.197	.789	1.268
3	(Constant)	9.329	27.547					
	Informationprocessing	.386	.890	.568	.279	.227	.491	2.036
	Visual	.464	1.398	.436	.222	.178	.779	1.283
	Instructotalpreference	.199	.687	.520	.203	.162	.531	1.884
4	(Constant)	6.593	25.140					
	Informationprocessing	.360	.861	.568	.269	.216	.487	2.052
	Visual	.281	1.247	.436	.178	.140	.718	1.393
	Instructotalpreference	.176	.663	.520	.194	.153	.528	1.895
	Tactile	.083	.799	.346	.140	.109	.818	1.223

Excluded Variables^a

Model	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics		
					Tolerance	VIF	Minimum Tolerance
1 Instructotalpreference	.249 ^b	3.928	.000	.222	.537	1.861	.537
Socialinteraction	.053 ^b	1.006	.315	.058	.804	1.243	.804
Visual	.222 ^b	4.254	.000	.240	.789	1.268	.789
Auditory	.084 ^b	1.299	.195	.075	.545	1.836	.545
Tactile	.183 ^b	3.717	.000	.211	.898	1.114	.898
2 Instructotalpreference	.223 ^c	3.568	.000	.203	.531	1.884	.491
Socialinteraction	.047 ^c	.899	.369	.052	.804	1.244	.669
Auditory	.069 ^c	1.101	.272	.064	.543	1.841	.487
Tactile	.134 ^c	2.652	.008	.152	.823	1.216	.723
3 Socialinteraction	.002 ^d	.042	.966	.002	.755	1.324	.474
Auditory	-.009 ^d	-.140	.889	-.008	.476	2.100	.414
Tactile	.121 ^d	2.422	.016	.140	.818	1.223	.487
4 Socialinteraction	.003 ^c	.061	.952	.004	.755	1.324	.470
Auditory	-.009 ^c	-.145	.885	-.008	.476	2.100	.411

