# CHAPTER II

# LITERATURE REVIEW

## 2.1 INTRODUCTION

Over the past two decades, research has been conducted on a shift in higher education (HE) course content delivery, instruction, and teacher-learner interaction that occurs neither wholly face-to-face (F2F), nor entirely online, but rather within "the carefully designed synthesis of online and face-to-face learning incorporating a range of media based upon a sound constructivist pedagogical framework" (Buckley et al., 2010).

The synthesis, known as blended learning, can take on different blended forms, from mostly face-to-face (F2F) to mostly online, to a perfect 50-50 split. All the definitions of blended learning, implicitly recognize, that learner self-direction, active involvement and motivation are critical (Johnson, 2014).

The shift towards student-centered learning and the increased adoption of online components as part of once traditional higher education instruction formats has led researchers to the conviction that "in order to address some of the limitations associated with the exclusive use of e-learning or F2F learning for that matter, there is a need to adopt a more 'blended' approach to learning" (Ituma, 2011). New technologies, supporting a blended learning instructional format, bring added benefits as well as challenges to the traditional mode of learning. Advantages include the ability to expand learning beyond the time bound walls of the classroom. Web 2.0 tools (blogs, wikis, discussion forums, voice and video tools, flash files, etc.) allow for extended practice as well as instruction, which a blended learning instructor can

guide, monitor, and assess (Whyte, 2011). In addition to affording new types of online assessment opportunities through web 2.0 applications, these tools also allow for unlimited individual, peer-to-peer, small group, and whole group activities, projects, and assignments (Johnson, 2014).

According to So and Bonk (2010), however, blended learning engenders a complex and challenging new model for many teachers or instructors, as well as their students. The challenges of blended learning remain daunting for teachers because accomplishment at learning requires their students to become at least somewhat proactive and autonomous (Kuh, 2009). Not only must university students break out of the mold of relative passivity that they may have acquired in K-12 formation, they must also overcome the nervousness often associated with second language acquisition (Awan et al., 2010). In order to facilitate the transition from minimal student engagement for success, instructors need to move beyond their own acquired and generally traditional instructional styles, and to address personal reluctance to explore new methodologies, tools, and approaches to e-learning, such as blended learning.

Meanwhile, some instructor still feels the need to cover all of the course material in class, rather than online, in order to control the entire learning process. This instructor perception creates serious limitations to the overall potential effectiveness of a blended solution for the learners (Johnson, 2014). Senior (2010) emphasized that, instead of trying to cover everything in face-to-face, instructors should focus on more general pedagogical outcomes and use technology as a means of virtually extending the classroom and concentrating on the learners' interests, requirements, experiences, and goals.

This approach to teaching aligns with the social cognitive or social constructivist frameworks that encourage the creation and facilitation of learning environments in which instruction focuses on enhancing student self-regulation and motivation through proactive engagement with students throughout the course content (Baker, 2010). In effect, this approach seeks to shift the students' focus of control from external (teacher-centered) to internal (learner-centered) in order to enhance student self-efficacy and to reduce their anxiety or sense of helplessness in the face knowledge acquisition. Student proficiency should remains the goal and not covering every page of the course book in class. A blended instructional format adds value to learning if students engage proactively with course content through the online platform allowing instructors to maximize face-to-face class time through communicative activities, facilitated by the course instructor (Richards, 2010; Senior, 2010).

Instructors need to accept that blended learning works effectively. In a study conducted by Shibley et al. (2011), the results showed that blended learning proves more effective than face-to-face instruction alone. The authors stated that the appropriate alignment and purposeful integration of Information and Communication Technology (ICT) and teaching strategies in a blended course can enhance both face-to-face and online student learning because it offers students "more structured learning opportunities outside of class than they have had previously and this increased time-on-task seems to improve learning.

Often, teachers new to blended instructional formats feel that they are teaching or doing the same thing twice and, therefore, fail to engage fully with students in the online portion of a blended course (Nakazawa, 2009). The issues of time and

resource management require consideration through the appropriate design and implementation of blended learning and as such when instructors are clear about their roles and responsibilities.

According to So and Bonk (2010), the design and implementation of blended learning environments require a clear integration between the two components of the course (face-to-face and online) in order to assure effective content delivery and knowledge transfer, and to fully support meaningful collaboration within and among members of the class group. This purposefully designed coordination fosters a sense of continuity and integration of the learning experience across and throughout the blended components of the course in a more holistic fashion. So and Bonk (2010) stressed that blended course designers should keep in mind and understand that the online platform does not replace the need for face-to-face teaching and learning, but affords an opportunity to extend that interaction beyond the classroom in meaningful ways. The authors stated, however, that some types of learning activities, tasks, or experiences stand better suited to online interactions than face-to-face. Instructors need not replicate or "teach the same thing twice" and must seek to design meaningful interaction in both spheres of a blended course, so that "critical discourse episodes in face-to-face discussions are not lost and continue to develop online" (So & Bonk, 2010).

Jefferies (2010) indicated in their research work that technology can be very important support for students in their multifaceted balancing act between their busy studying, working, and personal lives and the students have enthusiastically reported that technology is a key enabler for them.

Blended learning can be traced as a learning stage where more than one kind of learning is being applied to the utilization of optimizing the learning outcomes and the expense of learning. This path of teaching and learning binds together e-learning and conventional learning. Hence, blended learning refers to the instructional environment by which incorporate and utilize innovative technology with classroom learning in one structure, considering the dimension that make better education. So that the blended learning tools such as software, computer facilities and the internet are fused with normal tutorials in which instructors meet with learners face-to-face more regularly. It is significant that it is unsatisfactory to overlook the predominant educational techniques (Rhema & Miliszewska, 2010; So & Bonk, 2010).

The difficulties of learning concepts and, in some cases, the concepts convergence or offset with the commitment of the tutor to follow the traditional teaching induce misunderstanding in some learners' concepts. Some studies (Ahn & Butler, 2013. Alkharang and Ghinea, 2013), uncovered that the students' idea misconception coming about because of the variety of sources that could happen because of the system for educating, the tutor, the book and by the difficulty of the concepts. The studies likewise demonstrated that the misunderstanding of a percentage of the concept is generally high, particularly among opposite concept with converged planets. The studies prescribed that learning developers ought to utilize modern strategies for the conceptual and theoretical change to develop and deepen the proper scientific and experimental comprehension. Utilizing technology is imperative as a part of taking in the ideas and gaining the capacity for learning toward oneself. Besides, the technology drives learners to further inquiry, analysis, understanding, interpretation and criticism about the facts and concepts. It is conceivable to utilize modular learning methodologies (synchronous and asynchronous). Synchronous learning can be

connected in direct discussion between the instructors and learners in the classrooms or according to procurements of the proposed teaching strategy of the lesson with the utilization of certain computer software developed in advance. The asynchronous learning is utilized in forums agreed with all learners, emails and in the conceded activities.

Blended learning means diverse things to distinctive individuals. The word "blended" infers a mixture or combination. At the point when a picture is posted over a section of content, a presentation is made that may be more enlightening to the viewer or reader, yet the picture and content remain intact and can be exclusively perceived. Then again, when two jars of diverse shaded paints are mixed, the new paint will look not the same as both of the first hue. Indeed, if the new paint is mixed well, neither of the original color will keep on existing. Comparable circumstances exist in blended learning. The mix can be a basic seperation of a part of a course into an online component. These activities start to obscure the modalities in a new mixture or blend where the individual parts are not as discernable as they once were. Add to this, the expanding popularity of integrating video conferencing, podcasting, YouTube videos, wikis, blog, and other media into class work and the definition of blended learning gets to be extremely liquid (Sahare & Thampi, 2010).

The study of Ahn and Butler (2013) discovers that there is indeed a relationship between the conceptual comprehension and the inspiration to learn and discover. Additionally, blended learning assumes an essential part in concerning learning to work and influences the dynamic cooperation of learners through their participation and the collaboration with one another. Learners can exchange, investigate, analyze and talk about thoughts to discover solutions for the confronted issues and to answer

queries and questions asked by the instructor. Also learners may utilize e-learning tools accessible in the learning environment which has an incredible commitment to the advancement of higher-order thinking abilities.

According to Faizah & Hazadiah (2010) adult continually live in a quickened and multi-tasking mode and thus, prefer learning program that cater their chaotic way of life. Henceforth, they expressed that programs, learning modes offering, shorter semesters, part-time mode, lesser contact hours, flexible tables, morning classes, and near to home venues are all that much supported by the adult. Customizing adult learners' inclination to their needs does not only support their lifelong learning process as well as satisfy and please their employers. Faizah and Hazadiah (2010) added that the internet has become the most preferred mode of instruction since studying can be accomplished in the workplace and the home. Some adult learners are receptive to hybrid programs where accelerated programs and distance learning merge in an eclectic mode.

Farahiza (2010) highlighted few meanings of blended learning discovering that were given by past researchers which are, blended learning is the learning outside the conventional classroom utilizing information technology for the conveyance of the learning materials, a mix of two sort of learning environment, physical classroom learning and online learning figuring out how to improve the learning outcomes; it is a blend of various conveyance media intended to supplement one another and advance learning and application learned behaviour.

Traditional learning or e-learning formats alone may not be effective enough in achieving learning outcomes. However, it can be possible with blended learning in

which traditional and e-learning settings are combined in one form (Ahmad et al., 2011).

Certain conducted researches have shown that blended learning has been very successful over the past years and it has the potential to yield better results than traditional and online learning alone (Deperlisoglu & Kose, 2010). For instance, Allen and Seaman (2011) pointed out that, one-third of all academic leaders continue to consider that the learning outcomes for blended learning are inferior to those of face-to-face instruction. "Going beyond the barriers of time and location" is one of the other best potentials of blended learning (Jusoff & Khodabandelou, 2009).

However, in Malaysian higher education institutions, blended learning approach has increasingly attracted great interest and support (Azizan, 2010; Siew-Eng et al., 2010; Embi, 2011). Malaysian institutions offer a wide variety of blended courses to the students and as a result of this gained the attention of the learners worldwide.

Blended learning programs offer an innovative environment for communication among students and instructors and at the same time allows the instructors to develop courses, which are student-centered and allow teamwork (Nyachae, 2011). Even though blended program allows easy access to the content and instructor, anytime from anywhere, it has to be appropriately designed to engage the students in order to promote the desired learning. It is imperative for educators to know how to create a learning environment where all key areas work simultaneously.

According to Mojokowski (2013), the importance of technology is not technology. The importance is the partnership that humans form with technology to incorporate it into their lives. Blended learning is defined by The North American Council for

Online Learning as a learning approach that combined the best elements of online and face-to-face learning (NACOL, 2013). There are a handful of studies that had been done on blended learning or supplementing online learning for face-to-face learning. Most of these students indicate that technology and learning should go hand in hand. According to Tutty and Klien (2010), using technology is highly engaging for all age groups and is a way to enhance the learning process for all performance base instruction. In addition, Mojkowski (2013), states that technology could provide access to an abundance of learning resources so that anyone can learn anything at any level at any place from anyone. It is about finding the correct balance between face-to-face and online learning.

This shift of blended learning involving face-to-face and online instruction is intended to make learning more productive by giving better teaching tools, more time, and informative data, according to Vander Ark (2012). It allows individual instruction in a regular classroom setting. "The widespread adoption and availability of digital learning technologies has led to increased levels of integration of computer- mediated instructional elements into the traditional F2F [face to face] learning experience," According to North American Council for Online Learning (2013), blended learning is likely to emerge as the predominant model of the future, and to become far more common than face-to-face or online learning alone.

Blends of online and face-to-face instruction, on average, had stronger learning outcomes than face-to-face instruction alone states the United States Department of Education (USDE) (2009). Shanley (2009) research of student retention on online courses states that, regardless of the mode of learning, it is important that students have an opportunity to experiment with tools and technology required for the class

before the critical elements of the class are introduced. It has to be more than just adding in technology when technology is convenient; it has to be incorporated into the learning process. Students must not just learn about the technology, but should learn with it as part of their everyday routine.

In the latest finding from the National Writing Project (2010), a recent survey of middle and high school teachers found that digital technologies are shaping student writing in countless ways and have also become helpful tools for teaching writing. Technology is allowing students to share their work with a larger audience, collaborate with other students more efficiently, and reigniting the creative spark in the new generation of writers. It is improving their writing skills and their word usage. The report also stated that 50% of instructors surveyed say today's digital technologies make it easier for them to shape and improve student writings. Technology can help improve writing and grammar usage.

Meanwhile, in year 2009, more than 74% of American higher education institutions agreed that online education is an important component of their long-term strategy (Allen & Seaman, 2010). Even though the results about the acceptance of online instruction by faculties are mixed, Allen and Seaman (2010) have confirmed that the percentage of chief academic officers that think that students' retention is a greater problem for online courses was twice as large as those who disagree.

The Cohere (2011) study results highlighted similar opinions of students trying out blended learning in Canada. For instance, the University of Calgary offered funding to instructors for redesigning their courses to adhere to a blended format. The result of the inquiry after implementing blended learning stated that both students and instructors indicated an increase in the quality and quantity of interactions. At Mount

Royal University, blended courses were offered for more than one decade. Students reported an enhanced understanding of course content. Those who participated in blended courses actively obtained the best final course grades. Again, interactive learning technologies were used, such as blogs, wikis, social media sharing, and networking applications were used. The University of Waterloo reported a positive experience with blended courses, as well. Online presentations and activities were matched with online discussion boards and face-to-face tutorials. The enthusiasm of students and the interactions between them, and with instructors was shown to have increased throughout the weeks.

Successful stories of blended learning were certainly not experienced without hurdles. Renes and Strange (2011) argued that the human factor, rather than technology, contributes to limiting the adoption of the technology in the learning environment. The transition from a traditional experience or an online course to a blended one is a process that requires overcoming many challenges. The interactions of students with their colleagues and with faculty, staff and their acceptance of the content of the course and its delivery mode have to be rethought for blended instruction. As Cohere (2011) suggested, institutions have to understand blended learning in order to expand the willingness for it to be adopted by faculty.

Bates and Sangra (2011) argued that; There is persuading proof that online studies do generally too, if not better than understudies in traditional class room and personal courses, however more imperative, the with a specific end goal to improve this move, a mixed adapting course ought to additionally expand the association between the educator and student, furthermore among understudies. It ought to moreover improve the instrument for incorporating developmental and summative input with a specific

end goal to help understudies' learning encounters (Yen & Lee, 2011). Therefore, blended learning is a fundamental redesign of the instructional model with a shift from lecture-centered to student-centered instruction where students become active and interactive learners. Results depend on the conditions in which students are studying. All modes of delivery will suffer from badly designed teaching or inadequate resources". The mixed learning (Blended Learning) is another way of instruction. Mixed learning union the utilization of conventional sewing and learning with that through the web and other innovative media. Colleges have gone far to adjust to the evolving ways. Blended learning is now getting more and more attention seeing as the focused of education is now student-centered teaching and learning. Blended learning can in fact aid students in their achievement (López-Pérez et al., 2011).

While trying to define the term blended learning, it is important to note whom we are defining it for. Students are one of the factors to focus on in most of the definition. According to Staker and Horn (2012), BL is a formal education program where student learns partially through content and instruction online with some element control over time, place, path and/or a pace and in part at an administered brick-and-mortar setting away from home. In addition, blended learning is an imperative method and gradually prominent for educating the masses. It is apparent across educational sectors including higher education, training environments and government settings. Blended learning uses traditional classroom and the internet to provide affordable, time flexible, geographically convenient, and accessibility for all. It is affordable because it utilizes fewer resources such as tutor time and commuting costs for students. It is open for all, because all ages anywhere and anytime can use the net to find out about learning. It improves the quality of education because it increases

interactivity between the students, and the students with their studies. Students can use technology to aid them grasping all dimensions of knowledge.

In Asia Pacific educational organizations have adopted a blended learning, including South Korea, Singapore, Taiwan, Japan, Malaysia, Thailand and China. In Malaysia all advanced education organizations have recognized the profits of mixed figuring out how to cater for a wide assortment of understudies and additionally help the showing and learning process and mixed learning has got the enthusiasm of advanced education pioneers in Malaysia an increasing amount (Azizan, 2010; Siew-Eng et al., 2010; Embi, 2011).

Mixed learning has been around since the mid 21st century. As per Sharma (2010) the term was initially utilized as a part of the corporate world to allude to a course intended to permit laborers to both proceed in the working environment and study. Be that as it may, little agreement has been made to what mixed realizing in training.

The term 'blended learning' has recently used widely by United State researchers in their studies on online based teaching and learning (Tselios et al., 2011). However, there are other alternative terms such as "hybrid", "technology-mediated instruction", "web-enhanced instruction", and "mixed-mode instruction" that are used in current research literature. Another way of looking at BL is by Sharma (2010) three definitions of BL that is relevant to the education world. The three definitions are a combination of face-to-face and online teaching, a combination of technologies and a combination of methodologies.

According to Lewis (2009), "technology is nothing without an instructor and a plan". In a blended learning context, instructors working with students—and students

spending a great deal of time on knowledge acquisition remain the basic dynamic. Blended learning components can strengthen the instructor-learner-content relationship, but will not do so automatically, and cannot turn into a replacement for the instructor (Fang, 2010). As Garrett (2009) stated, "it will always be better for students to acquire knowledge in courses led by well-trained instructor than to attempt to do so independently, no matter how good the materials". A strong sense of instructor presence and the need to establish strong rapport with and among students in the online portion of blended learning courses is necessary in order to reduce anxiety and promote more effective knowledge acquisition (Salcedo, 2010; Senior, 2010).

## 2.2 ADOPTION OF BLENDED LEARNING

### 2.2.1 Blended Learning Changes Teaching Paradigm

There are multiple roles in blended or online teaching and the inadequate clarification of these roles in blended courses confuses both instructors and students (Ocak, 2011). Even though students must conscientiously self-regulate their own learning, instructor monitoring of online work proves essential to the effective and seamless delivery of educational resources in support of face-to-face teaching and the enhancement of online participation by learners (Knight, 2010). The external guidance on the part of instructors who actively engage with their students in the online portion of a course shows particularly important if students are to succeed. The way that instructors choose to conduct this guidance can take many forms (tutoring, coaching, managing, facilitating). In each case, the instructors' own particular role will often be a reflection of their face-to-face demeanor, interaction, and connect with

students as well as their particular technical and technological skills and competencies (Senior, 2010; Vlachopoulos & Cowan, 2010).

According to Vlachopoulos and Cowan (2010), all of the above mentioned approaches and roles can be more-or-less effective in e-moderation, that is the process of managing the communication of others online.

Again, enhanced teaching presence both on- and off-line proves crucial to support student engagement with blended course content (Senior, 2010). The concept of instructor presence becomes vital and may increase course attendance and boost learning, especially for reluctant learners. Low student attendance in the face-to-face component of the blended courses at institution concerns teachers and administrators alike (Johnson, 2014).

### 2.2.2 Teaching Experience Improved

For some of the more mature-adopters of e-learning, teaching has become more rewarding with blended learning. Teachers can focus on the fun parts when students are autonomous and confident enough to engage in relevant self-study. Effective instructors reduce student anxiety through the development of a community of learners and through personalized, learner-focused teaching in both online and face-to-face settings (Richards, 2010). Cooperative learning among students' results from a teaching strategy that requires helping one another to create an atmosphere of mutual achievement, collaboration, support, encouragement, and praise in order to increase proficiency and reduce anxiety in a blended learning course (Awan et al., 2010; Suwantarathip & Wichadee, 2010). Blended learning offers instructors an opportunity to deal with the changing roles of teachers in the 21st century and

requires are conceptually of the "valuable part they play in supporting the learning opportunities of their students in our progressively interconnected world" (Senior 2010).

### 2.2.3 Changing Role Requires Training

In different studies, the researchers had assumed that appropriately-trained instructors, who believe they are competent and effective educational providers, are likely to demonstrate confidence in their instructional practices in most settings. Külekç (2011) stated that "teacher efficacy beliefs [fostered in teacher-training programs] are regarded as an important criterion in increasing productivity and motivation during the teaching and learning process". Many preservice or in-service instructor training programs, however, often fail to prepare their instructors to integrate technology into their teaching, which leaves them unprepared for the challenges of computer-based or blended instruction (Sayadian et al., 2009). Furthermore, many teacher training programs generally focus on preparing teachers for service at the primary and secondary levels of education and do not pertain to instruction in HE, where faculty often have little or no training regarding the teaching and facilitation of learning (Johnson, 2014).

### 2.2.4 Learning in the Blended Context

With blended learning, an instructor will be able to monitor and track the student learning process and to interweave the social and academic domains (Dang & Robertson, 2010). Of course, students can always attempt to cheat the system, a practice referred to in several of the focus groups and blended programs require mechanisms that minimize fraudulent behavior (Joseph et al., 2009). However, the instructor has no reason to suspect that student deception will be commonplace,

especially if attractive and motivating online content exists and the instructor knows the students in their classrooms and can recognize the style of their submitted work online (Johnson, 2014).

### 2.2.5 Blended Learning Increases Student Efficacy for Learning

Awan et al. (2010) stated that this common anxiety "is not something to be ignored or considered a problem for students to deal with on their own". The formation of a Community of Practice among teachers comprises an important step in evaluating and improving teaching practice in dealing with this issue. Inviting students to take an active part in the learning community also becomes essential. Blended learning platforms through web 2.0 tools, for instance, can give teachers and students an opportunity for simulated real-life practice in oral and writing skills in a less anxiety-ridden setting, thus allowing for more confident output (Cheng et al., 2010; Salcedo, 2010). One of the major ideas for the development of the online platform, as a component of an overall blended learning program was to provide anxiety-free venues for students to practice in without fear of making mistakes or suffering ridicule (Johnson, 2014).

The introduction of online, blended, or other forms of hybrid course content delivery has not suddenly, overnight, resolved these matters. However, the literature demonstrates that the ability to extend student access to course content and increase opportunities for meaningful student-to-instructor and student-to-student interaction in productive activities outside of the traditional four walls of the classroom through a blended learning program offers a potentially groundbreaking advance in the area of knowledge acquisition (Johnson, 2014).

Learner autonomy remains a multifaceted capacity recognized and addressed in the particular social context of blended courses at the university level (Dang & Robertson, 2010). Learner autonomy has much to do with an individual student's innate, personal, cognitive, and learning styles for tackling the challenges of blended learning (Srichanyachon, 2011). But, blended instruction can potentially help instructors facilitate learning for all students. On one hand, blended learning allows students to initiate their own learning processes without exclusive overreliance on the instructor (Dang & Robertson, 2010). On the other hand, language learning denotes a social phenomenon that requires some basic level of human-to-human interaction. According to Nakazawa (2009), "some skills can be acquired through self-study, while other skills need to be learned through the experience of interacting with other people along with the guidance of an instructor". Primary among these, stand the productive skills of speaking and writing in which human assessment, accuracy, and feedback remain unmatched by online programs (Fang, 2010; Shih, 2010). Web 2.0 does offer voice tools and writing platforms, such as wikis and blogs requiring a high degree of human interaction and may offer a partial solution to this challenge (Wichadee, 2010).

However, an overreliance on technology for knowledge acquisition could lead to student boredom or a strong sense of isolation and a felt lack of essential academic support (Gencilter, 2009). A truly blended learning program could help to resolve some of the multifaceted challenges (Johnson, 2014). Thoughtful blended learning course design will prove essential to achieving a more student-meaningful and instructor-supported blend that all participants can embrace.

Creating the conditions for a high level of student motivation and satisfaction can act as a counterweight to the challenges of a blended approach and can prove crucial to the process of successful learning (Wu et al., 2010). Bolstered by overall student motivation and satisfaction, a sustained, continuous, and persistent engagement by students over time no matter the modality can become an attainable goal (Kocoglu et al., 2011).

Blended programs present an attractive and viable solution to this challenge, when thoughtfully implemented, and decision makers are searching for evidence and experience-based proposals to that effect (Johnson, 2014).

## 2.3 BLENDED LEARNING MODELS

As the term blended learning taking in gets more consideration from instructors, numerous models of mixed learning are produced. These models are made trying to outfit the convenience of mixed adapting in the classroom. Staker and Horn (2012) reported on 4 models of blended learning emerging in the education sector today. The models are rotation model; flex model, self-blend model and Enriched-virtual model. The rotation model is further divided into four subcategories that are stationed-rotation model, lab-rotation model, flipped-classroom model and individual-rotation model.

The rotation model is a program where students rotate on a fixed timetable or at a teacher's decision between learning modalities. At least one of the stations uses online learning. The other method or station might include activities such as small-group or full-class instruction, group projects, individual tutoring and pencil-and-paper assignments (Staker and Horn, 2012). Station rotation and lab-rotation modal have the same concept in which students rotate between places or groups. The

difference is station rotation happens in the class while lab-rotation model happens on campus in several classes or computer labs. The individual rotation looks at students have a personal schedule in which they will use to rotate between different stations. This model differs from the other three because student does not necessarily go to every available station or modality.

Flex model in a blended learning model where primary delivery of content and instruction are done through the Internet. Face-to-face support by teachers is provided on a flexible and adaptive as-needed basis. Some activities that are used in this model are small-group instruction, group projects, and individual tutoring (Staker & Horn, 2012). Self-Blend model is where students take one or more online courses to enhance the learning process of certain subject. The last model is the enriched-virtual model. This model concept started out as a full time online learning which was later skilled to be a blended learning model. Students get to decide between attending a face-to-face class and learning online. it may seem similar to Flipped classroom and enhance-virtual model. However, the student does not attend the online campus every weekday and it is a whole-school experience.

Meanwhile, University of Malaya, blended learning model used is a simplified version of the flipped-classroom model as proposed by Staker and Horn (2012). Students are required to attend classes on a weekly basis as well as monitor their activity online using SPECTRUM.

In this fast developing world, technology has taken center stage in education. Many past, researchers have taken an interest in blended learning and the classrooms. Delivery modes may vary from face-to-face, blended, and fully online. Bleffert-Schmidt (2011) and Risner, (2011) found that no statistically significant difference

was found between three different delivery modes which are face-to-face, Blended, and fully online. However, general satisfaction and appreciation of the blended modality was observed. Online classroom pedagogy was more student-centered (Ruck, 2012).

McDonald (2012) indicated three different models of blended in higher education: supplementary learning, interdependent learning and adaptable learning.

Supplementary learning is the experience pattern of adult learners when they assign meaning to blended learning based on perception of face-to-face and online component. Meanwhile interdependent learning is the complimentary relationship between online and face-to-face components of the course to generate greater understanding of the course content, peer and the instructor and adaptable learning is the adaptability of the learning structure and process which learners feel would beneficial between traditional learning or online learning (McDonald, 2012).

In addition, the differences in the course contexts, experience of process and learner orientation influence the meaning of blended learning. Eventually, adequate technical support is important for implementing blended learning model (Moukali, 2012), as well as teacher technical training (Peruso, 2012).

Lately, a huge volume of examination on the powerful utilize and mix of Information and Communication Technologies (ICT) instructional practices has been watched. The fundamental gimmick that separates the e-taking in frameworks from the customary learning situations is the level of innovation use and the continuous movement of control and obligation of the learning methodology to the learners, issuing them the chance to learn whenever, anyplace. This movement of control

appears to emphatically impact the learning adequacy of learners. Other findings Wu et al., (2010) suggest that computer self-efficacy, among others, significantly affect performance expectations. The interaction has a significant effect on the learning climate.

Many researchers have tried to evaluate the role of technology in the learning process with significant emphasis being placed on the components of the learning systems. Ishizuka (2011) pointed out those important factors having a paramount influence on participation and engagement with a learning structure could be associated with their acceptance and affective responses towards the system.

There is an extraordinary requirement for foundations to keep side by side, both of current patterns in the instruction enclosure and also the general social environment in which their students' capacity. This environment today can be described as being "loaded" with cutting edge data and specialized devices which further commute scholarly organizations towards consolidating extra data innovation (ICT) based exercises in the backing of the learning/educating procedure (Hales & Fura, 2013).

## 2.4 MERITS, DEMERITS AND CHALLENGES OF BLENDED LEARNING

### 2.4.1 Merits of blended learning

As many authors have reported, students who have experienced blended learning appreciate this course delivery model because it adds other advantages in addition to the flexibility and ubiquity of online courses, such as direct interaction, learning support, and motivation (Fabry, 2012; Fearson et al., 2011). Additionally, blended learning encourages students to be independent and utilize technology. The cost of

learning becomes less because a tutor with the assistance of technology can monitor many students. Besides, blended learning ease intercultural communication gap between people because it can cross geographical borders to make a planetary community. Students who are shy to take part in classroom discussion for any reason, such as lacking the skills to speak in public or feel constrained by time can easily place their questions and opinions in their forums at their own pace.

In the United Kingdom, students were inclined to enroll in blended learning courses because they were looking for flexibility, more support, motivation, idea sharing, interaction, and better communication (Fearson et al., 2011). Enhancement of student performance is what American students reported when they compared blended learning courses to traditional ones (Chan, 2011).

Blended learning produces a greater student engagement, achievement, and satisfaction than traditional or purely online approaches, although there are mixed results (Chen et al., 2010). The mixed results may arise from the wide range of approaches to blended learning currently employed and the lack of understanding about how student characteristics influence what works best for a given individual.

A fast way to delivering a mixed adapting course. Determined by a particular pedagogical need, educators can straightforwardly include another action that suitably addresses their issue without expending additional time and exertion in reconsidering and replacing the entire course or exploring the numerous conceivable mixed learning parts and conveyance techniques. A case is McCarthy (2010) Facebook action.

Because of the profits that mixed learning projects bring, for example, expands adequacy, cultivate the nature of the instructor learner association, input immediately and alternate preferences (Alebaikan & Troudi, 2010), numerous instructive settings have changed their conveyance routines to mixed projects to exploit the best pedagogical methods of blending online and face-to-face learning.

In the same stance, Siew-Eng et al (2010) discovered that learners regardless in rural or urban area were satisfied with blended learning, especially on the course content and materials that they can read, download and print at any time. The learners also revealed that they can improve their information, communication and technology skills by using the blended learning mode, because they can interact with friends and facilitators at any time and the course was flexible in term of learning location, time and process.

Farahiza, (2010) derived with benefits of blended learning in her conference paper, she claimed that blended learning, enhance social interaction, communication and collaboration, it offers flexibility and efficiency, it extends the reach and mobility, it optimizes development cost and time, it offers an efficient and effective approach, it provides more choices about learning to learn, it increases learning resources and experience and lastly, it encourages independence and conviviality.

Furthermore, on-line learning engagement gives an intelligent and interactive setting for communication among learners and instructors in the classroom and may encourage agreeable exercises or activities even beyond the classrooms (Yuen, 2010).

### 2.4.2 DEMERITS OF BLENDED LEARNING

Besides the advantages, there are also few disadvantages or challenges in using blended learning. Research conducted by Siew-Eng et al. (2010) shows that even though learners were satisfied with the blended learning mode, some of the learners complained that the system is not stable and they frequently could not access the web site and it causes inconvenient to them.

Anuwar (n.d.) in his paper stated that there are many challenges that need to be overcome in order to enhance the effectiveness of blended learning. First, generally there is still a lack of awareness amongst the population, especially the parents who feel that the traditional learning model is better. Second is the low adoption rate, in which many institutions are keen to embrace blended learning, but they still lack of the content, inadequate infrastructure together with the problem of digital divide especially to those who live in rural areas. Next, in order to engage the content, it requires a rich combination of multimedia components. However, due to bandwidth and connectivity limitations, downloading of engaging content to the learners will be slow and it may create frustration and boredom among learners and it affects the ease of learning. Lastly, online learning requires a very high degree of self-motivation which is to be found lacking among learners in Malaysia.

### 2.4.3 CHALLENGES IN BLENDED LEARNING

The use of blended learning can pose challenges for students and universities. Unrealistic expectations and feelings of isolation are challenges for students, while universities are challenged by time and support issues. Both students and institutions encounter challenges presented by technology issues. Students enrolled in blended

courses can sometimes have unrealistic expectations. The students in those studies assumed that fewer classes meant less work, had inadequate time management skills, and experienced problems with accepting responsibility for personal learning. Students in such courses have also reported feeling isolated due to the reduced opportunities for social interaction in a face-to-face classroom environment (Smyth et al., 2012).

Experiencing issues with more modern innovations is an alternate test for actualizing mixed learning. This was especially the situation where understudies needed to depend on moderate (e.g. Dialup) Internet associations (Smyth et al., 2012). The poor internet network has been accounted for to hinder understudies' capacity to participate in online examination.

An alternate test identified with innovation is the pervasive access the innovation bears. Despite the fact that the adaptability to take in online and from a separation gave by mixed learning is seen as favorable, the pervasive access might likewise be obtrusive to learners' close to home lives. For some, the online segment brings about additional time gave to study and less to individual concerns. This can prompt members feeling overpowered and tired (Smyth et al., 2012).

Educators need to have some innovative learning to effectively apply this methodology. As indicated by (Cennamo et al., 2009), to effectively incorporate innovation into the showing background, educators need information that can permit them to:

- Identify which innovative device is expected to meet a particular pedagogical objective.

- Specify how the device will be utilized to help students to accomplish that objective.
- Enhance students' capacity to utilize proper innovative devices as a part of the distinctive period of the learning methodology: investigation, examination and generation.
- Select and embrace innovative devices that can permit them to recognize the need and determination issues identified with their own particular expert advantages.

Including an additional movement can be seen by students as a trouble instead of a reward. The included action can be viewed by numerous studies as only one more undertaking on top of an officially content-substantial course (Garrison & Vaughan, 2011).

With the expansion of another action without wiping out a current one can exorbitantly build the teacher's workload. Instructors can acknowledgment imperatives and overpowering workloads as an aftereffect of including extra internet showing assets (Alammary et al., 2014).

An extra activity in an existing course is often not recognized by administrators, and teachers are therefore not compensated for their efforts. Inadequate compensation and incentives is one of the main factors negatively affecting teachers' e-learning use (Alammary et al., 2014).

The last test for colleges executing mixed learning is the trouble in gaining new learning, innovation abilities, for example, how to encourage internet learning groups, encourage online exchange gatherings, and oversee understudies (Dziuban & Moskal,

2013). With respect to understudies, innovation can likewise be a test for colleges executing mixed learning.

### 2.4.4 Conceptual Framework

The goal of the research as from the identified objectives is to provide effective and efficient blended learning system. It can be concluded that many factors and instructions combined together in producing an effective blended learning. From the above theories and concept discussed in the above literature review, it can be seen that there are many factors of consideration that produce an effective blended learning system in any institution, and the most prominent and strong ones are the ones that can be seen in the below Framework.

FIGURE 1: Conceptual framework.


Source: Stacey & Gerbic, 2010

If these sets of dependent variables and independent classes of variables are mixed or integrated together in due proportion taking into consideration of each variable, blended learning, especially in higher institutions most especially Universities will be highly effective will no doubt improve the quality of learning, skills of students and

teaching or tutoring practices as a whole. Students are most likely to improve academically, likewise teachers and the whole institution or educational organization will be lifted to the roof top. These variables are the points of consideration or and the success factors discussed above. For a successful and effective Blended learning, these points discussed must be applied to the success of a blend in learning.

The generic proposed framework or personal theory involves three classes of independent variables or variable groups. Each of these independent variables constitutes of a set of dependent variables. The first set involves Institutional Consideration, Consideration to students, consideration to teachers and pedagogic considerations which as a whole are independent of the rest, but these four variables are dependent on one another. Similarly, E-learning, Face-to-face learning and Self managed learning are dependent on one another, but independent of the consideration class variables discussed above. As we all know that E-learning, face to face and self managed learning are the generic and/or primary elements in a blended learning system when combined or integrated. Thirdly, the design of the blend, a mix of media and learning styles, executive support, content, student support, time flexibility are set of dependent variables to one another which are six in number and similarly, independent of the other factors mentioned above. These three sets of independent variables, each containing sub-dependent variables combine to produce an effective learning in a blended way of a university system or perhaps any similar educational organization (Stacey & Gerbic, 2010).

## 2.5 INFORMATION SECURITY

The security is extremely pivotal in developing and adopting blended learning system. Developing measures and standards for distance learning and education impact in a noteworthy manner the improvement of blended learning system. Blended learning system must be secured against manipulation from the side of the students and also it protects the user's privacy and it ensures client's security. The security necessities and requirement for blended system are investigated and explored regarding the "Privacy Principles". The abilities of various existing privacy enhancing technologies, including systems for network privacy, policy-based security, security administration and management, and trust system, are to be explored, reviewed and evaluated. The security is extremely critical in building up a blended learning system. Rising measures and standards for distance learning and education influence in a noteworthy manner the advancement of blended learning system. Blended learning system must be secured against control and manipulation from the side of the learners and also it ensures client's security and as well its privacy. Security is a critical issue in the real instructive and educational context where blended learning increases in fame and more individuals are taking online courses (YounisAlsabawya et al., 2013).

### 2.5.1 Security Consideration

The roles of security incorporate the following: user authentication / authorization, protection of private data from unintended access, and assurance of data integrity guarding against data defilement by attackers. Authentication is extremely significant in blended learning in light of the fact that the user's information is expected to be secured. Security is an essential issue in the real educational context where blended learning increases in popularity and more peoples are taking online

courses. Blended learning platforms are today's design frameworks that need to be secured. To achieve a good level of security, there are many important elements that must be taken into account: authentication, access control and data integrity (Iacob, N. 2011).

### 2.5.2 Database Security

Database security concerns the utilization of an expansive scope of information security controls to secure and protect databases, potentially including the information, the data, the database applications or stored functions, the database system, the database servers and the related network links against the bargain of their secrecy, integrity, confidentiality and availability (Ciobanu & Ciobanu, 2012).

**Secured Access**: This implies the blended learning system should have a strong authentication mechanism in place. It has a log-in framework where just the genuine client/user is permitted to utilize the system or just the individuals who are enrolled are permitted to have access to the system. With the necessities, the blended learning system ought to have a strong authentication, an instance of the effective authentication mechanism is by utilizing the biometric authenticator or any confirmation or authentication that can demonstrate and prove the personality of the user and that mimic or fake user can be avoided. This is a vital prerequisite in blended learning system (Ciobanu & Ciobanu, 2012).

**Evaluation Results Integirty, Authenticity and Confidentiality:** The evaluation must have integrity and that the learner record must be authentic. Evaluation Records (Exam, Activities, Quizzes). Since evaluation results are important, it should be confidential only to the true learner and cannot be viewed by others (Zuev, 2012).

### 2.5.3 User Information Security

Learners and moderators profile ought to be secured as well. Secured access is obliged to confirm and verify the client/user. This is to demonstrate and to prove the identity of the user against impersonation or pretension. Along these lines, just the genuine and true user can partake. The best and effective strategy is by utilizing the biometric confirmation/authentication, for instance, it could be in type of iris examining or unique finger impression. With the latest technology like for instance in smartphones, there is an eye detection, which distinguishes a man's eyes while taking a look at the gadget's screen. This authenticator must be running while learner has a continuous session (Ciobanu & Ciobanu, 2012).

## 2.6 BLENDED LEARNING SECURITY VULNERABILITIES

The blended learning platform ought to be tested for external interruption issues when it is implemented utilizing systems like:

- XSS (or Cross Site Scripting);
- Cross Site Request Forgery (CSRF);
- Direct SQL code injection in the web page;
- Remote injection using a virus/trojan file;
- Stack-smashing attacks;
- SQL injection in the site address (URL SQL injection);
- Perform different searches using search engines to retrieve personalized website information like password, user name;
- Password cracking using decryption systems;

- The web indexing of the site should not disclose security features like scripts or database address connection;
- Guessing the web site session id (session prediction) (Defta, 2011).
- Cross Site Scripting (or XSS) is a standout amongst the most well-known application-layer web assault. XSS usually targets scripts implanted in a page which are executed on the client server-side. XSS in itself is a risk which is brought about by the internet security weakness of client- side (in the user's web browser) as opposed to on the server-side scripting languages, with HTML and JavaScript as the prime culprits for this exploit. The concept of XSS is to control and manipulate client-side scripts of a web application to execute in the way wanted by the malicious user. Such a manipulation can implant a script in a page which can be executed each time the page is loaded, or whenever an associated event is performed (Defta, 2011).

An XSS attack can be used to achieve the following malicious results:

- Accessing sensitive information;
- Identify theft;
- Altering browser functionality;
- Web application defacement;
- Denial of service attacks (Ciobanu & Ciobanu, 2012).

To prevent such an attack,the blended learning platform designer can perform the accompanying action:

- Guarantee that the pages in the Web website return client inputs when accepting them for any malicious code;

- Do not totally trust Web sites that utilize HTTPS (Secure Sockets Layer) regarding XSS;

HTTPS guarantees secure connections, yet transforming of the information or data entered by the user is interior to the application. In the event that the application has XSS holes, the attacker may send a malicious script that can in any case be executed by the application and lead to XSS intrusion.

- Convert all non-alphanumeric characters to HTML character entities before displaying the user input in search engines and forums;
- Use testing tools extensively during the design phase to eliminate such XSS holes in the e-learning application before it goes into use (Kumar & Kamlesh, 2011).

Cross-Site Request Forgery (CSRF) is an attack that traps the exploited victim into loading a page that contains a malicious request. It is malicious in the sense that it acquires the identity and privileges of the victim to perform an undesired function in the system like altering the victim's email address, place of residence, or password, or buys something. CSRF attacks by and large target function that cause a state change on the server yet can likewise be utilized to access sensitive information. For most sites, the browser will automatically incorporate with such demands any accreditations connected with the site, for example, the client's session cookie, fundamental authentic credentials, IP address, and Windows domain credentials etc. In this manner, if the user is currently authenticated and as well confirmed connected to the site, the site will have no actual way to recognize this from a legitimate user request. In this way, the attacker can make the victim perform actions that they didn't intend to, such as logout, purchase item, change account information,

retrieve account information, or any other function provided by the vulnerable website (Ciobanu & Ciobanu, 2012).

SQL injection is a generally basic kind of attack, and can be maintained a strategic distance from with strict adherence to some fundamental coding practices. Utilizing this technique, a hacker can pass string input to an application with the trust of gaining unauthorized access to a database. Hackers enter SQL queries or characters into the web application to execute a surprising and unexpected action that can then act in a malicious way. Such queries can bring about access to unauthorized data, bypassing of authentication or the shutdown of a database regardless of the possibility that the database resides on the web server or on a different server. The most widely recognized methods to prevent this sort of SQL injection vulnerability are:

- Check the user's input for dangerous characters like single-quotes;
- Using prepared statements, which tell the database exactly what to expect before any user-provided data is passed to it;
- Encrypt sensitive data; ensure that error messages give nothing away about the internal architecture of the application or the database (Ciobanu & Ciobanu, 2012).

The SQL injection can be applied also for URLs, which can be modified by an attacker in order to access important information (Iacob, 2011).

Stack-smashing attacks focus on a particular programming fault: imprudent utilization of data buffers designated on the program's run-time stack, namely local variables and function arguments. Stack-crushing attacks are not serious

problems, subsequent to an overall harmless service, (for example, a web server or FTP server) can be made to execute arbitrary commands. The idea is really clear: insert some attack codes (for instance, code that invoke a shell) somewhere and overwrite the stack in such a route, to the point that control gets passed to the attack code.

To avoid this issue, the program developer (programmer) must:

- Use a language or compiler that performs automatic bounds checking;
- Use an abstraction library to abstract away risky APIs;
- Use technologies that attempt to protect programs against these attacks (LibSafe, IBM Propolice, etc.)

Session hijacking is the misuse of a valid computer session, at times additionally called a session key to gain unauthorized access to information or services in a computer system. This fundamentally means stealing the magic logon hash from the session cookie (Miletic, 2011). This is accomplished by giving a remarkable and hard- to-figure identity value (session id) to the browser (either in a cookie or the URL) which the browser submits with each new request made. The session is alive as the length of the browser continues sending the id with each new demand. Session Prediction means guessing a substantial session id utilizing different tools and methods (like brute force technique). The attack is conceivable when session id is weakly encrypted, excessively short or assigned sequentially. Sessions that don't terminate on the HTTP server can permit an attacker boundless time to guess or brute-force a substantial authenticated session id and in the end gets access to that user's web account. Additionally, session id can be potentially logged and cached in proxy servers. When transmitted via a URL parameter, GET requests can

potentially be stored in browser history, cache and bookmarks. It can be also easily viewable then (Kumar &Kamlesh, 2011).

To prevent issues regarding the session security, the following best practices should be followed:

- Session id should be adequately long and unpredictable;
- Check if the session id is valid;
- Check if the session id has been generated by the application (was not manually introduced by the user);
- Regenerate session id after a period of time or when the user privilege level has changed;
- Use only cookies to propagate a session id;
- Expire session on security error;
- Avoid "remember me" option (persistent logins)
- Expire session after a period of inactivity
- Remove session cookie when a session is destroyed (Ciobanu & Ciobanu, 2012).

## 2.7 Element of information security threats in blended learning

Information security is the assurance and protection of data from dangers or threats. The threats may be from inside or outside, individually known as Insider Threats And Outsider Threats. Information security is to be implemented and executed to guarantee business coherence and to as needs be minimized business risk. The blended learning has the same qualities of e-learning in term of information and communication technology. Subsequently guaranteeing the availability, confidentiality and integrity of

information is likewise of a noteworthy concern to blended learning environment (Jefferies & Hyde, 2010).

Availability in blended learning as portrayed for e-learning is the affirmation that the blended learning environment is accessible by authorized users, at whatever point required. Availability is best guaranteed by thoroughly keeping up all equipment, hardware, performing equipment repairs instantly when required, giving a certain measure of redundancy and failover, giving sufficient and adequate communication bandwidth and preventing the event of bottlenecks, implementing emergency backup power systems, keeping current with all necessary system upgrades, and guarding against malicious actions such as denial-of-service (DoS) attacks (Mendez & Gonzalez, 2010).

Two facets of availability are typically examined, which are denial of service (DoS) and loss of data handling and processing abilities. The blended users are totally dependent of the information on the internet, subsequently, the availability of materials and information to be accessed to whenever and any location is of paramount. Neglecting to satisfy this will have a tremendous effect on blended learning users and e-learning providers. (Jefferies & Hyde, 2010) mention that some features which affect blended learning are privacy and security for e-delivery and collaborative education. The availability of materials and information is inadequate. It is important to guarantee the reliability of the materials and the information published. This relates to another security element, which is integrity.

Integrity in blended learning is the same as e-learning which is the security of information and protection of data from deliberate or accidental unauthorized changes. Integrity includes keeping up the consistency, exactness, accuracy and trustworthiness

of information over its whole life cycle. Data should not be changed in transit, and steps must be taken to guarantee that data can't be modified by unauthorized individuals (for instance, in a breach of confidentiality). In addition, a few methods must be set up to distinguish any changes in data that may happen as a consequence of non-human-caused events, for example, an electromagnetic pulse (EMP) or server crashes. In the event that a startling change happens, a reinforcement duplicate (backup) must be accessible to restore the affected data to its correct state. Integrity depends on access controls; therefore, it is necessary to positively and uniquely identify all persons who attempt access. Integrity can be compromised by hackers, masquerades, unauthorised user activity, unprotected downloaded files, LANs, and unauthorised programs (e.g., Trojan horses and viruses), simply because each of these threats can lead to unauthorised changes to data or programs. Although availability and integrity are the main security elements which require emphasis within blended learning environment, the element of confidentiality is also important (Walid, 2012).

Confidentiality is the protection of information in the system so that unauthorized persons cannot gain access. Confidentiality prevents sensitive information from reaching the wrong people, while making sure that the right people can in fact get it. A good example is an account number or routing number when banking online and any means of identification. Data encryption is a common method of ensuring confidentiality. User IDs and passwords constitute a standard procedure; two-factor authentication is becoming the norm and biometric verification is an option as well. The following are some of the most commonly encountered threats to information confidentiality: hackers, masqueraders, unauthorized user activity, unprotected downloaded files, local area networks (LANs), and Trojan horse (Walid, 2012).

## 2.8 INFORMATION SECURITY IN BLENDED LEARNING

As a system that depends such a great amount on the utilization of internet (particularly information and communication technology), blended learning is liable to the effects from every risk and threat encountered by the information and communication technology. These include:

1. Deliberate software attacks (viruses, worms, macros, denial of services (DoS).
2. Technical software failures and errors (bug, coding problems, unknown loopholes).
3. Acts of human error or failure (accidents, employee mistakes).
4. Deliberate acts of espionage or trespass (unauthorized access and/or data collection).
5. Deliberate or intentionally acts of sabotage or vandalism (destruction of information or system).
6. Technical hardware failures or errors (equipment failure).
7. Deliberate acts of theft (illegal confiscation of equipment or information).
8. Compromises to intellectual property (piracy, copyright, infringement).
9. Technological obsolescence (antiquated or out-dated technologies).
10. Deliberate acts of information extortion that is blackmail for information disclosure (O'leary & O'Leary, 2011).

Rosenberg (2011) placed E-learning on three fundamental criteria which can be applied to blended learning due to its much dependency on ICT. These criteria are as follows:

1. Network-capable updating, storage/retrieval, distribution and sharing of information.

2. Delivering at the end of the user via the computer using standard internet technology, and

3. Focus on the broadest view of blended-learning.

The first and second criteria expose the blended learning institution to the threat, as the use of information and communication technology (ICT) could ultimately lead to many possible information-security risks which could compromise information, such as loss of confidentiality, availability, exposure of critical data, and vandalism of public information services.