Developing a New Learning System with Social Software by Studying the Learners’ Readiness and Acceptance

by

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A thesis submitted for the degree of
Master of Science
by Research

School of Business and Design
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Malaysia

2012
Abstract

E-learning has increasingly been used by educational institutions to support their learning activities. However, previous studies have shown that the traditional e-learning model has put heavy emphasis on content delivery and technology (content and technology-centric model) instead without focusing on the social aspects of learning. Without these aspects, e-learning does not have the benefits of online learning community, personal learning environment and connectivism.

This research aims to develop a new learning system (NLS) to the learners that integrates social software tools. The purpose of the NLS is to provide learners with a more collaborative, social and interactive learning experience in an online learning environment, which are rarely available in the traditional e-learning such as Blackboard. Past experiences have shown that new technologies do not necessary lead to major improvement in education. Therefore, to successfully implement the NLS, this research found that it is needed to assess readiness and acceptance of the learners in adapting to the different learning styles and learning experiences of the NLS. It also helps to understand the learners’ learning needs and how they come to accept the NLS. In addition, this research has also carried out some theoretical studies on the social aspects of learning, collaborative learning, and investigation on the use of social software and its effect in learning to the learners.

This is a multi-stage research, which incorporates theoretical analysis and empirical research through survey questionnaire. The second stage is subdivided into two phases. In the first phase, survey questionnaire was used to assess the learners’ perceived readiness in adapting the NLS prior to the implementation of the prototype system. A prototype system was developed as the NLS based on the theoretical foundations and the research findings that this research has studied. The prototype system is then implemented for usability testing on the learners. In the second phase, another set of survey questionnaire was conducted on the learners who have participated in the usability testing to assess their acceptance towards the NLS. Overall, the participants show positive attitudes towards the NLS.
Acknowledgement

Many people have supported me during my Master studies and I am grateful for all their assistance, support, and encouragements.

First of all, I sincerely thank my supervisors and mentors, Mr. Gregory Wee and Dr. Patrick Then for their continuing support in this research work. Their assistance and advices throughout are invaluable to the completion of this research.

I am also grateful with the opportunities of working with Mr. Iskandar over the development of the prototype system and thank him, who implemented parts of the prototype system as well as to all the students in Swinburne University of Technology Sarawak who had participated in this research studies. Furthermore, I would want to thank Dr. Lee Seldon, who have helped me especially in the beginning of my research studies and his continuous thoughtfulness and advices are much appreciated.

I would also like express my sincere thanks to my former lecturer and friend, Mr. Ondris Pui for his encouragements to pursue my Master studies. To my colleagues, Mr. Michael Lee, Mr. Rodney Lim, Mr. Azuar, and Mdm. Bibiana Lim for their interests on my research, contribution of ideas, discussions, and help throughout.

I want to thank my girlfriends and friends for being so supportive. Without them, all my years of my Master studies would have been unbearable. I would also like to express special thanks to my friend, Miss. Jenny Choo for her support and help especially in my English.

Finally, I want to thank my family for their spiritual support and understanding, for endlessly supporting me undergoing the ups and downs during my Master studies. I also want to thank God for listening to my prayers and enabling me to complete my Master studies.
Declaration

I declare that this thesis contains no material which has been accepted for the award of any other degree or diploma, except where due reference is made in the text of the thesis. To the best of my knowledge, this thesis contains no material previously published or written by another person except where due reference is made in the text of this thesis.

__________________
Serena Sim Shing Yin
July, 2012
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Chapter 1: Introduction

1.1 Overview

1.1.1 E-learning

E-learning (electronic learning) has evolved from its predecessor, namely distance learning (Wong 2007). Distance learning occurs when learners and educators are logistically separated. It was offered as early as the mid-1800s (Sonner 1999). Various types of distance learning have evolved along with the technologies when Information and Communication Technologies (ICT) has developed (Baker 2003). In the mid-90s, the emergence of web-based platforms and Internet connectivity allowed education to explore how this new technology could improve learning. E-learning was then being introduced. The limitations of face-to-face, time, and location-defined traditional educational services cannot support the complicated and demanding learning and training needs of learners today (Wagner 2001). Since then, it attracted many learners from all over the globe mainly because of its benefits that overcome the limitations of face-to-face learning. From the literature reviews, there are basically three major groups of benefits of e-learning namely efficiency, effectiveness, and flexibility (Wong 2008).

Efficiency is defined as achieving maximum productivity with minimum wasted effort or expense (i.e. cost, effort, and time). For learners, costs are saved from travelling and living expenses. Learners can study wherever and whenever they have access to computer and Internet. In addition, e-learning is said to be efficient because learners spend less time to learn (Ivergard & Hunt, cited in Wong 2008).

Effectiveness is defined as the degree to which something is successful with a desired result. In terms of learning, effective can be defined as improvement of knowledge, skills, and attitudes (Kirkpatrick 1994). Wong (2008) summarized that effectiveness is using technology to enhance the learning process to grasp more knowledge and even improve their skills.

Flexibility is the ability to learn at anywhere, anytime, and self-directed. Fry (cited in Wong 2008) described e-learning as a major strategic drive for e-learning providers as it enables delivering of educational services across geographical and time boundary.
Collins, Hitlz and Koory (cited in Wong 2006b) represented e-learning flexibility as in anywhere and anytime. In summary, flexibility in e-learning is to increase the versatility of learning for learners.

It is clearly stated that the evolution in learning has changed from distance learning to e-learning. E-learning is naturally suited to distance learning; however, e-learning is not quite the same as distance learning. Distance learning is a concept that has evolved into e-learning. It is used to describe a learning environment that takes place away from the actual traditional face-to-face learning (White 2007), whereas e-learning, many definitions have been defined by several authors. In general, e-learning is defined as communication and learning activities through electronic means (i.e. computers and networks) by Schank (2002). To be more detailed, Fry (cited in Wong 2006a) defined e-learning as ‘delivery of training and education via networked interactivity and a range of other knowledge collection and distribution technologies’. Bleimann (2004) also stated that e-learning is a self-directed learning that is based on technology especially web-based technology. He also stressed that e-learning is a collaborative learning.

A number of terms or concepts have also been used to describe the mode of e-learning such as online learning, virtual learning, distributed learning, network, and web-based learning (Naidu 2006). However, Tsai and Machado (2002) mentioned that there are differences between e-learning, online learning, and web-based learning. Table 1 summarizes the different definitions of some of the learning concepts.

<table>
<thead>
<tr>
<th>Learning Concepts</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-learning</td>
<td>E-learning are learning activities that involve computers, networks, and computer technologies.</td>
</tr>
<tr>
<td>Web-based learning</td>
<td>Learning contents and learning activities through the Web.</td>
</tr>
<tr>
<td>Online learning</td>
<td>Learning materials directly accessible from within a core application only such as Microsoft Word’s Office Assistant.</td>
</tr>
<tr>
<td>Distance learning</td>
<td>Learners and instructors are separated and interacted via technological means.</td>
</tr>
</tbody>
</table>

Table 1: Different definitions of learning concepts  
(Source: Wong 2008)
Table 1 above shows that above concepts are different but they are similar in terms of technological means such as Internet and web technologies involved for e-learning purposes. Internet and web technology are important in e-learning (Wong 2007). Apart from web-based technology, e-learning also requires multimedia based courseware (Evan & Fan, 2002) through virtual learning. Therefore, e-learning is the umbrella concept that covers all definitions of these different learning concepts (Wong 2008).

Wang (2007) stated that e-learning should have a website that contains learning materials such as syllabus and reading lists where learners can just obtain the learning material from the website. E-learning is then delivered and managed by Learning Management System (LMS), which is a software often utilized in training and education that delivers course contents to learners, tracking learners’ learning progress, and managing their records (Valuisky, cited in Lam et al. 2009). Some of the LMS are commercial products such as Blackboard, while some of them are free to use, such as Moodle and Sakai. Blackboard and Moodle are commonly and successfully used in e-education (Graf 2007). Chuah (2007) explained that LMS provides an alternative means to deliver instructions other than in classroom, which provides a virtual and rich learning environment to backup lecturers that allows them to create and manage learning materials by using various ICT in both synchronously and asynchronously. Honey (2001) provided many good examples of learning activities that involved ICT. These examples include learning from e-mail, online research, online discussion, and e-mail. Therefore, it is clear that e-learning is centered on ICT (Wong 2006a).

E-learning is being more rapidly adapted by many universities for the advantages of its better access, flexibility and convenience, and e-learning has become one of the solutions to meet the large demand of learning in many fields (Chuah 2007). It allows learners to acquire knowledge, access learning materials, and obtain online assistance at anytime and anywhere through ICT. Thus, learning has become more flexible and it is no longer dictated by a learner’s geography, age or background experience. E-learning is taking shape in Malaysia as well. There are two e-learning based universities in Malaysia, namely University of Tun Abdul Razak (UNITAR) and Open University of Malaysia (OUM) (Angeline, citing in Wong 2008). Swinburne University of Technology Sarawak (SUTS) is not exceptional as well. SUTS has been using Blackboard as an enhancement to the traditional face-to-face classroom learning environment. It focuses
in providing SUTS’ learners to access learning materials provided by their lecturers, update announcements, and participate in discussion topics created by their lecturers at anytime and anyplace.

1.1.2 Web 2.0 and Social Software

Over the past few years, the web has been shifting from being a medium, in which information was transmitted and consumed, into being a platform, in which content was created, shared, remixed, repurposed and passed along (Downes 2005). The previous Web 1.0 was about static HTML pages and primarily concerned with the passive delivery of top-down content generated for mass audience with only ‘one-to-many’ type of interaction node. Whereas the new phase of web evolution, which has been referred as Web 2.0 by O’Reilly (2005), is seen to allow users to direct in the creation, refinement, and distribution of shared content (Selwyn 2007). It is also known as read-write web. Chatti, Jarke and Frosch-Wilke (2007) further explained that it is also a new generation of user-centric, open, dynamic web, with peer production, sharing, collaborative, collective intelligence, distributed content, and decentralized authority in the foreground. Table 2 illustrates the differences between the traditional Web 1.0 and Web 2.0.

<table>
<thead>
<tr>
<th>Basic Service</th>
<th>Web 1.0</th>
<th>Web 2.0</th>
<th>New Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online advertisement</td>
<td>DoubleClick</td>
<td>Google AdSense</td>
<td>Dynamic advertisement based on the page content</td>
</tr>
<tr>
<td>Photo sharing</td>
<td>Ofoto</td>
<td>Flickr &amp; MySpace</td>
<td>Personalized templates, tagging, annotating &amp; comment</td>
</tr>
<tr>
<td>Website</td>
<td>Personal Website</td>
<td>Blogging</td>
<td>Peer to peer source &amp; each downloading machine becomes server</td>
</tr>
<tr>
<td>File sharing</td>
<td>Akamai</td>
<td>BitTorrent</td>
<td>Open content &amp; collaboratively written</td>
</tr>
<tr>
<td>Online encyclopedia</td>
<td>Britannica Online</td>
<td>Wikipedia</td>
<td>Event request &amp; comments from collective users</td>
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<tr>
<td>Online event organizing</td>
<td>Evite</td>
<td>upcoming.org &amp; EVDB</td>
<td>Marketability</td>
</tr>
<tr>
<td>Identity</td>
<td>Domain name speculation</td>
<td>Search engine optimization</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Differences between Web 1.0 and Web 2.0.
Chapter 1  Introduction

<table>
<thead>
<tr>
<th>Basic Service</th>
<th>Web 1.0</th>
<th>Web 2.0</th>
<th>New Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visitors volume interfacing 2 programs</td>
<td>Page views</td>
<td>Cost per click</td>
<td>Navigation behavior</td>
</tr>
<tr>
<td></td>
<td>Screen scraping</td>
<td>Web services</td>
<td>Merging into 1 platform: The Web</td>
</tr>
<tr>
<td>Centralized authorship</td>
<td>Publishing</td>
<td>Participation</td>
<td>Democratization of authorship</td>
</tr>
<tr>
<td>Centralized managed content</td>
<td>Content management system</td>
<td>Wikis</td>
<td>Open content</td>
</tr>
<tr>
<td>Pre-defined</td>
<td>Directories (taxonomy)</td>
<td>Tagging ('folksonomy')</td>
<td>User-defined</td>
</tr>
<tr>
<td>Single provider</td>
<td>Stickiness</td>
<td>Syndication</td>
<td>Federated provider</td>
</tr>
</tbody>
</table>

Table 2: Differences between Web 1.0 and Web 2.0
(Source: Cram, Kuswara & Richards 2008)

Table 2 illustrates the key characteristics of Web 2.0 as not only a platform of communications between applications, but it also leads to the trend of user-generate content, where users can publish and share contents. With Web 2.0 data sharing, the web also becomes a platform for social software that enables groups of users to socialize, collaborate, and work with each other (Franklin & van Harmelen 2007).

Social software is a major component of Web 2.0 (Bragg 2007). In particular the notion of Web 2.0 highlights the growing popularity of the term ‘social software’ where users are connected to and collaborate with each other in a variety of group interactions (Shirky 2003). Social software covers a wider range of software tools that support social interaction, feedback, conversation, and networking (Boyd; Downes, cited in McLoughlin & Lee 2007), which allow users to gather resources, share the resources with others, and facilitate active participation of each user. Web 2.0 is an umbrella term for a host of recent internet tools whilst different in form and function, all of these tools share a common characteristic of supporting Internet-based interaction between and within groups, which is why the term ‘social software’ is often used to describe Web 2.0 tools and services (Selwyn 2008). The most common tools include social networking, blog, wiki, social bookmarking, and media sharing as shown in Table 3.
<table>
<thead>
<tr>
<th>Social Software Tool</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Networking (i.e. Facebook, Friendster)</td>
<td>Category of Internet applications to help connect friends, business partners, or other individuals together using a variety of tools.</td>
</tr>
<tr>
<td>Blog (i.e. Blogger, Wordpress)</td>
<td>A weblog (or blog), is a website where entries are made displayed in chronological order. They often provide commentary or news on a particular subject, typically combining text, images and links to other blogs, web pages and other media related to the specific topic.</td>
</tr>
<tr>
<td>Wiki (i.e. Wikipedia)</td>
<td>Collaborative websites that allows users to add, edit, and delete content.</td>
</tr>
<tr>
<td>Social Bookmarking (i.e. Delicious)</td>
<td>Websites that allow users to post their list of bookmarks of favourite websites for others to share.</td>
</tr>
<tr>
<td>Media Sharing (i.e. YouTube, Flickr)</td>
<td>Websites that allow users to upload, share, and view media (i.e. photos, videos).</td>
</tr>
</tbody>
</table>

Table 3: List of social software tools and descriptions
(Source: Pettenati and Ranieri 2006; Social software 2010)

McLoughlin and Lee (2007) further explained that current social software tools not only support social interaction, feedback, conversation and networking, but also endowed with a flexibility and modularity that enables collaborative remixability (a transformative process in which the information and media are organized and shared by individuals, and can be recombined and built on to create new forms, concepts, ideas, mash-ups, and services).

With the impacts of social software, the new e-learning tends to focus on a more ‘user-centered’, ‘social networked and open communication’ learning approach (Downes, cited in Lam et al. 2009). It is also suggested that social software should be considered in the design of a LMS (Lam et al. 2009).

1.1.3 Social Software in Collaborative Adaptive Learning Platform (CALP)

Social software has been becoming a great potential in teaching and learning due to its ability for sharing, interaction, and collaboration among learners in the learning environment, and it also increases its influences to the universities in making use of these tools to support teaching and learning. Many have been integrated into LMS
(Judd, Kennedy & Cropper 2010) which will be discussed further in Section 2.2. This has led to the collaborative adaptive learning platform (CALP) approach by Klamma et al. (2007) which integrates elements from social software for learning. The main aims of CALP are to deliver quality learning resources that are tailored to the learners’ needs, preferences, interests, skills, learning goals, etc. Besides that, CALP will support knowledge sharing and community building. More details on CALP will be discussed in Chapter 2.

1.2 Statement of the Problem

As discussed in Section 1.1 that there are benefits of e-learning like flexibility (in time and place), effectiveness, and efficient. However, there are some limitations that have been identified by Hamburg, Lindecke and Ten Thij (2003) such as lack of peer contact and interaction, high initial costs for preparing multimedia content of learning materials, and also substantial cost for its maintaining and updating, cooperation, and personal contact.

Most of the e-learning is designed, authored, delivered and managed via LMS as a statically package online courses and modules without focusing on the social aspects of learning (Chatti et al. 2008) and has put heavy emphasis on content delivery and technology (content and technology-centric model) instead. The content and technology-centric model of learning has failed to achieve performance improvement and innovation (Chatti et al. 2008). Van Harmelen (2006) also agreed by pointing out that traditional LMSs are not flexible enough or are not addressing to the individual needs of a specific learner.

Furthermore, the nature of the learning content that is delivered by the traditional e-learning is still in a lecturer-directed and delivery-centered concept. In the traditional method of e-learning as shown by Sharma and Kitchens (2004) in Figure 1, learners’ learning areas are limited between their educators, friends and classmates; their learning areas are always within their university only. In term of communities, learners are put into discussions supported by LMS and these communities are limited to a given group of learners such as in a university class. Typically in such university class has a fixed start and end-point. Therefore, the communities in the traditional e-learning method are very limited.
The web has been shifting over the past few years from being a medium in which information is transmitted and consumed, into a platform in which content is created, shared, remixed, repurposed and passed along (Downes 2005), and a platform where people connect in a form of digital social networks. This transformation has been largely due to the availability and popularity of social software.

Thus, learning in this 21st century is becoming more social, personal, distributed, flexible, dynamic, and lifelong in nature. According to Chatti at al. (2008), learning is basically about people. Looking at the current trends of learning that have been defined by Koper (2004), learning has become a more learner-centered and self-directed form of learning. Therefore, the current e-learning requires changing in focusing from technology-driven to people-driven model to have a collaborative learning environment that could foster knowledge networking and community building. In learning, this trend is manifested in learner-centered or student-centered design, which it is placing the control of learning into the hands of the learners. Jolliffe (cited in Lam et al. 2009) stated that the objectives of a LMS should be learner-centered and goal-oriented, in order to take into an account for different backgrounds of different learners.

Social software increases its influence with concepts and technologies which promote sharing, collaboration, communication, socializing, networking; the need for online collaborative learning environment becomes more effective. Nevertheless, the
traditional e-learning model has not been completely supporting this type of learning. Without these features, e-learning does not have the benefits of social learning. Marenzi (2008) also agreed that the traditional e-learning system (i.e. LMS) should blend with social software tools in order to create new environments that reshape information process and flows, and connect competences. The objective is to allow users to invest as much of the available effort as possible in the production of rich interaction, resulting in an optimal collaborative load. The use of social software tools also fosters the sense of community and group motivation, and supporting lifelong competence development.

Therefore, this has encouraged this research to develop a new learning system (NLS) which integrates social software based on CALP approach by Klamma et al. (2007) (refer to Section 1.1.3). The CALP approach helps to overcome the limitations of traditional e-learning into collaborative adaptive learning in which learners control over their learning process that tailor to their learning needs, preferences, interests, skills, and learning goals. It also helps to deliver an improved learning system to the learners. The purpose is to provide learners a more collaborative, social, and interactive learning experience in an online learning environment. More details on CALP will be discussed in Chapter 2. This research also carries out some studies on the social aspects of learning, collaborative learning, and to investigate the use of social software and its effects in learning to the learners.

Figure 2: New Learning System (NLS)
1.3 Research Aim

To overcome the limitations of traditional e-learning, this research aims to develop a NLS which integrates social software based on CALP approach as discussed in Section 1.2. CALP approach is designed to place the learners at the center, giving the learners control over their learning process that tailors their learning needs, preferences, interests, skills, and learning goals as well as supporting collaborative learning, knowledge sharing, networking and community building. As discussed in Section 1.1.2, social software covers a range of tools such as social networking, blog, and wikis. This research only focuses on using social networking sites (SNS) as the key tool in developing the NLS and applying CALP approach. Therefore, the main aim of this research is to develop a NLS using SNS and applying CALP approach.

However, before any social software tools (i.e. SNS) are introduced into a learning system, it would be necessary to measure the readiness and acceptance of the learners themselves about using such system. In order to effectively implement NLS, there is a need to study the learners’ readiness and acceptance in adapting these tools in their learning experiences (Galy, Downey & Johnson 2011). Stephenson (cited in Lim, Hong and Tan 2008, p. 541) also emphasized that new technologies do not necessarily lead to major improvement in education. Moreover, learners in a new learning environment would develop new perception and change their learning styles, thus ultimately influencing their academic achievements (Schmeck and Ceisler-Bernstein 1989, cited in Poon 2004).

Therefore, in order to achieve successful implementation of the main research aim, more focused subsidiary aims are defined:

1. To examine learners’ perceptions and readiness towards adapting the NLS.
2. To examine learners’ perceptions and acceptance towards using the NLS.

The subsidiary aims also help to understand the learners’ learning needs and how they come to accept the NLS as well. With this research’s findings, it could be a reference to other universities when planning to implement the same NLS that integrates social software tools (i.e. SNS).
1.4 Research Questions

The main aim of this research is to develop a NLS to the learners that integrates SNS and applying CALP approach. This research seeks to answer the following main research question:

What is needed to successfully implement the NLS that integrates SNS and applying CALP approach?

In order to answer the main research question, this research has divided into two stages which will be discussed further in the research framework in Section 3.1. Each stage defines a series of more focused subsidiary research questions.

As social software continues to expand, it influences not only the learners’ learning styles and learning behaviors, but also the theories and concepts of learning processes’ design and approach. Thus, this research seeks to answer the following subsidiary research question in stage 1 of this research:

(A) What elements are needed in which SNS can provide to ensure that NLS design will be endured?

As discussed in Section 1.3, in order to successfully implement the NLS, it is needed to assess readiness and acceptance of the learners in adapting to these tools. Therefore, a series of more focused subsidiary research questions have been further defined in stage 2 of this research. The subsidiary research questions are developed into two sets. The first set of subsidiary research questions measure the learners’ experiences towards e-learning and social software tools (i.e. SNS), and their level of readiness towards the NLS:

(B) What are the learners’ experiences in e-learning (LMS)?
(C) What are the learners’ experiences in social software tools (i.e. SNS)?
(D) What are the learners’ readiness levels towards the NLS?

The learners’ experiences are assessed to address the learners’ needs for the development of the NLS. The learners’ readiness assessment provides the key information to initiate the change of the learning system and learning styles. It helps in the design of a more effective and usable system for learning to the learners.
The second set of research questions measure the learners’ perception on the NLS as compared to the traditional LMS and their acceptance levels towards the NLS:

(E) What are the learners’ perceptions on the NLS compared to the traditional LMS (Blackboard)?

(F) What are the learners’ acceptance levels towards the NLS?

The comparison is to assess the learners’ experiences towards NLS in terms of collaborative learning, knowledge sharing, networking and community building, and personal learning experience in comparison with the SUTS’s current LMS (Blackboard). Learners’ acceptance is to measure learners’ level of acceptance towards the NLS after they have tested on the NLS.

1.5 Scope of the Research

The following are the scopes of this research:

- This research is only conducted in Swinburne University of Technology Sarawak (SUTS), which is located in Kuching, Sarawak, Malaysia. Besides that, participants are only limited to SUTS’ students. Educators (i.e. professors, lecturers, instructors) are not involved in this research. These students are only confined to those currently enrolled in Computing, Multimedia and Design courses from bachelor degree, foundation, and diploma program in SUTS as they high level computer literacy. However, this research is not course/unit specific.

- This research only opts to study the learners’ readiness and acceptance towards the NLS based on the learners’ perceptions. Therefore, this research is only focused on the area of learners’ perceptions. Survey instrument was used to collect the data.

- A prototype system is to be developed to examine the learners’ acceptance towards the NLS. The prototype system in this research is served as a typical example of the final system. It is used to give the learners an idea of how the final system works, assist in identifying any problems with efficacy, collect feedback from the learners, increase system development speed, and it is cost effective.
As this research only studies the students in SUTS, therefore Blackboard is taken as an example of e-learning (LMS) since SUTS has been introducing Blackboard to the students as their LMS to conduct their e-learning.

The focus of the prototype system is on the social interactions and in particular on collaboration in learning process as well as on the tools to support the learners.

Social software covers a wide range of tools. This research only specifically focuses on the use of social networking sites (i.e. Facebook) to be integrated in the prototype system as this research assumes that social networking sites are the most popular tool among other social software tools. This research also assumes that Facebook is the most popular social networking sites to the participants.

The purpose of the NLS is to provide learners a sharing, collaboration, community building, personal, and informal learning experiences in an online learning environment. The learning activities in the system are done voluntarily by the participants and they will not be assessed with grades. However, their learning activities will be moderated.

1.6 Limitations of the Research

The following are the limitations of this research:

- This research only studies on SUTS’ students. Therefore, it does not represent the overall views of universities’ students in Malaysia. Students in SUTS may have different perceptions than other universities in Malaysia.

- This research only opts to study the learners’ readiness and acceptance towards the NLS. Other factors (i.e. effectiveness, security and privacy issues, etc) are not studied in this research but it will be considered for future works. Therefore, this research is only focused on the area of learners’ perceptions. Survey instruments were used to collect the data.

- The survey questionnaires used in this research are not claimed as ultimate factors and questions for assessing the learners’ readiness and acceptance.
towards a NLS. More factors and questions can be easily added. However, other researchers can apply the survey instruments that are used in this research as a reference when planning to implement the same learning system, which integrate social software in other universities.

- Due to time and cost constraint, this research is limited to develop a prototype system that used open source software to serve as a typical example of the NLS.

- The content contains in the NLS is limited to learning context only, and it is online based.

1.7 Definition of Terms

Some of the definition of terms that are used throughout this thesis:

- *Learning Management System (LMS)* is web-based software that utilized in delivering course content to learners, in order to make the content and administration (i.e. tracking learners’ learning progress, managing records) to be easily accessed through Internet.

- *Traditional E-learning Model* that is used in this thesis is referred to an e-learning model that has currently been accepted and adapted by learners. Traditional e-learning model such as Blackboard. The nature of the learning content that is delivered by the traditional e-learning model is still in a lecturer-directed and delivery-centered concept.

- *Social Software* is defined as a range of web-based software tools that allows users to interact and share data with other users. Social networking sites (i.e. Facebook, MySpace) are one of the tools of social software. Social software is also often used to describe Web 2.0 tools as it shares common characteristics of supporting Internet-based interaction between and within groups.

- *Collaborative Adaptive Learning Platforms (CALP)* is an approach introduced by Klamma et al. (2007). It introduces collaboration adaptive learning by evolving Web 2.0 and social software. More details on CALP are discussed in Chapter 2.
New Learning System (NLS) is a new learning system that is developed and implemented in SUTS that integrates social software tools and applying the collaborative adaptive learning platform (CALP) approach. A prototype system was created to serve as the NLS for usability testing purposes and it is named, “StackBuffers”. The details of the prototype system design and implementation are discussed further in Chapter 4.

Communities of Practice (CoP) is a concept by Wenger (2006). It is defined a group of communities that form trust and will dedicate to support each other in increasing knowledge, share a concern or a passion for something they do, and enhancing performance in a particular objective.

Perceptions can be defined as interpretations or feelings towards situations based on the learners’ senses (Wong 2008). However, in order to have perceptions, learners must have some experiences towards the subject. Therefore in this research, in order to test the perceptions levels, the learners must have some e-learning and social software experiences.

1.8 Structure of the Thesis

This thesis consists of seven chapters, as structured below:

Chapter 1 presents the overview of this research, including the introduction of e-learning, Web 2.0 and social software; the research problem, research aim and research questions; scope and limitations of the research.

Chapter 2 provides the background of e-learning and social software, specifically on social networking sites and its affordances in education. It also reviews existing literature on the theories and concepts of e-learning, thus establishing a theoretical analysis.

Chapter 3 describes and justifies the overall research methodology employed in this research.
Chapter 4 presents the findings for the first phase of this research and discussions on the findings. The findings are based on the data collected from conducting survey questionnaire to examine the learners’ readiness.

Chapter 5 describes the proposed system implementation and design. A prototype system has been developed and implemented for usability testing purposes on the second phase of this research.

Chapter 6 presents the findings for the second phase of this research and discussions on the findings. The findings are based on the data collected from conducting survey questionnaire to examine learners’ acceptance towards the use of the system.

Chapter 7 summarizes this research and its findings, draws conclusions and discussions for this research as well as suggesting future recommendations.
Chapter 2: Literature Review

2.1 Background

The increasing demand for continuous education and flexible learning has developed e-learning. E-learning enables open and flexible learning to the learners. Moreover, Mutula (2003) found that e-learning provides a cost-effective way of providing classroom-based learning and preparing learners to participate in the global information society, expanding learning opportunities to overcome the barriers of time and space. E-learning comprises the use of computer and network to deliver learning content. Learning content is delivered via the Internet, audio or video tape and CD-ROM in the form of text, image, animation, streaming video and audio to make learning more interesting.

The actual concept of e-learning began to emerge in the late 1990s when Internet technology became prevalent (Baker 2003). A wide range of different Internet tools have been used to support e-learning. Internet tools include discussion forums, chat, file sharing, video conferences, and weblogs. These tools are integrated into a single stand-alone system, LMS. LMS can be used in different ways and different purposes. However, a common idea behind LMS is that it offers tools to run and manage an e-learning course. All learning activities and materials in a course are organized and managed by and within LMS.

As we have arrived at the first decade of the new millennium, the nature of Internet technology has begun to change. The emergence of the Web 2.0 and social software has transformed the web from the ‘read web’ to ‘read-write web’. Therefore, it provides two-way communication and leads itself to collaboration and development of a learning community. This change has captured the attention of the nature of learning. Learning has manifested in learner-centered design where learners control over their learning process. This learning design is also greatly emphasized on active learning, communication, collaboration, participation and change of role as a learner. Therefore, in this 21st century; learning is becoming more social, personal, distributed, flexible, dynamic, and lifelong in nature.
E-learning is then changing to a degree significant enough to warrant a new name, ‘E-learning 2.0’ by Downes (2005). He also further explained that the emergence of Web 2.0 and social software is not a technology revolution, it is a social revolution. It is about enabling and encouraging through open applications and services. According to Ehlers (2009), e-learning 2.0 is not a replacement of e-learning. It refers to a number of developments, trends and points of view, which require change from teaching and learning. The new point of view essentially connects e-learning with five characteristics (Ehlers 2009):

1. Learning takes places always and everywhere (i.e. is ubiquitous) and therefore in many different context, not only in the classroom.
2. Learners take on the role of organizers.
3. Learning is lifelong process, has many episodes and is not (only) linked to educational institutions.
4. Learning takes place in communities of learning, so called communities of practice (CoP). Learners participate in formal, as well as informal communities.
5. Learning is informal and non-formal; takes place at home, at the work place, and during leisure time and is no longer centered on lecturers or universities.

E-learning 1.0 follows a broadcasting logic, whereby information and materials are distributed, presented and are made available to the learners. Ehlers (2009) described this method of learning as the metaphor of ‘acquisition’ of learning content, whereas e-learning 2.0 emphasizes the metaphor of ‘participation’. In this method of learning, learning is perceived as a networking, social process, in which Web 2.0 and social software are used to develop a learning process through collaboration and communication in a community. Learning resources are obtained from a group of communities and not from a classroom and university. This group of communities shares a concern or a passion for something they do and learn how to do it better as they interact regularly; it is also a concept known as CoP by Wenger (2006). Wenger (1998) stated that CoP is different from a network in the sense that it is about something; it is not just a set of relationship. It has been an identity as a community, and thus shapes the identities of its members. This will form trust in this CoP and will dedicate to support each other in increasing knowledge and enhancing performance in a particular objective. Table 4 shows the different conditions and subjects between e-learning 1.0 and e-learning 2.0.
Table 4: Different conditions and subjects between E-learning 1.0 and E-learning 2.0
(Source: Ehlers 2009, pp. 301)

2.2 Social Software

As discussed, social software is often used to describe Web 2.0 tools and services. Web 2.0 is an umbrella term for tools that share a common characteristic of supporting Internet-based interaction between and within groups. The term ‘social software’ has been used in many different contexts. In the learning context, Anderson (2005) defined social software as networked tools that support and encourage individuals to learn together while retaining individual control over their time, space, presence, activity, identity, and relationship.

The growing interest of social software has increased influences to the universities in making use of its tools to support their learning activities. A number of studies in educational usage of social software tools have been discussed (McLoughlin & Lee 2007); many have adopted these tools in educations. The common social software tools such as blog, wiki, and social networking are discussed as follows:

Blog – Blogs are very easy and flexible tool for using without requirement of any technical skill, therefore any users are able to use blogs. Blogs are also called online diaries where users can write their thoughts as an entry or post. It enables users to create, publish, and organize their entries into web pages. Other users can also comment and discuss their entries. Users can also publish information which they collect from various resources and establish relations between them in blogs. This creates collaboration and social interactions between users. It is suggested that blogs enhance writing skills, encourage critical thinking with collaborative learning, and provide feedback and active learning (Seitzinger, cited in Usluel & Mazman 2009). In Budhrani
and Espiritu’s (2010) recent research has used blogs to achieve evidence of deep learning among students, in which evidence of deep learning is seen when students can explain new facts and ideas in their own words, can cite relevant examples or add context, and can relate new facts and ideas to their own experiences. It is discovered that blog helps in deeper learning in students by the content they generate and their writing styles. By using blogs, learners maintained a more reflective writing and be able to discuss topics beyond classroom. Usluel and Mazman (2009) further explained that blogs are well suited to serve as online personal journals because they enable learners to share files and resources, publish blogs on the Internet and learners also have the possibilities of writing for readers beyond classmates. In addition, blogs can be used as e-portfolios that keep records of personal development process, reflections and achievements (Lu 2007).

Wiki – Wikis are a collection of web contents that can be edited by any users. As it is a read-write web, users can visit wikis to read and add content to wiki or update and edit content within wiki. As wikis are free open source, no one authorizes the creation of wiki pages and everyone is automatically authorized to write, edit, and publish (Fountain 2005). Wikis are considered to be effective tools for learning and teaching as they facilitate collaborative learning, provide collaborative writing, support project based learning, promote creativity, encourage critical searching, support inquiry based and social constructivist learning (Cress & Kimmerle; Guzdial et al.; Yukawa, cited in Usluel and Mazman 2009). In Judd, Kennedy and Cropper’s (2010) recent research used wikis for collaborative learning in assessing collaboration through contribution among students. Results indicate that overall participation was high and students made use of the wiki’s commenting feature as a critical tool for coordinating their contributions for and with others.

Social networking – Social networking are software that support collaboration, knowledge sharing, interaction and communication of users from different places who come together with a common interest, need or goal (Pettenati and Ranier 2006). In addition, it has the ability to connect learners with each other into new networks or communities of collaborative learning. As Maloney (2007) explained that students will invest time and energy in building relationships around shared interests and knowledge communities within social networking sites such as Facebook and MySpace. Over the
past few years, the use of social networking sites has been increasing. Survey has been
done by Lamp, Ellison and Steinfield (2006) at Michigan State University (MSU) to
show how MSU students are using Facebook and the purpose for which they use
Facebook. Results indicate that students use Facebook to stay in touch with friends from
high school, find out more about the people they had met offline, for example people
living in their same residency or in their classes. In Vivian and Barnes’ (2010) recent
research indicates that social networking sites are a technology that many students are
frequently using. Evidences collected also show that various social networking sites
affordances have potential for collaboration, in particular instances where learners are
seeking help or assistance (Idris & Wang 2009).

2.2.1 Affordances of Social Software

The educational affordances of social software expand how we learn, communicate,
create and gain knowledge. An affordance is an action that an individual can potentially
perform in their environments by using a particular tool (Affordance, cited in
McLoughlin & Lee 2007). According to Kirschner (2008), educational affordances can
be defined as the relationships between the properties of an educational intervention and
the characteristics of the learner that enable certain kinds of learning to take place.
McLouglin and Lee (2007) suggested that it is imperative to acknowledge that
technologies are intricately related to many other elements of the learning context that
can shape the possibilities they offer to learners, how learners perceive those
possibilities and the extent to which learning outcomes can be realized.

Many published research studies have discussed the affordances of social software in
relation to education. Boyd (2005) discussed the affordances of social software in terms
of the three types of support that it provides:

1. Support for conversational interaction between individuals or groups from real-
time instant messaging to asynchronous collaborative teamwork.
2. Support for social feedback, in which a group rates the contributions of others,
producing a digital reputation for participants.
3. Support for social networks to explicitly create and manage participants’
personal relationships and to help them develop new ones.
However, Owen et al. (2006) extended the definition to include a recognition that social software is also characterized by community gains that many users benefit from other users acting in sociable and community-oriented ways.

McLoughlin and Lee (2009) have further explained affordances of social software as follows:

1. *Connectivity and social rapport* – Social networking sites such as MySpace and Facebook attract and support networks of people and facilitate connections between them. This represents of what Gee (cited in McLoughlin and Lee 2009) calls affinity spaces, where people acquire both social and communicative skills and at the same time become engaged in the participatory culture of Web 2.0.

2. *Collaborative information discovery and sharing* – Data sharing is enabled through a range of software applications, experts, and novices alike that can make their work available to the rest of the online world. For example, through their personal blogs they can create an e-portfolio to allow people to access their works.

3. *Content creation* – Web 2.0 emphasizes the pre-eminence of content creation over content consumption. Anyone can create, assemble, organize, and share content to meet their needs and those of others.

4. *Knowledge and information aggregation and content modification* – The massive update of Really Simple Syndication (RSS), as well as related technologies such as podcasting and vodcasting (which involve the syndication and aggregation of audio and video content, respectively), is indicative of a move to collecting material from many sources and using it for personal needs. The content can be remixed and reformulated (the concept of a mash-up).

The affordances of social software discussed above share some common characteristics in relation to education as illustrated in Figure 3.
Figure 3 shows how individual learners link with communities and networks in the process of gaining knowledge and learning through social network, content sharing, collaboration, communication and interaction. According to Liccardi et al. (2007), social networks are a social structure of nodes that represent individuals and the relationships between them with a certain domain. In a learning domain, the study of social networks encompasses the processes of social learning that occur when a self-selecting group of people who have a common interest in a subject collaborate to share ideas or find solutions (Liccardi et al. 2007). Learning communities, information sources, and individuals can all be classified as nodes (Marhan 2006).

In this learning model, learners’ learning is mediated through the following communication and interaction nodes:

- One-to-one (learner and learner)
- One-to-many (learner and learners)
- Many-to-many (learners and communities)

With these communication and interaction nodes, learners will consequently form a CoP. Social networks can be construed as CoP since social networks fulfill the criteria outlined by Wenger (1998). Social network has a common goal, where members contribute to the community, and members of the community have shared practices (Liccardi et al. 2007).
2.3 Social Networking Sites

Social software comprises a wide range of tools and one of the most familiar tools is the social networking sites. The term ‘social networking sites’ is often used to describe social networking. Boyd and Ellison (2007) defined the term ‘sites’ as vary in the extent to which they incorporate new information and communication tools, such as blogging, photo and video sharing.

Boyd and Ellison (2007) defined social networking sites (SNS) as web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their lists of connections and those made by others within the system. These sites allow users to post profile, to invite and add their friends, join a variety of groups and even make new friends. These sites focus on building social networks with people who share common interests and activities.

Pettenati and Cigognini (2007) categorized the characteristics of social networking as shown in Table 5.

<table>
<thead>
<tr>
<th>Goal</th>
<th>Relation based on individual interests, debate, confront on specific topics; multiplicity and heterogeneity of joining interests and motivations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belonging</td>
<td>Spontaneous and autonomous motivation</td>
</tr>
<tr>
<td>Duration</td>
<td>Non-defined</td>
</tr>
<tr>
<td>Cohesion and enabling factors</td>
<td>High level of trust (relevance of reputation), sense of responsibility, high technological skills, distributed reflexivity and evaluation (non autonomous, nor heteronymous but socially spread)</td>
</tr>
<tr>
<td></td>
<td>Type of relation: share/evaluate</td>
</tr>
</tbody>
</table>

Table 5: Social networking characteristics
(Source: Pettenati & Cigognini 2007)

How do SNS work? Users in SNS build up their networks by linking with others. Most SNS require a confirmation by both parties for the link to be made. Connections are usually made public and this is an important component as it allows users to extend their own networks to ‘many-to-many’ node, in SNS, it is termed as ‘friends of friends’. It is a common practice to search the linkages of one’s connection to find new connections. Once the linkages are connected, users can freely share messages, ideas,
activities, etc. This practice consequently builds a community, which can be defined as CoP.

### 2.3.1 Types of Social Networking Sites – Facebook

There are many types of social networking sites. *List of social networking websites* (2011) has over 40 lists of SNS. There are some popular SNS, including Facebook, MySpace, and Twitter. Basically, these social networking sites provide common services. For example, users can create a profile page with an image and other personal information for identification, establish connections with friends online, and engage in discussions, and sharing knowledge and information. However, it is proposed that only one specific site to be included in the scope of this research, which is Facebook.

*Facebook* is founded by Mark Zuckerberg together with co-founders Dustin Moskovitz, Chris Hughes, and Eduardo Saverin as a college community tool at the Harvard University in February 2004. In March 2004, Facebook expanded from Harvard to Stanford, Columbia and Yale. In September 2006, Facebook expanded its registration so anyone can join with only required a valid email address and minimum age of 13. According to the report in Facebook: Facts & Figures for 2010 (*Facebook: Facts & Figures for 2010* 2010), Facebook has reached 20 million active users in April 2007, 100 million active users in August 2008, 175 million active users in February 2009, and 400 million active users in February 2010. An average of 250 million new registrations takes place per day since January 2007. At the recent report in Facebook Statistics, Stats and Facts for 2011 (*Facebook Statistics, Stats & Facts for 2011* 2011), Facebook has over 500 million users. Facebook is now used by 1 in every 13 people on earth, with over 250 million of them (over 50%) who log into Facebook every day. The average users have about 130 friends and it will still expand in 2011 (Idris & Wang 2009).

Facebook has great potentials in education. It allows integration of various applications to support learning activities. Facebook functions as an open platform unlike other LMSs which the functions are often limited. For example, Facebook incorporates with developer partners such as YouTube to allow users to have media sharing application. In May 2007, Facebook launched with 65 developer partners and over 85 applications were launched. In Facebook Statistics, Stats and Facts for 2011 (*Facebook Statistics,
Stats & Facts for 2011) reported that there are 20 million applications installed per day.

In addition, Facebook also helps in supporting community building and social interaction by which users are connected with various form of social circles from personal, group, network or pages. In September 2004, Facebook added the Groups application and wall post as profile features. For example, the Facebook’s wall post allows users to exchange short messages in the form of text, video, photo or link content with their networked friends, which are visible to all other users who belong to the local network that created which involves social interaction. Commenting on the wall post can lead to interaction between the wall post-author and wall post-readers in that network, and can lead to interesting discussions and debates. Consequently, this will create a social knowledge network from a group of people with similar interests to form a CoP, in which this interaction forms a combination of the following communication and interaction nodes as discussed previously. This has given educators the idea to use Facebook to communicate with their students (Mazer, Murphy & Simonds 2007; Ellison, Steinfied & Lampe 2007).

2.4 Theories and Concepts

As social software continues to expand, it influences not only the learners’ learning styles and learning behaviors, but also the theories and concepts of learning processes’ design and approach. Thus, this research studies the following theories and concepts which are to be addressed to ensure that the NLS design will be endured.

2.4.1 Learning Components

In learning practice, the relational aspects of knowledge and learning processes pointed out by Chatti, Jarke and Frosch-Wilke (2007) are revolving around the three components as shown in Figure 4, namely knowledge/information repositories, communities and networks, and experts and knowers.
Knowledge/information repositories: information repositories are created by codifying the collective knowledge of the organization and making it readily available (Chatti, Jarke & Frosch-Wilke 2007).

Communities and networks: Siemens (2006) defined a community as the clustering of similar areas of interest that allows for interaction, sharing, dialoguing and thinking together. In this context, CoP has come to be used. A CoP exists because it provides a shared practice as learners engage in a collective process of learning.

Experts and knowers: are persons with the required know-how that can help in achieving better results (Chatti, Jarke & Frosch-Wilke 2007). Rosenberg (cited in Chatti, Jarke and Frosch-Wilke 2007) stressed that experts are more than a source of knowledge; they are also advisers who are charged with providing guidance, corrective feedback and performance assessment.

2.4.2 Online Learning Community

To provide quality online learning experiences, Strand (2009) suggested that it is needed to intentionally facilitate an online learning environment where community components are built into with the help of Web 2.0 in building a supportive online learning community.
In the Fabric of Community Model developed by Sandage, he identified five components that may be present in a community. These components are belongingness, moral trust, mutual gifting, citizenship and story (Sandage, cited in Strand 2009). Using Sandage’s description as the foundation, the components for use in an online learning community could be defined as common purpose, sense of ownership, collaborative learning, sense of greater good, and share stories or experiences. The integration of these community components and the use of Web 2.0 technologies are the key in the establishment of a successful online learning community (Menchaca & Bekele 2008). As discussed before, there are a variety of Web 2.0 technologies that can help in education as well as creating community. Web 2.0 is also defined as social software in this context.

The idea of common purpose is what initially brings the community together. If one does not share a common purpose with others, then there is no group to have a sense of belongingness to. A sense of ownership is what gives longevity or permanence to a community. When the learners in a community have a sense of ownership, they are more likely to endure a problem or work through an issue. Mutual gifting or collaborative endeavors is the reason that community is needed. According to Strand (2009), community is where we can share with others our talents and skills, as well as receiving from others the benefits of their knowledge, insight and expertise. Together we have the potential to produce a better end product than if we were working alone. A sense of a greater good is the fourth component of community where learners are looking beyond the class to see how and what they are learning might be applied (Strand 2009). Creating a discussion would be one way to see how others respond to their ideas. The final component is sharing in the stories of others. This allows for learners to gain information and knowledge through others’ life experiences.

2.4.3 Personal Learning Environment (PLE)

The learning environment is no longer depends on a single system (i.e. LMS) as a one-size-fits all content, but it is a system made up of user-centric model that puts the learners at the center and give them control of what, who, and how to learn and approach. In a learning context, a user-centric model means the creation of self-organized learning networks that provide a base for the establishment of a form of educational that goes beyond course and curriculum centric models, and envisions a
learner-centered and learner-controlled model of lifelong learning (Koper 2004). This would mean a vision that will provide personalized learning experiences to every person every day and a move away from LMS to PLE (Hodgins, cited in Chatti, Jarke & Frosch-Wilke 2007).

Milligan (2006) defined PLE as a system with a set of tools which is more fully supportive towards the learning process and is more closely matched to the needs of an individual learner. These tools would give the learners greater control over their learning experiences and would form their own PLE in which they could also use to form a CoP based on their learning needs. Van Harmelen (2006) summarized the characteristics of PLE as a system that helps learners to take control of and manage their own learning. This includes providing support for learners to set their own learning goals, manage their learning; managing both and process, communicate with others in the process of learning and thereby achieve learning goals.

PLE driven approach does not only provide personal spaces which belong to and are controlled by the learners, but also requires a social context. This approach needs to offer means to connect with other personal spaces and networks for effective knowledge sharing and collaborative knowledge creation (Chatti, Jarke & Frosch-Wilke 2007). It also provides a learning environment that gives the learners multiple levels of socializing support and encourages the development of CoP.

Anderson (2006) has listed a few advantages of PLE:

1. Identity - Learners have existences beyond formal school, that can be used to both help learners contextualize their own understanding and for others to understand their epistemological legacy. The PLE tools integrate this outside life with formal study.

2. Ease of use
   a. PLE environments can be customized and personalized allowing education to flow into the learners’ other net applications.
   b. The PLE centers at the learning within the context created and sustained by the learner. It is not one owned by a university. This leads to sense of and practical application of educational self-direction.
3. Copyright and re-use – Contributions to a PLE are very definitely owned by the learners and thus can be used and re-used as that owner sees fit.

4. The PLE is a second generation network application in that unlike the LMS that was designed to enact the classroom on the network, the PLE is designed primarily as a personal lifelong learning environment. It extends learning beyond classroom and lecturer-centered model.

2.4.4 Connectivism

In today’s e-learning concept, the challenges that lie ahead are not just about bringing the course to an online learning community, but also to break through the lecturer-directed and delivery-centered limitation to create a true networked learning environment. Learning is becoming a social participation whereby learners create, sustain, share knowledge in a collaborative way through participation in a network and community. To build such community and network, learners need to go beyond the classroom boundaries by involving and communicating with the experts and knowers in order to form a CoP. Thus, connectivism as a new learning theory which has been introduced by Siemens (2005), presents learning as a connection/network-forming process. Through connectivism, learner can access to any learning resources from anywhere and anytime. Learning and knowledge are no longer restricted to a classroom, but also from a community of people and resources; it leads to a more resourceful learning and provides an education without boundaries.

Connectivism is characterized by the following principles (Siemen 2005):

- Learning and knowledge require diversity of opinions.
- Learning is a process of connecting specialized nodes or information sources.
- Learning may reside in non-human appliance.
- Capacity to know more is more critical than what is currently known.
- Nurturing and maintaining connections are needed to facilitate continual learning.
- Ability to see connections between field, ideas, and concept is a core skill.
- Currency (accurate, up-to-date knowledge) is the intent of all connectivist learning activities.
- Decision-making is a learning process. Choosing what to learn and the meaning of incoming information are seen through the lens of a shifting reality. While
there is a right answer now, it may be wrong tomorrow due to alterations in the information climate affecting the decision.

Connectivism’s principles address the lifelong learning. Pettenati and Cigognini (2007) argued that connectivism can lead to a re-conceptualization of learning which can be integrated as to build a potentially lifelong learning activity to be experienced in a personal learning environment. Learning is no longer restricted to the classroom based and to the formal learning inside learning institution; it is an activity which happens throughout the entire life without boundaries in this 21st century of learning environment. Therefore, there is an increasing demand for new approaches towards fostering lifelong learning perspective.

Besides that, research in learning and instruction suggest that people learn most effectively by pursuing realistic goals which are intrinsically motivating (Schank et al. 1994). Learning is greatly enhanced when it is exposed in a real-world learning context, which is more meaningful and contains real problem solving elements.

### 2.5 Collaborative Adaptive Learning Platform (CALP)

The theories and concepts as discussed in Section 2.4 which are to be addressed in designing the NLS lead to CALP approach which integrate elements from social software affordances with the need on LMS for learning. CALP is an approach that evolves Web 2.0 concepts and social software to have the potential to overcome many of the limitations of the traditional e-learning model. According to Klamma et al. (2007), CALP aims at supporting lifelong competence development and represents a fundamental shift towards a more social, personalized, open, dynamic, and distributed model for learning. The CALP main goals are to place the learners at the center, give learners control over their learning process, and deliver quality learning resources from the experts and knowers, which are formed from CoP that tailors to their needs, preferences, interests, skills, and learning goals. On the other hand, CALP needs to support collaborative knowledge creations and foster community building. Furthermore, it is also to support lifelong competence development by providing means to connect people to people, as well as people to the right knowledge.
CALP has to be based on these concepts and technologies and need to encompass the following elements (Klamma et al. 2007):

1. Support for personal knowledge management (PKM).
2. Support for collaborative knowledge capturing, sharing, networking and community building.
3. Support for both top-down and bottom-up annotation schemes.
5. Support for access and search across content and metadata.
6. Support for the personalized learning resource delivery through an intelligent adaptive engine, being able to connect people to the right knowledge and deliver quality learning resources that are tailored to the learner’s preferences and learning goals.
7. Support for personal social networks (i.e. individual’s self-defined networks) to facilitate bottom-up socialization, which is to help people build new relationships and enable them to join learning communities based on their preferences.
8. Support for personalized expert/community retrieval. The idea is to connect people to people through content.
9. Support for evaluation by quantifying and qualifying user experiences.
10. Social-topic network.
11. Support for distributed architecture.

2.6 System Model

The main aim of this research is to develop a NLS that integrates SNS for providing learners a sharing, collaboration, community building, personal experiences in an online learning environment. In recent years, the rapid development of emerging technologies, the integration of ICT has increasingly attracted the attention by developers to develop an education system that integrates ICT. According to Wang (2008), it is needed to plan thoughtfully in developing ICT integration into a learning environment. Therefore, to effective integration of SNS into the NLS in this research, a generic model for guiding the integration of ICT into a learning environment by Wang (2008) has been followed. According to Wang (2008), an education system is a unique combination of pedagogical, social, and technological components as shown in Figure 5.
In an educational context, *pedagogy* often refers to the teaching strategies, techniques or approaches that are used to deliver instruction or facilitate learning. *Social interaction* is crucial in daily life. It involves how learners interact with other people when they encounter problems. With the development of computer-mediated communication (CMC) such as emails and instant messages, social interaction becomes more convenient and flexible. In addition, as social software becomes more intertwined into people’s social activities, its social interaction features becomes effective tools in learning. Wang (2008) suggested that the social design of a learning environment must provide a safe and comfortable space, in which learners are willing to share information and in which they can also easily communicate with others. The *technology* component becomes more important in a technology-enhanced learning environment as expressed by Wang (2008) for learning activities are conducted through online.

The affordances of NLS will be presented further by following the key components of this system model with respect to the theories and concepts in Section 15.55.5.

## 2.7 Theoretical Analysis

This section concludes the analysis of the theories and concepts discussed above to answer the subsidiary research question (A) – What elements are needed in which SNS can provide to ensure that NLS design will be endured?

Social software has been becoming a great potential in teaching and learning due to its affordances. Social software comprises a wide range of tools and one of the most familiar tools is the SNS such as Facebook and MySpace. This research studied that the affordances of social software share some common characteristics such as it supports social network, content sharing, communication and interaction, and collaboration.
between individual learners in the process of gaining knowledge and learning as illustrated in Figure 3. With these characteristics in a learning environment, learners’ social network is mediated through the following communication and interaction nodes:

- One-to-one (learner-to-learner)
- One-to-many (learner-to-learners)
- Many-to-many (learners-to-learners)

With these communication and interaction nodes, learners will consequently form a CoP. CoP is a concept by Wenger (2006). It is defined as a group of communities that shares a concern or passion in something they do. In a learning practice, the relational aspect of knowledge and learning processes pointed out by Chatti, Jarke and Frosch-Wilke (2007) are revolving around the three learning components, namely knowledge and information repositories, communities and networks, and experts and knowers. In addition to provide quality online learning experiences, Strand (2009) suggested that it is needed to intentionally facilitate an online learning environment where community components are built into. In addition, with the affordances of social software, it also helps in building a supportive online learning community.

In a learning context, learner-centric model means the creations of self-organized and self-directed learning that goes beyond course and classroom centric models, and learner-directed model. It moves away from LMS to PLE, to provide a personalized learning experience to the learners. Miligan (2006) defined PLE as a system with a set of tools which is more fully supportive towards the learning process, and is more closely matched to the needs of an individual learner. These tools would give the learners greater control over their learning experience and managing their own learning. This includes providing support for learners to set their own learning goals, manage their learning, communicate with others that helps in building their own CoP, and thereby achieve their learning goals.

In addition, in today’s e-learning concept, the challenges that lie ahead are not just about bringing the course to an online learning community, but also to break through the lecturer-directed and delivery-centered limitation to create a true networked learning environment. Thus, connectivism as a learning theory which has been introduced by Siemens (2005) presents learning as a connection/network-forming process. Through connectivism, learning and knowledge are no longer restricted to a classroom and
course, but also form a CoP with experts and knowers, and resources; it leads to a more resourceful learning and provides an education without boundaries to the learners. In this learning environment, learning is greatly exposed in a real-world learning context which is more meaningful and contains real problem solving elements.

These lead to CALP approach which integrates elements that social software affordances meet with the need in designing the NLS. The main aims of CALP are to deliver quality learning resources that are tailored to the learner’s needs, preferences, interests, skills, and learning goals. On the other hand, CALP will support knowledge sharing and community building. CALP encompasses elements discussed in Section 2.5. These elements will be implemented in NLS. The design of the NLS with the integration of SNS will be broken down into the following key elements: personal tools and social networks, community building, and knowledge-pull model. The key elements of the NLS will be discussed further in Section 5.2.2. Table 6 illustrates how the NLS key elements are linked to the CALP elements as discussed in Section 2.5.

<table>
<thead>
<tr>
<th>NLS Key Elements</th>
<th>CALP Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal tools and social networks</td>
<td>1. Support for personal knowledge management (PKM).</td>
</tr>
<tr>
<td></td>
<td>4. Support for distributed opinion publication network – and other types of</td>
</tr>
<tr>
<td></td>
<td>network-based on Semantic Web technology.</td>
</tr>
<tr>
<td></td>
<td>6. Support personalized learning resource delivery through an intelligent</td>
</tr>
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<td></td>
<td>adaptive engine, being able to connect people to the right knowledge and</td>
</tr>
<tr>
<td></td>
<td>deliver quality learning resources that are tailored to the learner’s</td>
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<td></td>
<td>preferences and learning goals.</td>
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<tr>
<td></td>
<td>7. Support for personal social networks (i.e. individual’s self-defined</td>
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<td></td>
<td>networks) to facilitate bottom-up socialization, which is to help people</td>
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<td>build new relationships and enable them to join learning communities based</td>
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<td>on their preferences.</td>
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<td>8. Support for personalized expert/community retrieval. The idea is to</td>
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<td>connect people to people through content.</td>
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<td></td>
<td>10. Social-topic network.</td>
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<tr>
<td>Community building</td>
<td>2. Support for collaborative knowledge capturing, sharing, networking and</td>
</tr>
<tr>
<td></td>
<td>community building.</td>
</tr>
<tr>
<td></td>
<td>3. Support for both top-down and bottom-up annotation</td>
</tr>
</tbody>
</table>
Chapter 2  Literature Review

NLS Key Elements | CALP Elements
--- | ---
Knowledge-pull model | 5. Support for access and search across content and metadata.  
| 9. Support for evaluation by quantifying and qualifying user experiences.  
| 11. Support for distributed architecture.

Table 6: The connection between the NLS key elements and the CALP elements

Unlike the traditional LMS (Blackboard), NLS is no longer a system for delivering learning content to the learners only (content and technology-centric model). Furthermore, the nature of the learning content that is delivered by the traditional LMS is still in a lecturer-directed and delivery-centered concept. The learners’ learning areas are limited between their educators, friends, and classmates; their learning areas are limited within their university only (refer to Figure 1). With the affordances of social software, NLS focuses on a more ‘user-centered’, ‘social networked and open communication’ learning approach (Downes, cited in Lam et al. 2009). NLS designs to engage learners into learning as a community, in which they share, exchange knowledge, interact, and collaborate with others in CoP that they have mutual learning interests and needs. In conclusion, NLS focuses on supporting the following learning elements: interaction, collaboration, community building, sharing, real-world learning, and lifelong learning. In this learning approach, it no longer depends on a single system such as LMS as a one-size-fits all content, but it is a system which made up of learner-centric model that puts the learners at the center and gives them control of what, who, and how to learn.

![Figure 6: Conceptual Model of NLS](image_url)
The design of the NLS will be following the generic model by Wang (2008). According to Wang (2008), an education system is a unique combination of pedagogical, social, and technological components. The NLS key elements as shown in Table 6 will be revolving around the three components as shown in Figure 6.

### 2.8 Learners’ Readiness and Acceptance

Many published research studies have so far primarily focused on the end part; the effectiveness of the social software in e-learning. For example, the focus on the use of forums or discussion boards (Garrison & Arbaugh 2007), blogs (Kerawalla et al. 2009; Budhrani & Espiritu 2010), wikis (Judd, Kennedy & Cropper 2010; Minocha et al. 2008), and Facebook (Idris & Wang 2009).

However, before these social software tools are introduced into a learning system, it would be necessary to measure the readiness and acceptance of the learners themselves about using such system. A lot of research studies have also been published on the front part; the learners’ readiness and acceptance in adapting to traditional e-learning but without social software tools and their measurement instruments (Watkins et al. 2004; Aydin & Tasci 2005; Lam et al. 2009; Shraim & Khlaif 2010; Lim, Hong & Tan 2008; Masrom 2007). This area of study has not been studied in-depth as there are still issues regarding the learners’ readiness and acceptance in adapting towards a system that integrates social software tools. This has been the knowledge gap in the current literature. In order to benefit from the NLS, there is a need to study the learners’ perceptions towards their readiness and acceptance in adapting these tools in their learning experiences (Galy, Downey & Johnson 2011). Stephenson (cited in Lim, Hong and Tan 2008, p. 541) also emphasized that new technologies do not necessarily lead to major improvement in education. Moreover, learners in a new learning environment would develop new perception and change their learning styles, thus ultimately influencing their academic achievements (Schmeck & Ceisler-Bernstein 1989, cited in Poon 2004).

Therefore, for the success of a NLS implementation, there is a need to assess readiness and acceptance of the learners in adapting to the different learning styles and learning experiences of the NLS. It also helps to understand the learners’ learning needs and how they come to accept the NLS as well. With this research’s findings, it could be a
reference to other universities when planning to implement the same NLS that integrates other social software tools. So this research is worthwhile to be carried out to fill up the knowledge gap.
Chapter 3: Research Methodology

3.1 Research Framework

The main aim of this research is to develop a NLS to the learners that integrates SNS and applying CALP approach. Therefore, this research is designed to answer the following research question:

What is needed to successfully implement the NLS that integrates SNS and applying CALP approach?

In order to answer the above main research question, this research has divided into two stages. Figure 7 illustrates the framework of this research, which has two stages: theoretical analysis and empirical research. The second stage is subdivided into two phases which will be discussed further in this section.

![Figure 7: Research Framework](image-url)
3.1.1 Stage 1: Theoretical Analysis

This part of the research reviews the theories and concepts from the existing literature including learning components, online learning community, personal learning environment, and connectivism (refer to Section 2.4) which are to be addressed in designing the NLS. As social software tools (i.e. SNS) continues to expand, it influences not only the learners’ learning styles and learning behaviors, but also the theories and concepts of learning processes’ design and approach. Thus, theories and concepts have been studied in this part of the research to ensure that NLS design will be endured. This stage of research addresses the following subsidiary research question:

(A) What elements are needed in which SNS can provide to ensure that NLS design will be endured?

3.1.2 Stage 2: Empirical Research

This research used descriptive research design by conducting survey questionnaire to perform the empirical data collecting. The empirical data collecting was conducted in two phases:

Phase 1: Data Collecting on Learners’ Readiness

According to Watkins, Leigh and Triner (2004), one way of gauging a potential online learner’s readiness is through self-assessment. Therefore, survey questionnaire were distributed to the students in SUTS as participants to self-assess their level of readiness and attitudes towards the NLS that integrates SNS. The design of the survey questionnaire will be further explained in Section 3.4.1.

In this first phase, the survey was served as a preliminary stage to collect data concerning the learners’ general views, perceptions, and attitudes about their readiness towards the NLS prior to the implementation of the prototype system. Questions on their experiences in e-learning and social software tools were also asked in this first phase.

This phase of the research addresses the following subsidiary research questions:

(B) What are the learners’ experiences in e-learning (LMS)?

(C) What are the learners’ experiences in social software tools (i.e. SNS)?

(D) What are the learners’ readiness levels towards the NLS?
Phase 2: Data Collecting on Learners’ Acceptance

In this phase, prototype system was developed as the NLS and it was then implemented for usability testing purposes. Learners tested the prototype system as a learning system to share, exchange knowledge, collaborate, and interact with others in a group learning scenario. This usability testing was conducted for 12 study weeks. The NLS design has been based on the theoretical analysis and the findings on the phase 1 of this research that assesses the learners’ readiness in adapting the NLS.

Another set of survey questionnaire was conducted after usability testing on the participants who have participated in the usability testing to examine their acceptance and perceived attitudes towards the use of the prototype system. The survey questionnaire is originally developed by Davis (1989) and it is then modified based on Su et al. (2010). The design of the survey questionnaire will be further explained in Section 3.4.2.

This phase of the research addresses the following subsidiary research questions:

(E) What are the learners’ perceptions on the NLS compare to the traditional LMS (Blackboard)?

(F) What are the learners’ acceptance levels towards the NLS?

3.2 Research Participants

In the empirical research stage of this research, both sets of the survey questionnaires were distributed to the students in SUTS by using non-probability sampling (purposive sampling). According to Sekaran (cited in Wong 2008), purposive sampling is confined to specific types of people who can provide desired information. Purposive sampling is also known as judgment sampling. With the reference to Sekaran (cited in Wong 2008), purposive sampling is to obtain information from those who have the best information and experience on the subject being studied. Therefore, participants must fulfill the following criteria in order to get more accurate information:

1. Participants with e-learning experiences.
2. Participants with social software knowledge.
3. Participants with high level of computer literacy.
According to Dwyer (cited in Wong 2008) that experience is important as a selection criterion because it is needed when measuring perceptions. Therefore, the requirement of e-learning experiences is needed so that the participants would have adequate knowledge in e-learning usage to be able to provide adequate feedbacks and do comparison with the NLS. On the other hand, those without this requirement may not be able to fill the survey questionnaire precisely as they have lack of experiences and knowledge in e-learning usage.

In addition, NLS is a web-based system that involves the use of computer and network. Therefore, participants are needed to have a high level of computer literacy in order to participate in the NLS without difficulties. Computer literacy is defined as the knowledge and ability to use computers and related technology efficiently. Therefore, students who are currently enrolled in Computing, Multimedia and Design courses from bachelor degree, foundation, and diploma program in SUTS were selected to participate in this research because most of their units are mainly computer-based and they are claimed to have high level computer literacy.

3.2.1 Population and Sample Size

Population is the entire group of people that this research wishes to investigate. The target population of this research includes students that are currently enrolled in Computing, Multimedia and Design courses from bachelor degree, foundation, and diploma program in SUTS. There are approximately of 500 students who are currently in those selected programs.

A sample is basically a subset of the population (Sekaran, cited in Wong 2008). According to Kent (1999), a minimum sample size of 100 participants is needed for any kind of quantitative research to get a significant result. As discussed in Section 3.1 that this research consists of two phases to address the two subsidiary aims of this research (refer to Section 1.3). Therefore, two types of survey questionnaire were used to meet the subsidiary aims. The sample size for each survey questionnaire will be discussed further in the respective chapter:

1. Chapter 4: Learners’ Readiness
2. Chapter 6: Learners’ Acceptance
3.3 Research Instrument

As mentioned earlier, survey questionnaire is the instrument used in this research. The survey questionnaire was designed in pen-and-paper and online format. For pen-and-paper participants, self-addressed envelopes were given to the participants. Participants returned the completed survey questionnaires in the sealed envelopes to the private mailbox given. For the online format, the survey questionnaire was designed using Google Docs. Google Docs is a free web-based word processor, spreadsheet, presentation, form, data storage service provided by Google. It allows users to create and edit documents online and an URL link will be given to each document created. The participants were given an URL link that linked to the survey questionnaire to participate it online. Google Docs also provides spreadsheet as a backend database for storing the collected data. Survey questionnaire invitations were posted on the Blackboard announcement, and also sent via emails and face-to-face for the pen-and-paper participants. Participation through pen-and-paper or through online means consent to the publication of the data and acknowledgement that the participants will remain anonymous.

The survey questionnaire was used in this research mainly because of the time and cost constraints. Survey questionnaire has the ability to reach a large number of participants in the target population in a short time and it is less expensive. In addition, participants can respond to the survey questionnaires with assurance that they will be anonymous in which they will response truthfully.

3.4 Research Instrument Design

The survey questionnaires contain several types of questions; both open-ended and closed-ended questions format. Open-ended questions format allow participants to compose their own answers, while closed-ended questions format provide a number of alternative answers for the participants to select one or more of the answers.

The types of questions that are being used in this research are:
1. **Open-ended question**

Participants can give their personal opinions in open-ended questions. Open-ended questions were used to provide this research with more in-depth feedbacks from the participants.

E.g.: What limitations or problems did you encounter while using Blackboard?

2. **Dichotomous scale**

These questions required participants to choose between one of two fixed alternatives.

E.g.: Are you a user of any social networking site(s)?

   □ Yes □ No

3. **Multiple-choice questions**

Participants are required to select one response or select multiple responses from a selection of pre-determined responses. In some cases, participants can give other responses if it is not listed in the selection.

E.g.: What is your purpose of logging into Blackboard? Please select all that apply.

   □ It’s required by the lecturers
   □ Access learning materials
   □ Able to connect with my other classmates and lecturers
   □ To update on announcements
   □ Others (please specify): __________________

4. **Likert scale**

Participants are provided with 5-point scale with anchors ranging from 1 (strongly disagree) to 5 (strongly agree) to measure how strongly a participant agrees or disagrees with a statement given.

E.g.: I have the basic skills of finding my way around the Internet.

   1 – Strongly Disagree, 2 – Disagree, 3 – Not sure, 4 – Agree,
   5 – Strongly Agree
Likert scale is used to measure the learners’ readiness and acceptance in this research. Many previous studies also adopted Likert scale as the method to measure the learners’ readiness and acceptance in e-learning such as Lam et al. (2009), Lim, Hong and Tan (2008), Aydin and Tasci (2005), and Watkins, Leigh and Triner (2004). Therefore, Likert scale is appropriate to be used in this research to measure the learners’ level of readiness and acceptance towards the NLS.

5. Ranking Scale

This type of scale question provides participants a variety of options and requires them to rate each one, with 1 being not important and 5 being very important.

E.g.: How important is it to you to have the following elements in learning?

- Collaboration and Interaction
- Interests and Needs
- Knowledge and Ideas Sharing
- Networking and Community Building
- Real-world Learning
- Lifelong Learning

### 3.4.1 Learners’ Readiness

The survey questionnaire to assess learners’ perceived readiness in adapting the NLS contains 48 questions and is divided into five sections as follows (refer to Appendix A for the full survey questionnaire):

- Section A: Personal Information (3 questions)
- Section B: General Information on Internet Usage (3 questions)
- Section C: Experiences in E-learning and LMS (6 questions)
- Section D: Experiences in Social Networking Sites (9 questions)
- Section E: Learners’ Readiness (27 questions)

Section A contains questions on demographic characteristics such as age, gender, and course major. Section B is to gather the general information on their Internet usage. Section C and D are to gather information about the students’ experiences in e-learning.
and social software tools (i.e. social networking sites). In Section E, the questions used five-point Likert scale to measure the participants’ readiness in adapting to the NLS based on strongly whether a participant agrees or disagrees with each of the statements. Those questions are classified into four measurements: (1) online skills, which examines the participants’ skills in online learning, (2) self-directed attitudes, which examines whether the participants are able to be a self-directed learner, (3) social software tools (SSTs) support, which examines participants’ perceptions of using SSTs in supporting their learning experiences, and (4) success factors, which examines participants’ perceptions towards the success in their learning through the NLS concept. A similar survey questionnaire instrument was originally developed by Watkins, Leigh and Triner (2004) to measure learners’ perceived readiness to engage in e-learning. This has been modified to measure learners’ readiness towards the NLS for this study. The development of this measurement instrument is based on the theories and concepts studied in Section 2.4. This section is also further divided into questions to obtain more feedbacks from the participants.

Table 7 summarizes the types of questions (refer to Section 3.4) used in to measure the measurements of the survey questionnaire:

<table>
<thead>
<tr>
<th>Question Type Used</th>
<th>Measurements</th>
</tr>
</thead>
</table>
| Open-ended question      | **Section C:**  
                           | Limitations and problems faced in using Blackboard.  
                           | Benefits gained from learning through Blackboard.  
                           | Suggest improvements or features to be implemented in LMS to enhance learning.  |
|                          | **Section D:**  
                           | Limitations and problems faced in using SNS.  
                           | Benefits gained from SNS.  
                           | Suggest improvements or features to be implemented in SNS to enhance learning.  
                           | Privacy issue in SNS.  |
|                          | **Section E:**  
                           | Suggest features to be implemented in the NLS to enhance learning.  |
| Dichotomous scale        | **Section A:**  
                           | Age and gender.  |
|                          | **Section C:**  
<pre><code>                       | Level of difficulty of using Blackboard to communicate with others.  |
</code></pre>
<table>
<thead>
<tr>
<th>Question Type Used</th>
<th>Measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Section D:</strong></td>
<td>User of any SNS.</td>
</tr>
<tr>
<td></td>
<td>Level of difficulty of using SNS to communicate with others.</td>
</tr>
<tr>
<td><strong>Section E:</strong></td>
<td>Private or publicly accessible for the NLS.</td>
</tr>
<tr>
<td></td>
<td>Willingness to use the NLS.</td>
</tr>
<tr>
<td>Multiple-choice question</td>
<td><strong>Section A:</strong> Major of course study.</td>
</tr>
<tr>
<td></td>
<td><strong>Section B:</strong> Purpose of using Internet.</td>
</tr>
<tr>
<td></td>
<td>Way of searching information.</td>
</tr>
<tr>
<td></td>
<td><strong>Section C:</strong> Purpose of logging into Blackboard.</td>
</tr>
<tr>
<td></td>
<td><strong>Section D:</strong> Type of SNS owns.</td>
</tr>
<tr>
<td></td>
<td>Purpose of owning SNS.</td>
</tr>
<tr>
<td></td>
<td><strong>Section E:</strong> Social software tools have used in learning.</td>
</tr>
<tr>
<td>Likert scale</td>
<td><strong>Section B:</strong> The period of spending time on the Internet per week.</td>
</tr>
<tr>
<td></td>
<td><strong>Section C:</strong> The period of logging into Blackboard per week.</td>
</tr>
<tr>
<td></td>
<td><strong>Section E:</strong> Learners’ readiness that measures the online skills, self-</td>
</tr>
<tr>
<td></td>
<td>directed attitudes, social software tools support, and success factors.</td>
</tr>
<tr>
<td>Ranking scale</td>
<td><strong>Section E:</strong> The importance of learning elements.</td>
</tr>
</tbody>
</table>

**Table 7:** Types of questions used in the survey questionnaire to measure the learners’ readiness

### 3.4.2 Learners’ Acceptance

The survey questionnaire to assess learners’ perceived acceptance towards the use of the NLS contains 36 questions and is divided into three sections as follows (refer to Appendix B for the full survey questionnaire):

- **Section A:** Personal Information (3 questions)
Section B: Learners’ Feedback on the System (11 questions)

Section C: Learner’s Acceptance of the System (22 questions)

Section A contains questions on demographic characteristics such as age, gender, and course major. Section B is to evaluate on the participants’ experiences on the NLS in comparison with SUTS’ current LMS (Blackboard), and five-point Likert scale was used. In Section C, five-point Likert scale was also used to evaluate how participants come to accept and use the NLS. The questions are classified into four measurements: (1) perceived usefulness, which examines the degree to which the participants believe that using the NLS will improve their learning performances, (2) perceived ease of use, which examines how effortless that the participants perceive in using the NLS will be, (3) perceived satisfaction, which examines the participants’ involvement in learning scenarios within the NLS, and (4) willingness for future use, which examines the participants’ will to use the NLS in the future. Open-ended questions were also used in the survey questionnaire to allow participants to further explain their choice of answers.

Table 8 summarizes the types of questions (refer to Section 3.4) used in to measure the measurements of the survey questionnaire:

<table>
<thead>
<tr>
<th>Question Type Used</th>
<th>Measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open-ended question</td>
<td><strong>Section B:</strong> Overall opinion on the NLS.</td>
</tr>
<tr>
<td></td>
<td>Overall opinion on the NLS in comparison with Blackboard.</td>
</tr>
<tr>
<td></td>
<td><strong>Section C:</strong> Further explanations on the perceived usefulness,</td>
</tr>
<tr>
<td></td>
<td>perceived ease of use, perceived satisfaction, and willingness for future</td>
</tr>
<tr>
<td></td>
<td>use on the NLS. Suggestion or improvements recommend on the NLS.</td>
</tr>
<tr>
<td>Dichotomous scale</td>
<td><strong>Section A:</strong> Age and gender.</td>
</tr>
<tr>
<td>Multiple-choice question</td>
<td><strong>Section A:</strong> Major of course study.</td>
</tr>
<tr>
<td>Likert scale</td>
<td><strong>Section E:</strong> Learners’ acceptance that measures the perceived usefulness,</td>
</tr>
<tr>
<td></td>
<td>perceived ease of use, perceived satisfaction, and willingness for future</td>
</tr>
<tr>
<td></td>
<td>use.</td>
</tr>
</tbody>
</table>

Table 8: Types of questions used in the survey questionnaire to measure the learners’ acceptance
3.5 Analysis of Research Findings

The data SPSS (Statistical Package for Social Science) software was used to analyze the data collected. Three types of statistics are used for data analysis; descriptive statistics, reliability analysis, and analysis for multiple responses.

Descriptive statistics was used to summarize the data into frequency tables. Frequency table is used to present frequency of data. Frequency table includes percentage of responses, mean and standard deviation. Mean is arithmetical average of a frequency. Standard deviation is used to measure dispersion of data from mean. Mean and standard deviation were also used to present data that are Likert scale based. Apart from using descriptive statistic, analysis for multiple responses was used to analyze data on multiple-choice questions. A frequency table is also presented by only showing the percentage of responses. Reliability analysis was used to estimate the internal consistency of responses on a measure. It was used to analysis the data that are Likert scale based.

3.6 Ethics Concerns

This research has obtained approval from Swinburne’s Human Research Ethics Committee (SUHREC). Please refer to Appendix C for the approval letter in an email form from SUHREC. All data collected is kept confidential. The participants who participated in this research are remained anonymous.
Chapter 4: Learners’ Readiness

This chapter presents the results and findings of the first phase research framework as discussed in Chapter 3, Section 3.1 (refer to Figure 7). This preliminary survey studies to explore: (1) What are their perceptions towards the use of e-learning and social software tools (i.e. SNS), (2) Whether they perceived social software tools as potential features in learning, and (3) Are they ready to adapt to the NLS.

4.1 Research Participants

The survey questionnaires were randomly distributed to 250 participants that fulfilled the criteria discussed in Section 3.2. According to Kent (1999), a minimum sample size of 100 participants is needed for any kind of quantitative research to get a significant result. Therefore, the sample size of 250 is sufficient. A total of 219 usable responses (120 males and 99 females) were returned with an acceptance response rate of 87.6%. The survey questionnaire was carried out between May 2010 and July 2010.

4.2 Assessment Model of E-learning Readiness Survey

An assessment model of e-learning readiness survey (e-LRS) has been designed by Aydin and Tasci (2005) to provide easy coding and assessment for the learners (users of the new system), and to measure their level of readiness as shown in Figure 8. The code 1, 2, 3, 4, and 5 are used as the five-point Likert scale. The 3.41 mean score can be identified as the expected level of readiness (elr) with the item.

![Figure 8: Assessment Model of e-LRS](Source: Aydin & Tasci 2005, pp. 250)
4.3 Results and Findings

4.3.1 Reliability of Analysis of Survey Questionnaire

Cronbach’s Alph analysis was used to determine the internal reliability of each item measure of the participants’ readiness on the last section of the survey questionnaire. Nunnally (1978) has indicated that 0.70 and above to be an acceptable reliability coefficient. According to Cronbach’s Alpha analysis, the level of reliability of each item is satisfactory, from 0.695 to 0.876 (refer to Table 9).

<table>
<thead>
<tr>
<th>Learners’ Readiness Measurements</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online Skills</td>
<td>0.695</td>
</tr>
<tr>
<td>Self-Directed Attitudes</td>
<td>0.714</td>
</tr>
<tr>
<td>Social Software Tools Support</td>
<td>0.876</td>
</tr>
<tr>
<td>Success Factors</td>
<td>0.773</td>
</tr>
</tbody>
</table>

Table 9: Reliability of the learners' readiness measurements

4.3.2 Demographic Information

This section covers the demographic information of the participants. Demographic information includes age, gender, and their education major. Table 10 summarizes the demographic information of the participants.

<table>
<thead>
<tr>
<th>Description</th>
<th>N</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 – 19</td>
<td>73</td>
<td>33.3</td>
</tr>
<tr>
<td>20 – 24</td>
<td>135</td>
<td>61.6</td>
</tr>
<tr>
<td>25 – 29</td>
<td>11</td>
<td>5.0</td>
</tr>
<tr>
<td>30 and above</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>219</td>
<td>100</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>120</td>
<td>54.8</td>
</tr>
<tr>
<td>Female</td>
<td>99</td>
<td>45.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>219</td>
<td>100</td>
</tr>
<tr>
<td><strong>Major</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computing</td>
<td>109</td>
<td>49.8</td>
</tr>
<tr>
<td>Multimedia and Design</td>
<td>104</td>
<td>47.5</td>
</tr>
<tr>
<td>Both</td>
<td>6</td>
<td>2.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>219</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 10: Demographic of participants
The participants are almost equal in terms of gender with less than 10% difference; 54.8% males and 45.2% females. A majority of the participants are in the range of 20 – 24 years of age (61.6%), while some are in the range of 16 – 19 years of age (33.3%). There are only about 5.0% of participants who are in the range of 25 – 29 years of age and 0% who are 30 years and above. Most of the participants are from Computing major (49.8%) and 47.5% of the participants who are from Multimedia and Design major. There are 2.7% of the participants major in both.

4.3.3 General Information on the Internet Usage

The results reveal that 81.3% of the participants spend on the Internet on a daily basis. The participants also reveal that they use Internet mainly for personal purposes (89.5%). There are participants who also use Internet for education purposes (75.3%).

4.3.4 Learners’ Experiences in E-learning

This section discusses the research findings for subsidiary research question (B) – What are the learners’ experiences in e-learning (LMS)? This research opts to study on the students in SUTS; therefore, Blackboard is used as an example of e-learning (LMS) as the students have adapted Blackboard as their LMS.

Most of the participants use Blackboard to access learning materials (86.3%) and to update on announcements (80.8%), which are also the benefits that they have gained from using Blackboard. Some of the participants (33.3%) use Blackboard because it is required by the lecturers. However, in terms of communication, only 11.4% of the participants think that Blackboard enables them to connect with their other classmates and lecturers. Majority of the participants find it difficult to communicate with others (81.0%) because the participations in Blackboard are low, as low as 21.9% of the participants reveal that they log into Blackboard every day and it is also difficult to communicate in real time because they do not know when others are online. They commented that “seldom people log on to Blackboard every day so it is quite hard to interact with them”, “if others do not participate, there will be no one to collaborate with”, “not everyone is participating in Blackboard unless it is required such as to participate a discussion topic to obtain marks” and “I do not know whether others are online”.
4.3.5 Learners’ Experiences in Social Software

This section discusses the research findings for subsidiary research question (C) – What are the learners’ experiences in social software tools? This research specifically focuses on the use of social networking sites (i.e. Facebook) as this research assumes that social networking sites are the most popular tool among other social software tools to the participants.

Among the sample size of 219 participants, 215 participants (98.2%) own at least one of the SNS such as Facebook (100.0%), MySpace (7.9%), LinkedIn (4.2%), DeviantART (19.5%), Friendster (24.7%), Twitter (23.7%), Multiply (3.3%) and some others (10.7%). Facebook is the most popular SNS among the participants with 100.0% of the participants owning it. Most of the participants (71.2%) find SNS an easy tool to communicate with others. They commented that “Almost all of my friends are connected through Facebook. Besides that, rich features such as messaging are available to connect with each other” and “We can just leave messages on other people walls even though they are offline. Besides that, there is a chat box that allows us to chat with other people who are online at the same time”. Therefore, majority of the participants use SNS for the purpose of keeping in touch with friends (95.3%) and reunion with old friends (80.9%). They commented that “I have been able to do a lot of networking with contacts that have may be crucially helpful with work-related cases in future. I have been to also meet new friends as well as keep up with old friends”. Some of the students (59.1%) use SNS to communicate and share ideas with others as well. They commented that “SNS enable to share things and see things that shared by other people through different types of media such as video, photos and links”. Besides that, 74.4% of the participants find SNS is interesting and fun. As high as 72.6% of the participants claim that they log into their SNS every day. Overall, the participants gave good feedback towards SNS like “it makes our lives more interesting and fun” and “The system is excellent. It is easy and efficient to use”.

Referring to Question 22 of the survey questionnaire (refer to Appendix A), majority of the participants have used at least one of the social software tools in their learning activities. Social software tools such as discussion forums (54.8%), chats or video conferencing (MSN Messaging, Skype) (77.4%), blogs or online space (i.e. Blogger)
(44.2%), SNS (i.e. Facebook, Twitter) (75.6%), wikis or other collaborative writing tools (i.e. Writely) (35.0%), social bookmarking (i.e. del.icio.us, digg) (12.9%), and multimedia (i.e. Flickr, YouTube) (72.8%). The results show that the chat, SNS, and media sharing are the social software tools that are often used by the participants as their learning tools.

4.3.6 **Learners’ Readiness**

This section discusses the research findings for subsidiary research question (D) – What are the learners’ readiness levels towards the NLS? The levels of readiness are divided into four measurements, namely online skills, self-directed attitudes, social software tools, and success factors.

**Online Skills**

<table>
<thead>
<tr>
<th>Item</th>
<th>Online Skills</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I have the basic skills of finding my way around the Internet.</td>
<td>0.5%</td>
<td>1.4%</td>
<td>8.7%</td>
<td>54.3%</td>
<td>35.2%</td>
<td>4.22</td>
<td>0.697</td>
</tr>
<tr>
<td>2</td>
<td>I think that I would be comfortable using a computer several times a week participate in an online discussion.</td>
<td>0.0%</td>
<td>4.6%</td>
<td>26.5%</td>
<td>52.1%</td>
<td>16.9%</td>
<td>3.81</td>
<td>0.764</td>
</tr>
<tr>
<td>3</td>
<td>I think that I would be able to express myself better (i.e. mood, emotions and humor) through online writing.</td>
<td>0.0%</td>
<td>3.2%</td>
<td>19.2%</td>
<td>54.8%</td>
<td>22.8%</td>
<td>3.97</td>
<td>0.741</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.00</td>
<td>0.734</td>
</tr>
</tbody>
</table>

**Table 11:** Learners’ readiness results related to online skills measurement

Note: (1) For each item responses in the Likert format with 1 = Strongly Disagree, 2 = Disagree, 3 = Not Sure, 4 = Agree, 5 = Strongly Agree

(2) For the overall mean scores, scores of 1.0 – 2.9 = low level, 3.0 – 3.9 = moderate level and 4.0 – 5.0 = high level.

(3) SD = Standard Deviation

Table 11 illustrates the mean scores for the question associated with the online skills measurement of the participants. NLS is a web-based system that involves the use of
Internet; therefore, learners’ online skills are essential. The learners have to have the basic skills of finding their ways around the Internet. To participate in an online discussion, learners have to be comfortable using a computer several times a week. In an online discussion, learners have to be able to express their mood, emotions and humor through online writing.

The results show that the participants have high level online skills (\(M_{os}=4.00 > M_{ch}=3.41\)). This is mainly because the participants have been using Blackboard as their LMS, they already have the skills of finding ways around the Internet. Besides that, the growing interest of SNS with 98.2% of the participants owning at least one of the SNS such as Facebook (refer to Section 4.3.5) has also increased influences to the way participants communicate through online.

**Self-Directed Attitudes**

<table>
<thead>
<tr>
<th>Item</th>
<th>Self-Directed Attitudes</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>I think that I would be able to remain active and motivated even though there is no guidance from instructor.</td>
<td>2.3%</td>
<td>10.0%</td>
<td>38.4%</td>
<td>34.2%</td>
<td>15.1%</td>
<td>3.50</td>
<td>0.950</td>
</tr>
<tr>
<td>5</td>
<td>I think that I would be able to control over my learning process and deliver quality learning resources based on my needs and interests.</td>
<td>0.5%</td>
<td>2.3%</td>
<td>24.2%</td>
<td>61.6%</td>
<td>11.4%</td>
<td>3.81</td>
<td>0.675</td>
</tr>
<tr>
<td>6</td>
<td>I think that I would be able to learn more effectively through online interaction and collaboration with others (i.e. experts).</td>
<td>0.0%</td>
<td>6.4%</td>
<td>21.9%</td>
<td>58.9%</td>
<td>12.8%</td>
<td>3.78</td>
<td>0.746</td>
</tr>
<tr>
<td>7</td>
<td>I think that I would have the ability to interact online with others even though I might not know them in the first</td>
<td>0.0%</td>
<td>5.5%</td>
<td>25.6%</td>
<td>53.0%</td>
<td>16.0%</td>
<td>3.80</td>
<td>0.771</td>
</tr>
</tbody>
</table>
Table 12: Learners’ readiness results related to self-directed attitudes measurement

Note: (1) For each item responses in the Likert format with 1 = Strongly Disagree, 2 = Disagree, 3 = Not Sure, 4 = Agree, 5 = Strongly Agree
(2) For the overall mean scores, scores of 1.0 – 2.9 = low level, 3.0 – 3.9 = moderate level and 4.0 – 5.0 = high level.
(3) SD = Standard Deviation

NLS introduces learner-centric model that puts the learners at the center and gives them control of what, who, and how to learn. In this learner-centric model, self-directed attitudes are essential because in this learning situation, learning is no longer lecturer-directed. Therefore, learners have to be able to remain active and motivated even without guidance from instructor such as a lecturer. From the results above, the participants agree that they would be able to self-directed learners who are able to learn without guidance from instructor (Item #4, M=3.50).

In addition, learners are also expected to control over their learning process and deliver quality learning resources based on their needs and interests. In a learner-centric model, learning and knowledge are no longer restricted to a classroom and course, but also form a CoP with experts and knowers, and resources. Learners have to be able to interact and collaborate with others even though they might not know them in the first place, and actively response and learn along with others. From the results above, the
participants agree that they would be able to control over their own learning process (Item #5, M=3.81), effectively communicate and interact with others even though they might not know them in the first place (Item #6, M=3.78; Item #7, M=3.80, and Item #8, M=3.84).

Overall, the participants show moderate level of self-directed attitudes as shown in Table 12. Its mean score is the lowest score among the measurements mainly because the participants are already adapted to lecturer-directed learning style whereby their learning activities are directed and guided by their lecturers and also . Besides that, participants are also adapted of using Blackboard which put heavy emphasis on content delivery and technology. The participants have been using Blackboard to access materials, update announcements, and participate in discussion topics provided by their lecturers (refer to Section 4.3.4), which are very much lecturer-directed and delivery-centered concept. Although its mean score is the lowest score among the measurements, but it is still higher than the expected level of readiness (M_{SDA}=3.71 > M_{elr} = 3.41).

### Social Software Tools Support

<table>
<thead>
<tr>
<th>Item</th>
<th>Social Software Tools Support</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>I think that I would be able to use online social software tools (i.e. blogs, forums, social networking, etc) to communicate and work on an assignment with others who are in different time zones.</td>
<td>0.5%</td>
<td>4.6%</td>
<td>21.5%</td>
<td>57.5%</td>
<td>16.0%</td>
<td>3.84</td>
<td>0.758</td>
</tr>
<tr>
<td>12</td>
<td>I think that I would be able to ask questions and make comments through online social software tools.</td>
<td>0.9%</td>
<td>3.2%</td>
<td>17.4%</td>
<td>58.0%</td>
<td>20.5%</td>
<td>3.94</td>
<td>0.767</td>
</tr>
<tr>
<td>13</td>
<td>I think that I would be able to carry on a conversation with others using online social software tools.</td>
<td>0.0%</td>
<td>1.4%</td>
<td>16.9%</td>
<td>56.2%</td>
<td>25.6%</td>
<td>4.06</td>
<td>0.691</td>
</tr>
<tr>
<td>14</td>
<td>I think that learning</td>
<td>0.0%</td>
<td>2.3%</td>
<td>19.2%</td>
<td>53.4%</td>
<td>25.1%</td>
<td>4.01</td>
<td>0.732</td>
</tr>
<tr>
<td>Item</td>
<td>Social Software Tools Support</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>------</td>
<td>-------------------------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>------</td>
<td>----</td>
</tr>
<tr>
<td>15</td>
<td>through online social software tools enable me to access wider learning resources both people and materials.</td>
<td>0.5%</td>
<td>1.8%</td>
<td>23.7%</td>
<td>58.0%</td>
<td>16.0%</td>
<td>3.87</td>
<td>0.705</td>
</tr>
<tr>
<td>16</td>
<td>I think that I would be able to form a wider network with a group of people with similar knowledge and interests through online social software tools.</td>
<td>0.5%</td>
<td>0.0%</td>
<td>13.2%</td>
<td>63.9%</td>
<td>22.4%</td>
<td>4.08</td>
<td>0.627</td>
</tr>
<tr>
<td>17</td>
<td>I think that online social software tools allow for interaction, sharing and thinking together with others.</td>
<td>0.5%</td>
<td>0.5%</td>
<td>14.2%</td>
<td>60.7%</td>
<td>24.2%</td>
<td>4.08</td>
<td>0.663</td>
</tr>
<tr>
<td>18</td>
<td>I think that online social software tools will enable learning to be more social, personal, distributed, flexible and lifelong in nature.</td>
<td>0.0%</td>
<td>3.7%</td>
<td>19.6%</td>
<td>59.8%</td>
<td>16.9%</td>
<td>3.90</td>
<td>0.710</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.97</td>
<td>0.707</td>
</tr>
</tbody>
</table>

**Table 13:** Learners’ readiness results related to social software tools support measurement

Note: (1) For each item responses in the Likert format with 1 = Strongly Disagree, 2 = Disagree, 3 = Not Sure, 4 = Agree, 5 = Strongly Agree

(2) For the overall mean scores, scores of 1.0 – 2.9 = low level, 3.0 – 3.9 = moderate level and 4.0 – 5.0 = high level.

(3) SD = Standard Deviation
NLS is a system that integrates social software tools (SSTs) such as SNS. Therefore, learners’ positive perceptions towards the use of online social software tools are essential. With the use of SSTs, learners are able to communicate and even work on an assignment with others who are in different time zones. In addition, learners are able to interact with others by asking questions, making comments, and carrying conversations through the SSTs. From the results above, the participants agree that SSTs would support all these functions (Item #11, M=3.84; Item #12, M=3.94; Item #13, M=4.06, and Item #17, M=4.08).

As discussed in Section 2.2.1 on the affordances of social software, SSTs are able to support social network, content sharing, communication and interaction, and collaboration between individual learners in the process of gaining knowledge and learning. With these characteristics in a learning environment, learners able to access wider learning resources and network through the following communication and interaction nodes:

- One-to-one (learner-to-learner)
- One-to-many (learner-to-learners)
- Many-to-many (learners-to-learners)

From the results above, the participants agree that SSTs would help in accessing wider learning resources and network (Item #14, M=4.01 and Item #15, M=3.87). The participants also think SSTs allow for interaction, sharing, and thinking together with others that enable learning to be more social, personal, distributed, flexible, and lifelong in nature (Item #16; M=4.08; Item #18, and M=3.90).

These results indicate that the participants have positive perceptions on how SSTs would be beneficial on their learning process (M_{SSTS}=3.97 > M_{elr}=3.41). This is mainly because the participants have positive experiences in using SSTs such as chat conferencing, SNS, and wikis in their learning activities (refer to Section 4.3.5).

### Success Factors

<table>
<thead>
<tr>
<th>Item</th>
<th>Success Factors</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>Regular contact and support from the others (i.e. experts, peers, etc) is</td>
<td>0.0%</td>
<td>0.5%</td>
<td>24.7%</td>
<td>53.9%</td>
<td>21.0%</td>
<td>3.95</td>
<td>0.690</td>
</tr>
<tr>
<td>Item</td>
<td>Success Factors</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>Mean</td>
<td>SD</td>
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<tr>
<td>------</td>
<td>---------------------------------------------------------------------------------</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>------</td>
<td>-----</td>
</tr>
<tr>
<td>20</td>
<td>Experts not only a source of knowledge as they are also advisers who can provide guidance, corrective feedback and performance assessment.</td>
<td>0.0%</td>
<td>1.8%</td>
<td>17.8%</td>
<td>53.9%</td>
<td>26.5%</td>
<td>4.05</td>
<td>0.718</td>
</tr>
<tr>
<td>21</td>
<td>Frequent participation throughout the online learning process is important to my success in learning.</td>
<td>0.0%</td>
<td>2.7%</td>
<td>29.2%</td>
<td>53.0%</td>
<td>15.1%</td>
<td>3.80</td>
<td>0.719</td>
</tr>
<tr>
<td>22</td>
<td>I feel that integrating my learning experiences with real-world and lifelong learning is important to my success in future.</td>
<td>0.5%</td>
<td>0.9%</td>
<td>13.2%</td>
<td>59.8%</td>
<td>25.6%</td>
<td>4.09</td>
<td>0.678</td>
</tr>
</tbody>
</table>

Table 14: Learners' readiness results related to success factors measurement

Note: (1) For each item responses in the Likert format with 1 = Strongly Disagree, 2 = Disagree, 3 = Not Sure, 4 = Agree, 5 = Strongly Agree

(2) For the overall mean scores, scores of 1.0 – 2.9 = low level, 3.0 – 3.9 = moderate level and 4.0 – 5.0 = high level.

(3) SD = Standard Deviation

Item #19, #20, #21, and #22 are the factors that influence the participants’ perceptions on their success in learning through the NLS. Factors included regular contact and support from others, expert as an adviser, frequent participation, real-world, and lifelong learning. Regular contacts and supports from others such as experts and peers are important in a learning process because they are not only a source of knowledge; they are also advisers who can provide guidance, corrective feedback and performance assessment in a learning process. Participants also agree that regular participation throughout the online learning process is important to their success in learning (Item #21, M=3.80).
Regular contacts with the experts and peers, learners are able to integrate real-world and lifelong learning into their learning experiences because learning is no longer restricted to lecturer-directed and delivery-centered. From the results above, participants agree that integrating real-world and lifelong learning into their learning experiences is important to their success in future (Item #22, M=4.09). The results indicate that the participants have positive response towards the success of using the NLS (M_{Sf}=3.97 > M_{elr}=3.41). This shows that the participants agree to break through the lecturer-directed model to create a true networked learning where it connects with experts and peers to form CoP and they believe that this will bring benefits to their learning process.

Overall, the results show that the participants demonstrate moderate level of readiness to adapt to the NLS with average mean range of M_{all}=3.71 – 4.00 > M_{elr}=3.41 and 56.6% of the participants would like to try the NLS.

### 4.4 Discussions

Majority of the participants claim that Blackboard is a good system to get information through announcements and access learning materials of the course. However, majority of the participants claim that it is difficult to communicate with others in Blackboard mainly due to low participation. In contrast, participants have positive responses on SNS. Participants find SNS a place to share ideas and experiences with others. SNS also have a broader network, which not only help in building networks (i.e. new friends), but also connect networks (i.e. old friends) and stay connected within the networks. Participants have suggested that Blackboard should implement informal learning contexts whereby learning should not be restricted to the classroom based and to the formal learning inside learning institutions. They commented that “It feels very formal, unlike Facebook and other SNS”. Participants also agree that integration with social software in LMS may help in enhancing their learning experiences. They commented that “able to aid learning online instead of just for chatting purposes” and “Lecturers can enhance their relationship with the students through SNS. This is good because it motivates the students to study”. This shows that the participants have potential interests in using SNS in their learning activities. The findings also indicate that SNS is one of the SSTs that are often used by the participants (75.6%) as their learning tool.
As discussed in Section 2.7, SSTs have the potential to support various learning elements. Most of the participants rated the following learning elements as somewhat to be very important to their learning: Collaboration and Interaction (77.6%), Interests and Needs (87.7%), Knowledge and Ideas Sharing (88.1%), Networking and Community Building (83.1%), Real-world Learning (76.7%), and Lifelong Learning (78.5%) (refer to Appendix A). Therefore, the development and design of the NLS focus on these learning elements supported by SSTs to the learners.

However, before these SSTs are introduced to the NLS, it would be necessary to measure the readiness of the learners themselves and their perceptions about using such a system. This will help in designing of a more effective and usable platform for learning. Learners need to be ready for this type of learning technology as past experience showed that new technologies do not necessarily lead to major improvement in education (Stephenson, cited in Lim, Hong & Tan 2008, p. 541). For the success of a NLS implementation, there is a need to assess readiness of the learners to adapt to the different learning styles of the NLS. According to Watkins, Leigh and Triner (2004), one way of gauging a potential online learner’s readiness is through self-assessment. Therefore, this survey instrument is developed to assess the learners’ readiness based on the learners’ perceptions.

According to Guglielmino (cited in Aydin & Tasci 2005), technical readiness and readiness for self-directed learning are the two major components necessary for successful e-learning to occur. It is crucial to examine both these readiness. In this research, the technical readiness refers to the learners’ online skills. Similarly, the NLS is online based and learner-centric. Therefore, learners should have basic online skills and self-directed attitudes to benefit from the NLS. From the findings above, the participants’ online skills appear to have the highest mean score (M_{OS} = 4.00) and the participants’ self-directed attitudes mean score is greater than the expected (M_{SDA} = 3.71 > M_{rd} = 3.41). The participants also perceive that SSTs bring support to their learning process (M_{SSTS} = 3.97 > M_{rd} = 3.41) and perceive positive readiness towards the success of their learning through the NLS concepts that integrate social software (M_{SF} = 3.97 > M_{rd} = 3.41). It can also be observed from the findings above that the participants generally recognize the positive functions and benefits of the NLS. In conclusion, it is shown that the participants are generally ready for the NLS (M_{all} = 3.91 > M_{rd} = 3.41), but
few improvements are suggested such as adding in features (i.e. social networking features such as wall post) considered useful by the participants. They commented that “combination of basic e-learning system like Blackboard and basic social networking site like Facebook would make an excellent site”. They also commented that “Blackboard should implement some social networking applications such as wall post and online chat to make communication effective”. Through the improvement, it is likely that NLS can be better utilized by the participants and the purpose of implementing the NLS as a learning tool and its benefits can be fulfilled.
Chapter 5: System Design and Implementation

5.1 Introduction

E-learning has increasingly been used by educational universities to support their learning activities, for example by making learning materials available to the learners at anytime and anywhere. One approach to make this available is the use of LMS such as Blackboard and Moodle. There are different ways of using LMS in education. The common idea behind LMS is that e-learning is organized and managed within an integrated system, to make content and administration to be easily accessed through Internet, and it can be accessed anywhere and anytime. Different tools are integrated in LMS, which provide all necessary tools to run and manage an e-learning course. Tools include discussion forum, file sharing, assignments management, etc to support different learning activities. For example, discussion forum is to be used for a lecturer to post a topic or question and to let the students to discuss among themselves or answer the question posted. In summary, all learning activities and materials in a course are organized and managed by and within LMS.

However, LMS should not be just limited to these tools. With the affordances of the current trend of social software tools, these tools have been opening new doors for dynamic and social learning. E-learning may support learning into more collaborative, social, and interactive if enhanced with social software tools. Recently, the emergence of social software has questioned the use of integrated LMS (Dalsgaard 2006). Dalsgaard (2006) also pointed out that the usefulness of different tools in support of learning depends on which learning activities the tools should support.

This research develops a NLS that integrates social software tools. This research has analyzed the potential of using social software tools (i.e. SNS) for providing learners a sharing, collaboration, community building, and personal learning experiences. A prototype system has been developed as the NLS and implemented for usability testing on the participants as learners. According to Wang (2008), effective integration of ICT into teaching and learning is becoming an essential competency. Therefore, this research used the generic model proposed by Wang (2008), which consists of three
fundamental elements namely pedagogy, social interaction, and technology as a guide in effective integration of social software tools into the NLS.

5.2 System Analysis

5.2.1 Current System Use

The current e-learning system is designed, authored, delivered, and managed via LMS such as Blackboard and Moodle as a statically package online and modules. Chatti et al. (2008) claimed that the traditional LMS has put heavy emphasis on content delivery and technology (content and technology-centric model). The content and technology-centric model of learning has failed to achieve performance improvement and innovation. Van Harmelen (2006) also agreed by pointing out that the traditional LMSs are not flexible enough or are not addressing to the individual needs of a specific learner.

SUTS has been using Blackboard as an enhancement to the traditional face-to-face classroom learning environment. It focuses in providing SUTS’ students to access learning materials provided by their lecturers, update announcements, manage the students’ assignments, and participate in discussion topics created by their lecturers at anytime and anywhere. Blackboard serves as the contact between the university and the students. Figure 9 and Figure 10 are the snapshots of Blackboard from SUTS.

![Figure 9: A snapshot of Blackboard (SUTS) main page](image-url)
5.2.2 Proposed Current System Solution

The major challenge of the current system solution is to understand which technologies can be developed to match the requirements and goals of the theories and concepts discussed in Section 2.4, and also the learners' perceptions towards the NLS that have been discussed to build the NLS. Despite the growing recognition of the technology and function of instructional design in the current e-learning system, it has failed to make the best use of the opportunities that technologies can provide to make learning even better and effective in terms of supporting various learning elements such as collaborative learning, informal learning, and learner-centered learning. Instead of exploiting the affordances of social software that are available to develop desirable values, attitudes, and behaviors which affect the learners’ success and performance outside the formal learning (Naidu 2006), the nature of learning content and learning experiences that are delivered by the current e-learning system (traditional e-learning model) to the learners are still based on content and technology-centric model, which are still oriented in a lecturer-directed and delivery-centered concept.

The proposed NLS introduces the CALP approach by Klamma et al. (2007). It is an approach that could overcome the limitations of the traditional e-learning model by introducing collaborative adaptive learning with evolving social software and Web 2.0. However, Klamma et al. (2007) has specifically focused in using blogs on the approach. Social software tools are not only restricted to blogs. According to Pettenati and
Cigognini (2007), SNS is deeply rooted in our daily behaviors, interactions and conversations. This supports informal learning practices, contributing to the creation and transmission of knowledge. The social behavior and the support of its technologies and applications enable network building, which made by the learners to form a CoP, a network which tailors their needs, common learning goals, interactions, communication, and collaboration within the CoP. Therefore, this research proposed using SNS in the NLS to be included in the CALP approach.

The design of the NLS with the integration of SNS which will be broken down into the following key elements towards learner-centered and self-directed learning experiences based on the CALP elements that need to be encompassed as discussed in Section 2.5 (refer to Table 6):

1. *Personal tools and social networks* – this element is based on the PLE approach where learning tools are controlled by the individual learners based on their needs and interests. Recognizing that learning and knowledge are personal, thus it required an approach that moves away from a one-size-fits-all content-centric model and towards a *learner-centric model* that puts the learners at the center and gives them the control over their learning experiences (Chatti et al. 2008). This helps the learners in organizing and exchanging their personal knowledge and the knowledge that they acquire.

2. *Community building* – SNS supports community building. For example, the Facebook’s wall post where users can exchange short text messages with their networked friends, which are visible to all other users who belong to the local network that created which involves social interaction. Commenting on the wall post can lead to interactions between wall post-author and wall post-readers in that network and can lead to interesting discussions and debates. Consequently, this will create a social knowledge network from a group of people with similar interest to form a CoP. With this interaction, learners forms CoP by combining the following communication and interaction nodes:
   - One-to-one (learner and learner)
   - One-to-many (learner and learners)
   - Many-to-many (learners and communities)
When the learners form CoP, they can actively contribute and involve in other nodes on the network to share their resources, contributions and ideas. Through this experience, it enables lifelong and real-world learning.

3. **Knowledge-pull model** – this element is to bring learning content to a learner’s personal space. It also enables a wide access to learning resources, both the people and the material. This means that learner’s learning space is also expanded and not only restricted within the classroom boundaries. According to Chatti, Jarke and Frosch-Wilke (2007), in knowledge-pull model, learners create an environment where they can pull content that meets their particular needs from a wide array of high-value but less structured resources like information repositories, communities and experts, thus creating much more of a flexible, real time learning and knowledge culture. Media sharing (i.e. YouTube) is a good example from SNS features that can foster knowledge-pull model by sharing discovered media with people that have similar interests and needs within the CoP.

![Figure 11: Learning Elements in NLS](image)

In conclusion, the NLS is a system that integrates SNS features such as messaging, media sharing, discussions, social tagging and social sharing, and groups. NLS enables people to meet, connect, collaborate through computer-mediated communication, and to form online learning communities. NLS designs to engage learners into learning as a community, in which they share, exchange knowledge, interact, and collaborate with others in CoP that they have mutual learning interests and needs. In addition, it focuses
on the following learning elements: Interaction, Collaboration, Community Building, Sharing, Real-world Learning, and Lifelong Learning as shown in Figure 11.

5.3 System Platform

A prototype system named “StackBuffers” was developed as the NLS. StackBuffers\(^2\) was created by using open source content management system (CMS) called Joomla\(^3\) with integration of JomSocial\(^4\). Joomla is the most popular open source CMS in Malaysia and it is also an award winning CMS which enables developer to build websites and powerful online applications (Joomla 2011). Many aspects, including its ease-of-use and extensibility, have made Joomla the most popular website software available. Best of all, Joomla is an open source software that is freely available to everyone.

There are also other varieties of open source software available such as are Elgg\(^6\), Mahara\(^7\), and Xoops\(^8\) which provide social networking platforms and tools. However, Joomla is used as the platform for StackBuffers mainly because of JomSocial, which was created by The Azrul development team\(^5\). It is a new component for Joomla to transform static websites into dynamic, interactive social networking hubs with Facebook-like, and with its ease of use and robust functionalities, it has created a true Web 2.0 social networking solution for Joomla. JomSocial makes it easier to install Joomla’s social networking features onto the prototype system. Thus, this gives opportunities to this research to create the prototype system that integrates social networking features such as activity streams, flexible templating and design, photo gallery, video support, event management, customize profile, private messaging, and many add-on plugins and modules such as walls and chat box. Hence, JomSocial makes the top open sources networking software for everyone.

In addition, Driouech, Park and Jun (2008) claimed that Joomla has high efficiency and good design that can be extended to be an effective educational tool. It can easily store and organize educational content since it is flexible which it has the ability to add components to it, and the possibility of adding educational applications (Driouech, Park & Jun 2008). A number of research studies have used Joomla as an educational tool (Driouech, Park & 2008; Goold, Augar & Goodman 2008; Abdulwahed, M 2010).
Therefore, Joomla is studied to be suitable as the platform for StackBuffers on learning and pedagogical context that allows learners to conduct learning activities.

StackBuffers is open to everyone; users can join the website by adding themselves or to be invited by their friends who are already StackBuffers’ members. Thereafter, the users can write messages on their friends’ walls, upload media documents in the form of photo or video, join discussions groups and many more which will be discussed in details in Section 5.4. The users can easily enable social networking features to collaborate and to keep connected with their community.

5.4 System Design

![Figure 12: Main Page](image)

Figure 12 illustrates the main page when users visit StackBuffers. JomSocial comes with several modules, basically for statistics and updates that are used on the left panel of the main page (refer to Figure 12A). Registration for new users and login for members are available on the main page. To make the registration process hassle-free, JomSocial included the Facebook-Connect login-module so the members can login StackBuffers using their Facebook account (refer to Figure 12B). Profiles pictures and status updates are pulled safely and securely from Facebook, making it easy for new and existing users to sign up and stay logged into the website. The users can also choose not to pull the information from Facebook by just unselect the option given as illustrated in Figure 13.
Figure 13: Registration using Facebook account

Figure 14: Home Page

Figure 14 illustrates the home page when user successfully login to StackBuffers. Modules such as user menu, groups, active groups, latest group discussion as set by the administrator are also available on the left panel of the home page. Users can view all the activity feeds on the middle panel. The right panel includes the shortcut links to edit profile, view messages and etc.
On the profile page as illustrated in Figure 15, “My Status” space allows users to inform their friends of their actions and share their thoughts. Basic information and list of friends are presented on the middle panel. Basic information contains the information that identifies the user and a photo of the user is also displayed that helps others to easily identify the user.

JomSocial provides applications just like Facebook which allows developers to create applications and allows user to choose which one to use. JomSocial comes with several standard applications and offers an API for developers to create new ones as well. The administrator chooses which applications should be installed, as well as which applications are enabled on a user’s profile page by default. The default applications such as wall and groups are set on the profile page by the administrator. Nevertheless, users can also browse other applications like wall, groups, friend locations, latest photos, blog posts, etc and they can enable or disable them on their own profile page as illustrated in Figure 16.
One of the fundamental features of SNS is the wall post, which is a space to allow users to interact with each other by posting messages for users to see and comment. StackBuffers also provides the wall post feature as illustrated in Figure 17 and it is available on every user’s profile page.
To promote social interaction and collaboration, StackBuffers allows users to create their own group and to build their own small communities that share mutual learning interests and goals to form a CoP. The users are automatically set as administrator of the group created. As the group administrator, they can choose their groups users, control the contents, provide-convenient tools for group users to communicate with each other through its fundamental SNS features such as wall post, discussions and media sharing. Figure 18 illustrates an example of a group that is opened to all users who are interested in information technology (IT).

The group administrator can choose to make their group into public or private as illustrated in Figure 19. Public group can be joined by any users and invited users. Private group is already opened for selected users by the administrator. However, the description on the group will still be visible to all users. If any users are interested to join the group, they need administrative approval.
In groups, users can share resources such as discussion post where all users can share and discuss ideas, media sharing through photos and videos sharing. In addition, the groups also provide wall that enables them to post messages. In discussions, any users can post a topic and discuss it with other users who are interested in the topic (refer to Figure 21).

**Figure 20: Groups Discussions 1**

**Figure 21: Groups Discussions 2**
The media sharing feature allows users to post videos from external video linking such as YouTube, Vimeo, or 10 other major video providers or upload their own video files illustrated in Figure 24. The media sharing feature also allows users to create photo album to share photos.
Figure 24: Add Video

Figure 25: Groups Video Sharing

Figure 25 illustrates the video sharing in groups. The users can also share the video with their friends in Facebook or Twitter by using the “Share this” tool or send it through email. StackBuffers supports more than 20 social bookmarking sites as shown in Figure 26.
The users can also share their ideas and comments in the comments section provided in the video page as illustrated in Figure 27.

Besides that, users can also comment on the photo shared. StackBuffers also supports social tagging and social sharing. If the users have specific friend to share and comment the photo with, they can tag the friends as illustrated in Figure 28 and wait for their friends to comment and reply their comments.
Private messaging as illustrated in Figure 29 is also available in StackBuffers. User can do one-to-one messaging privately that is similar to email. Private messages cannot be read by any users except the selected recipients. This is useful when the communication is not intended to be shared with others.

StackBuffers also supports instant messaging that allows instant communication between users. The instant messaging has a box that appears in every page as illustrated in Figure 29C to let users know who are online. Notifications such as new messages, new comments, newly joined group members, new posts, and new friend requests will also be sent to the user’s private email that is given during the registration as illustrated.
in Figure 30. Hence, the users can quickly know what has happened in StackBuffers before logging into the site.

![Email Notification](image)

**Figure 30:** Email Notification

Besides that, a notification alert will also appear on the user’s profile page to notify the users as illustrated in Figure 31D.

![Notifications Alert](image)

**Figure 31:** Notifications Alert

### 5.5 System Affordances

This section presents the affordances of StackBuffers for learning. The affordances of StackBuffers are presented by following the key components of the generic model for an education system that is proposed by Wang (2008) as discussed in Section 2.6 and also with respect to the key elements listed in Section 5.2.2.
Chapter 5  System Design and Implementation

5.5.1 Pedagogical Affordances

Pedagogical affordances concern how a particular learning behavior could possibly be enacted within a given educational context (Kirschner et al., cited in Idris & Wang 2009). StackBuffers has the potential to support various learning elements such as community building, lifelong learning, collaborative learning, informal learning, and learner-centered learning. In StackBuffers, learners are actively building learning communities, which means the learners decide whom to learn and to share knowledge with (community building).

StackBuffers provides features that enable learners to share information and ideas through interaction with others. In StackBuffers learning environment, learners are put at the center of the learning environment, which they control over their learning activities and learning processes (PLE and learner-centric). They decide which content to consume, which person to learn with, and at which time to do so. In addition, StackBuffers is opened to learners to communicate and interact even after they have completed a course and hence construct lifelong learning.

In StackBuffers, learning content is no longer imposed by the lecturers, rather learners search for their own content that meets their learning needs through sharing, tagging, or communicating with their community (knowledge-pull). For example, learners can share a video in StackBuffers and can see what others think about the video posted by giving comments.

5.5.2 Social Affordances

Social affordances concern with perceived and actual properties of a system that can promote learners’ social interactions (Kirschner et al., cited in Idris & Wang 2009). StackBuffers supports social interaction through various types of social networking features. StackBuffers allows learners to interact with others within small groups by selecting their own group members, control the content available on the group page, and provide convenient tools for group members to communicate with each other. In summary, the learners control over their learning activities within the groups. The groups can be open or closed groups. Within any type of groups, learners can share
resources such as posts, videos, or photos to make the learning resources interesting. In addition, it supports interaction and communication in different nodes:

- One-to-one (learner-to-learner), using private messaging, instant messaging
- One-to-many (learner-to-learners), using groups, discussions
- Many-to-many (learners-to-communities), using media sharing, social tagging

They can also discuss ideas in the discussions space provided. In addition, they can post messages for others to view on their walls. Learners can share information, post ideas, and reflect on the learning content on their walls. When others find the learning content interesting, they can comment on the wall post and creates social interactions. This eventually helps in building a CoP with similar interests. When CoP is formed, learners will feel comfortable to share information with others. According to Wang (2008), the social interaction of an online learning environment must provide a safe and comfortable space, in which learners are willing to share information and in which they can also easily communicate with others. Besides that, the identity of a learner is visible in StackBuffers.

5.5.3 Technological Affordances

Technological affordances concern the usability of a system (Norman, cited in Idris & Wang 2009). According to Wang (2009), the availability and easy access are initial requirements for an effective online learning environment. StackBuffers is a system functioning relatively similar to a SNS (i.e. Facebook). Therefore, it is easy to learn and to use. It is open meaning it is available to everyone to join. Besides that, StackBuffers is customizable to meet the users’ various needs. Users can add photos as their profile pictures. In addition, they can add additional applications to their pages and users can add or remove the applications, and even can decide where they want to position the applications. For example, they can move the wall application to the top of their profile pages because they frequently use it. Moreover, StackBuffers is free of charge, even to the public.

5.6 System Testing

Usability testing was carried out from August 2010, spanning 12 study weeks. Usability testing is a method used to evaluate the prototype system, StackBuffers by testing on the participants. To successfully implement this usability testing with the students,
collaboration with the lecturers of the units is needed. Therefore, the number of participant is restricted upon the collaboration of the lecturers. This research only managed to obtain a total of 80 students to participate in this usability testing.

5.6.1 Setting

Participants from three different units namely Context and Culture, Multimedia and Design, and Information Technology (IT) that fall into the Computing, Multimedia and Design course were agreed to participate on the usability testing. As discussed in the scope of this research (refer to Section 1.5), this research is not course specific. The participants were first introduced to StackBuffers by the researcher. The participants were assigned to use StackBuffers for a total of their 12 study weeks informally whereby their participations in the system were not evaluated by marks.

In StackBuffers, groups were created for each unit by the administrator. Participants were enrolled to their respective group. However, participants from the respective group were allowed to join other groups of their interests. In the group, the participants can discuss anything related to their unit (group) assigned. The IT group was incorporated with the unit DBI1144 Intro to IT and DBI111 Using IT. In this group, participants discussed anything about IT and it was also opened to other IT communities who are interested in anything about IT. Multimedia and Design group was incorporated with the unit HDMMD212 Digital Video Camera Techniques and LFSE011 Multimedia where they discussed about their assignments, video and multimedia samples and techniques. Context and Culture group was incorporated with the unit LFSE004 Context and Culture that discussed about art and design. Their discussions can be in the form of video, photo, wall or discussion post using the social networking features (SNFs) provided by the system. Their learning situation and content are not restricted to classroom activities and course. Participants pull their own content that meets their particular learning needs and interests. This leads to the knowledge-pull model. With the collaboration with the lecturers of the units, the lecturers played a role as a peer, administrator for the group created, and moderator to guide the learning activities among the participants in the system.

Although Facebook is one of the popular SNS among the participants as discussed in Section 4.3.5, Facebook was not used as the prototype system for usability testing in
this research mainly due to its complexity of available features which are not relevant to
the learning and pedagogical context in this research. Instead, StackBuffers is a more
focused system on learning and pedagogical context because this system is used to
conduct learning activities and lecturers of the unit are assigned to monitor the learning
activities between the participants. Moreover, Facebook was not created for pedagogical
or education purposes at the first place. Facebook was created to provide social
networking services to its users and to help them communicate more efficiently with
their friends. Besides that, looking at the amount of information Facebook’s users
provide about themselves, the relatively exposure of information and the lack of privacy
controls enacted by the users can put users themselves at risk (Gross and Acquisti, cited

Data were then collected from the participants by conducting survey questionnaire that
comprised both the participants’ responses to the use of the system, compared it with
Blackboard, and their acceptance towards the use of StackBuffers based on their
perceptions. The results and findings will be discussed further in the next chapter.
Chapter 6: Learners’ Acceptance

This chapter presents the results and findings of the second phase research framework as discussed in Chapter 3, Section 3.1 (refer to Figure 7). In this second phase, prototype, StackBuffers was developed as the NLS and it was implemented and tested by the participants. Learners’ acceptance were measured to examine their acceptance and perceived attitudes towards the use of the system.

6.1 Introduction

Technology Acceptance Model (TAM) is an intention-based-model developed specifically for explaining user acceptance of computer technology (Hu et al. 1999, cited in Masrom 2007). It has been used as a theoretical basis for many empirical studies on user technology acceptance such as e-learning (Chong et al. 2010; Halawi & McCarthy 2008; Landry, Griffeth & Hartman 2006; Liu, Liao & Peng 2005), collaborative annotation system (Su et al. 2010), and SNS (Tan & Low 2010). However, there is still lack of theoretical or conceptual frameworks in many past studies on e-learning integration with social software. The question concerning the learners’ attitudes towards the use of social software (i.e. SNS) as a learning tool in e-learning has not been well researched. Therefore, TAM is used as a theoretical framework in this research to study the learners’ acceptance towards the NLS (e-learning integrates SNS).

6.2 Theoretical Framework

TAM was first developed by Davis (1989). TAM is derived from the Theory Reasoned Action (TRA) by Fishbein and Ajzen (1975). The TRA posits that individual behavior is driven by behavioral intention where behavioral intention is a function of an individual’s attitude towards the behavior and subjective norms surrounding the performance of the behavior.

TAM proposes that perceived ease of use and perceived usefulness of technology are predictors of user’s attitude towards using the technology, subsequent behavior intentions, and actual usage. Perceived ease of use was also considered to influence perceived usefulness of technology. Figure 32 shows the original version of TAM by Davis (1989).
In TAM, *perceived usefulness* is defined as “the degree to which a user believes that using a particular system would enhance the user’s job performance. This is believed that a system high in perceived usefulness, in turn, is one for which a user believes in the existence of a positive use-performance relationship” (Davis 1989).

*Perceived ease of use* is defined as “the degree to which a user believes that using a particular system would be free of effort” (Davis 1989). In other word, if users believe that using a system could be effortless, this will lead to perceived of ease of use.

Perceived usefulness and perceived ease of use will affect the user’s attitude towards using the system, which in turn determines the behavioral intention to use that system (Tan & Low 2010). According to TAM, people are more likely to use a system as they perceive easy and useful (Usluel & Mazman 2009).

TAM has been applied in numerous studies to examine user’s acceptance of information technology as discussed previously. As a result of these TAM related studies, perceived usefulness was further employed to study a user’s intention to use the system, and it was found that perceived ease of use also had a significant influenced on the perceived usefulness of a user who is currently using or learning an information technology (Su et al. 2010). This research has applied TAM model to explore the perceived usefulness and perceived ease of use of the NLS (prototype system). A reduced TAM model that was adopted by Masrom (2007) has been employed in this research. In this reduced TAM model, actual system use is excluded and external variables constructs are also not
included in this reduced model as there is no immediate intention to examine antecedents to perceived usefulness and perceived ease of use (Masrom 2007).

6.3 Research Participants

The survey questionnaire was distributed to those who participated in the usability testing. The survey questionnaire was carried out on December 2010 when the participants had completed the usability testing on week 13. It was very close to the final exam period; therefore the responses were quite ineffective. Due to the time constraint, the survey questionnaire could not be carried out further for better response. A total of 52 usable responses were returned. However, the response rate is 65% which is still over 50%. Therefore, the response rate is still considered sufficient.

6.4 Results and Findings

6.4.1 Reliability of Analysis of Survey Questionnaire

Section B of the survey questionnaire yields a Cronbach’s Alpha of 0.919, which according to Nunnally (1978), is above 0.70 and is therefore reliable. Table 15 shows the reliability of each of the measurement scores are higher than 0.70. Hence, the results demonstrate that the survey questionnaire is a reliable measurement instrument.

<table>
<thead>
<tr>
<th>Learners’ Acceptance Measurements</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Usefulness</td>
<td>0.879</td>
</tr>
<tr>
<td>Perceived Ease of Use</td>
<td>0.868</td>
</tr>
<tr>
<td>Perceived Satisfaction</td>
<td>0.928</td>
</tr>
<tr>
<td>Willingness for Future Use</td>
<td>0.961</td>
</tr>
</tbody>
</table>

Table 15: Reliability of the learners' acceptance measurements

6.4.2 Demographic Information

This section covers the demographic information of the participants. Demographic information includes age, gender, and their education major. Table 16 summarizes the demographic information of the participants.

<table>
<thead>
<tr>
<th>Description</th>
<th>N</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 – 19</td>
<td>30</td>
<td>57.7</td>
</tr>
<tr>
<td>20 – 24</td>
<td>22</td>
<td>42.3</td>
</tr>
<tr>
<td>25 – 29</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>30 and above</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Chapter 6  Learners’ Acceptance

<table>
<thead>
<tr>
<th>Description</th>
<th>N</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>52</td>
<td>100</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>27</td>
<td>51.9</td>
</tr>
<tr>
<td>Female</td>
<td>25</td>
<td>48.1</td>
</tr>
<tr>
<td>Total</td>
<td>52</td>
<td>100</td>
</tr>
<tr>
<td><strong>Major</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computing</td>
<td>27</td>
<td>51.9</td>
</tr>
<tr>
<td>Multimedia and Design</td>
<td>25</td>
<td>48.1</td>
</tr>
<tr>
<td>Total</td>
<td>52</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 16: Demographic of participants

The participants are almost equal in terms of gender with 3.8% difference; 51.9% are males and 48.1% are females. The participants are from two categories of age, 16 – 19 (57.7%) and 20 – 24 (42.3%). Majority of the participants are from Computing major (51.9%) and 25% are from Multimedia and Design major.

6.4.3 Learners’ Feedback on the System

This section discusses the research findings for subsidiary research question (E) – What are the learners’ perceptions on the NLS compare to the traditional LMS? In this research, Blackboard is used as the traditional LMS.

<table>
<thead>
<tr>
<th>Item</th>
<th>Learners’ Feedback</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I think create an online collaborative learning environment through social software is a good idea.</td>
<td>0.0%</td>
<td>3.8%</td>
<td>21.2%</td>
<td>53.8%</td>
<td>21.2%</td>
<td>3.92</td>
<td>0.763</td>
</tr>
<tr>
<td>2</td>
<td>I think the system supports collaborative learning, knowledge sharing, exchange ideas, networking and community building.</td>
<td>0.0%</td>
<td>5.8%</td>
<td>17.3%</td>
<td>63.5%</td>
<td>13.5%</td>
<td>3.85</td>
<td>0.724</td>
</tr>
<tr>
<td>3</td>
<td>I think the system helps me to</td>
<td>3.8%</td>
<td>11.5%</td>
<td>23.1%</td>
<td>44.2%</td>
<td>17.3%</td>
<td>3.60</td>
<td>1.034</td>
</tr>
<tr>
<td>Item</td>
<td>Learners’ Feedback</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>------</td>
<td>--------------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>------</td>
<td>----</td>
</tr>
<tr>
<td>4</td>
<td>I think the system gives me opportunity to communicate with others.</td>
<td>0.0%</td>
<td>11.5%</td>
<td>32.7%</td>
<td>46.2%</td>
<td>9.6%</td>
<td>3.54</td>
<td>0.828</td>
</tr>
<tr>
<td>5</td>
<td>I think the system supports personalised learning resources which are able to connect people with right knowledge and deliver quality resources that are tailored to my learning preferences and goals.</td>
<td>1.9%</td>
<td>3.8%</td>
<td>32.7%</td>
<td>51.9%</td>
<td>9.6%</td>
<td>3.63</td>
<td>0.793</td>
</tr>
<tr>
<td>6</td>
<td>I think the system gives me more control over my learning process.</td>
<td>3.8%</td>
<td>9.6%</td>
<td>26.9%</td>
<td>50.0%</td>
<td>9.6%</td>
<td>3.52</td>
<td>0.939</td>
</tr>
<tr>
<td>7</td>
<td>I think the system delivers enhanced informal learning experiences.</td>
<td>0.0%</td>
<td>5.0%</td>
<td>21.2%</td>
<td>59.6%</td>
<td>9.6%</td>
<td>3.69</td>
<td>0.781</td>
</tr>
<tr>
<td>8</td>
<td>I think the system increases my interest, motivation and learning achievement in a collaborative learning environment.</td>
<td>0.0%</td>
<td>11.5%</td>
<td>23.1%</td>
<td>57.7%</td>
<td>7.7%</td>
<td>3.62</td>
<td>0.796</td>
</tr>
<tr>
<td>9</td>
<td>I prefer the system better than the current learning</td>
<td>3.8%</td>
<td>1.9%</td>
<td>42.3%</td>
<td>40.4%</td>
<td>11.5%</td>
<td>3.54</td>
<td>0.874</td>
</tr>
</tbody>
</table>
Table 17: Learners’ feedback on the system results

<table>
<thead>
<tr>
<th>Item Feedback</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>management system (i.e. Blackboard).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.66</td>
<td>0.837</td>
</tr>
</tbody>
</table>

Table 17 shows the results of the participants’ perceptions towards the use of the system in comparison with Blackboard. The system integrates social software tools (i.e. SNS) to create an online collaborative learning environment to the learners. The participants agree that it is a good idea with the highest mean score (Item #1, M=3.92). The objective of the system is to provide the learners a platform that supports collaborative learning, knowledge sharing, exchange ideas, networking and community building. The participants agree that the system meet the objective (Item #2, M=3.85). In terms of communications, participants agree that the system helps them to organize and exchange their personal knowledge with others such as course mates, lecturers, peers, etc and it gives them opportunities to communicate with others (Item #3, M=3.60; Item #4, M=3.54). The participants also commented that with communicating and sharing ideas with others can help in providing them broader information that is not limited within classroom boundaries. They commented that “We can get information from others which are not [from] Swinburne [only] but compare to Blackboard, it only provide [from] Swinburne”, “The system is good for us to learn more and gain information from others”, “I think this system gives me the chance to share my ideas with others. It is a good way for students to study through this system”. The participants agree that the system supports personalized learning resources which are able to connect people with right knowledge and deliver quality resources that are tailored to their learning preferences and goals (Item #5, M=3.63). As a result, the participants agree that the system gives them more control over their learning process (Item #6, M=3.52). In addition, the participants agree that the system delivers enhanced informal learning experiences which increase their interests, motivations, and learning achievements in a
collaborative learning environment (Item #7, M=3.69; Item #8, M=3.62). They commented that “I like this system, it is more interesting”, “The system is more interesting and it is more informal. It is easy to share ideas with others through the system as well. Blackboard is more controlled by the lecturers”. In comparison with Blackboard, the participants prefer the system better (Item #9, M=3.54). Overall, the results show that the participants are favorable towards the integration of the social software tools into the system (M_all=3.66).

6.4.4 Learners’ Acceptance

This section discusses the research findings for subsidiary research question (F) – What are the learners’ acceptance levels towards the NLS? The participants’ level of acceptance towards the use of the NLS (StackBuffers) is divided into four measurements, namely perceived usefulness, perceived ease of use, perceived satisfaction, and willingness for future use. Since social software tools (i.e. SNS) were not intended specifically for professional learning, many challenges are raised by the ready acceptance of these technologies (Klamma 2006). Therefore, the perceived usefulness and the perceived ease of use of SNS such as the social networking feature (i.e. wall post, media sharing, etc) to share and exchange knowledge, interaction, networking and community building with others in NLS were measured in this research.

**Perceived Usefulness**

<table>
<thead>
<tr>
<th>Item</th>
<th>Perceived Usefulness</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I think using social networking features (SNFs) (i.e. wall post, photo and video sharing) in the system are useful to share knowledge and exchange ideas with others (i.e. course mates, lecturers, peers, etc).</td>
<td>1.9%</td>
<td>1.9%</td>
<td>23.1%</td>
<td>50.0%</td>
<td>23.1%</td>
<td>3.90</td>
<td>0.846</td>
</tr>
<tr>
<td>2</td>
<td>I think using SNFs in the system are useful for conversation and</td>
<td>0.0%</td>
<td>1.9%</td>
<td>17.3%</td>
<td>59.6%</td>
<td>21.2%</td>
<td>4.00</td>
<td>0.686</td>
</tr>
</tbody>
</table>
interaction through discussions (i.e. ask questions and make comments on a topic) with others.

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>I think using SNFs in the system are useful to support networking and community building with others.</td>
<td>0.0%</td>
<td>3.8%</td>
<td>30.8%</td>
<td>57.7%</td>
<td>7.7%</td>
</tr>
<tr>
<td>4</td>
<td>Overall, I think using SNFs in the system are useful to my learning activities and performances.</td>
<td>0.0%</td>
<td>5.8%</td>
<td>30.8%</td>
<td>51.9%</td>
<td>11.5%</td>
</tr>
</tbody>
</table>

Table 18: Learners’ acceptance results related to perceived usefulness measurement

Note: (1) For each item responses in the Likert format with 1 = Strongly Disagree, 2 = Disagree, 3 = Not Sure, 4 = Agree, 5 = Strongly Agree

(2) For the overall mean scores, scores of 1.0 – 2.9 = low level, 3.0 – 3.9 = moderate level and 4.0 – 5.0 = high level.

(3) SD = Standard Deviation

Social networking features (SNFs) such as wall post, photo and video sharing are used in the system. In terms of perceived usefulness, the participants agree that using social networking features (SNFs) such as wall post, photo and video sharing in the system are useful to share knowledge and exchange ideas with others (Item #1, M=3.90). The participants agree that using SNFs in the system are useful for conversation and interaction through discussions such as asking questions and giving comments on a topic with others with the highest mean score (Item #2, M=4.00). The participants commented that SNFs is a useful tool that motivates them to participate in discussions. They commented that “When I see my classmates discuss on SNFs, it motivates me to discuss automatically”. The participants agree that using SNFs in the system are useful to support networking and community building with others (Item #3, M=3.69). Overall, the participants agree that using SNFs in the system are useful to their learning activities and performances (Item #4, M=3.69, M_{PU}=3.82).
### Perceived Ease of Use

<table>
<thead>
<tr>
<th>Item</th>
<th>Perceived Ease of Use</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>I think it is easy to share knowledge and exchange ideas in the system through video and photo sharing.</td>
<td>0.0%</td>
<td>1.9%</td>
<td>25.0%</td>
<td>53.8%</td>
<td>19.2%</td>
<td>3.90</td>
<td>0.721</td>
</tr>
<tr>
<td>6</td>
<td>I think it is easy to communicate and interact with others in the system through wall postings, discussions and chats.</td>
<td>0.0%</td>
<td>1.9%</td>
<td>19.2%</td>
<td>61.5%</td>
<td>17.3%</td>
<td>3.94</td>
<td>0.669</td>
</tr>
<tr>
<td>7</td>
<td>I think it is easy to network and create a community with others in the system.</td>
<td>0.0%</td>
<td>1.9%</td>
<td>17.3%</td>
<td>73.1%</td>
<td>7.7%</td>
<td>3.87</td>
<td>0.561</td>
</tr>
<tr>
<td>8</td>
<td>I think the system is easy to access and navigate to find my way (i.e. to find the right buttons) in the system.</td>
<td>0.0%</td>
<td>3.8%</td>
<td>32.7%</td>
<td>51.9%</td>
<td>11.5%</td>
<td>3.71</td>
<td>0.723</td>
</tr>
<tr>
<td>9</td>
<td>I think it is easy to use the system even though there is no guidance from instructor.</td>
<td>0.0%</td>
<td>5.8%</td>
<td>30.8%</td>
<td>48.1%</td>
<td>15.4%</td>
<td>3.73</td>
<td>0.795</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.83</td>
<td>0.694</td>
</tr>
</tbody>
</table>

**Table 19:** Learners’ acceptance results related to perceived ease of use measurement

Note: (1) For each item responses in the Likert format with 1 = Strongly Disagree, 2 = Disagree, 3 = Not Sure, 4 = Agree, 5 = Strongly Agree

(2) For the overall mean scores, scores of 1.0 – 2.9 = low level, 3.0 – 3.9 = moderate level and 4.0 – 5.0 = high level.

(3) SD = Standard Deviation

In terms of perceived ease of use, the participants perceive it is easy to use the system ($M_{PEU}=3.83$). The participants agree that it is easy to share knowledge and exchange ideas in the system through video and photo sharing; it is also easy to communicate and

93
interact with others in the system through wall postings, discussions and chats; it is easy to network and create a community with others in the system as well (Item #5, M=3.90; Item #6, M=3.94; Item #7, M=3.87). They find it using SNFs are easier for communication and knowledge sharing. They commented that “by using SNFs, it is easier to let us communicate, share knowledge and exchange ideas”. When it comes to using the system, the participants agree that the system is easy to access, navigate, and use even though there is no guidance from instructor (Item #8, M=3.71; Item #9, M=3.73). They commented that “It is not hard to use the system; I can easily find my way around the system”.

**Perceived Satisfaction**

<table>
<thead>
<tr>
<th>Item</th>
<th>Perceived Satisfaction</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>I am satisfied with the sharing knowledge and exchanging ideas features in the system (i.e. wall post, photo and video sharing).</td>
<td>1.9%</td>
<td>5.8%</td>
<td>17.3%</td>
<td>51.9%</td>
<td>23.1%</td>
<td>3.88</td>
<td>0.900</td>
</tr>
<tr>
<td>11</td>
<td>I am satisfied with the communication and interaction with others in the system through discussions, wall posts and chats.</td>
<td>0.0%</td>
<td>3.8%</td>
<td>25.0%</td>
<td>59.6%</td>
<td>11.5%</td>
<td>3.79</td>
<td>0.696</td>
</tr>
<tr>
<td>12</td>
<td>I am satisfied with the networking and community with others in the system.</td>
<td>0.0%</td>
<td>1.9%</td>
<td>34.6%</td>
<td>53.8%</td>
<td>9.6%</td>
<td>3.71</td>
<td>0.667</td>
</tr>
<tr>
<td>13</td>
<td>I am satisfied with the flexible accessibility of the system anytime and anywhere.</td>
<td>0.0%</td>
<td>3.8%</td>
<td>25.0%</td>
<td>57.7%</td>
<td>13.5%</td>
<td>3.81</td>
<td>0.715</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.80</td>
<td>0.745</td>
</tr>
</tbody>
</table>

**Table 20:** Learners' acceptance results related to perceived satisfaction measurement

Note: (1) For each item responses in the Likert format with 1 = Strongly Disagree, 2 = Disagree, 3 = Not Sure, 4 = Agree, 5 = Strongly Agree
(2) For the overall mean scores, scores of 1.0 – 2.9 = low level, 3.0 – 3.9 = moderate level and 4.0 – 5.0 = high level.

(3) SD = Standard Deviation

In terms of perceived satisfactions, the participants are satisfied with the sharing knowledge and exchanging ideas features; communication and interaction with others through discussions, wall posts and chat; networking and community with others in the system (Item #10, M=3.88; Item #11, M=3.79; Item #12, M=3.71). They commented that “It helps a lot in my study through the information that share on the system”, “We can get information from others which are not from Swinburne but compare to Blackboard, it only provide [from SUTS] students”. The participants are also satisfied with the flexible accessibility of the system anytime and anywhere (Item #13, M=3.81).

**Willingness for Future Use**

<table>
<thead>
<tr>
<th>Item</th>
<th>Willingness for Future Use</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>I would like to keep using the system for learning purposes in other units.</td>
<td>3.8%</td>
<td>3.8%</td>
<td>28.8%</td>
<td>53.8%</td>
<td>9.6%</td>
<td>3.62</td>
<td>0.867</td>
</tr>
<tr>
<td>15</td>
<td>I would like to keep using the system for networking amongst my friends in the future.</td>
<td>3.8%</td>
<td>1.9%</td>
<td>30.8%</td>
<td>53.8%</td>
<td>9.6%</td>
<td>3.63</td>
<td>0.841</td>
</tr>
<tr>
<td>16</td>
<td>I would like keep using the system for networking and sharing knowledge with new students when I’m already working in the industry.</td>
<td>3.8%</td>
<td>1.9%</td>
<td>28.8%</td>
<td>55.8%</td>
<td>9.6%</td>
<td>3.65</td>
<td>0.837</td>
</tr>
<tr>
<td>17</td>
<td>I would like to keep using the system for learning and accumulating knowledge even after graduating.</td>
<td>3.8%</td>
<td>5.8%</td>
<td>28.8%</td>
<td>51.9%</td>
<td>9.6%</td>
<td>3.58</td>
<td>0.893</td>
</tr>
</tbody>
</table>

Table 21: Learners’ acceptance results related to willingness for future use measurement
Note: (1) For each item responses in the Likert format with 1 = Strongly Disagree, 2 = Disagree, 3 = Not Sure, 4 = Agree, 5 = Strongly Agree
(2) For the overall mean scores, scores of 1.0 – 2.9 = low level, 3.0 – 3.9 = moderate level and 4.0 – 5.0 = high level.
(3) SD = Standard Deviation

The participants would like to keep using the system for learning purposes in other units; for networking amongst friends in the future (Item #14, M=3.62; Item #15, M=3.63). They commented that “The system can help me in my learning. I can keep using the system for networking with other friends”. The participants would like to keep using the system for networking and sharing knowledge with new students even when they are already working in the industry (Item #16, M=3.65). The lowest mean score appear on item 17 in which some of the participants express negative attitudes towards keeping the system for learning and accumulating knowledge after graduating. They expressed that “After graduating, I think I may have no time to continue using this system”. However, the results still show moderate mean score (Item #17, M=3.69). Overall, the participants would be willing to use the system for future use with average mean score of $M_{WFL}$=3.62.

According to the results above, participants have positive attitudes toward the four measurements (perceived usefulness, perceived ease of use, perceived satisfaction, and willingness for future use). Participants would like to use the system because they have positive experiences in using the SNFs. Besides that, it is also because the participants are familiar with the use of SNFs such as Facebook to exchange knowledge and ideas, communicate and interact with others, and to build networking and community.

### 6.5 Discussions

From the findings above, the participants have positive perceptions towards the system than Blackboard with average mean score of $M_{all}$=3.66 (refer to Table 17). Even though StackBuffers is a new system to the participants, its functionality is relatively similar to a SNS such as Facebook. Facebook is the most popular SNS among the participants with 100.0% of the participants owning it. Therefore, the participants were easily adapted and familiar to the system. This is also because that StackBuffers provides a Facebook-like platform. This may due to participants’ positive experiences in using SNS as referred to the findings obtained from the first phase (refer to Section 4.3.5). By
integrating SNS into the system, the participants agree that it is a better learning environment than Blackboard in terms of delivering an online collaborative learning environment. It has the potential to support collaborative learning, knowledge sharing, exchanging ideas, networking and community building. Besides that, it gives variety of opportunities to the participants to communicate with others unlike Blackboard. For example, wall post, instant messaging that allows instant communication with others and it also let the participants know when others are online.

In addition, the SNFs presented in the system provide greater benefits for those with low self-esteem to present themselves in the traditional face-to-face classroom learning environment. The SNFs involved in the system motivate these participants to be more active in interaction and discussion that enable the participants to be more willing to present themselves by posting comments on each other’s walls, viewing each other’s profiles, joining groups based on common interests, commenting on other’s posts, and etc. Figure 33 shows that the participants were actively participated in a discussion topic.

![Figure 33](image)

**Figure 33:** Participants’ participations in a discussion topic

Besides that, the participants also showed huge interests in commenting a posting that was shared using media such as video as illustrated in Figure 34. The participants also showed great interests in this learning environment by using new technologies to share information and communicate in an informal way. With this learning environment, the
participants agree that it enhances their informal learning experiences and increases their interests, motivations, and learning achievements.

A survey questionnaire was created based on a reduced TAM model adopted by Masrom (2007). It is then modified based on Su et al. (2010) to measure the participants’ acceptance towards the system. According to Klamma (2006), two major critical success factors for professional learning social software are high usability and good sociability. Usability is concerned with how users interact with technology, whereas sociability is concerned with how members of a community interact with each other through the enabling technology. Based on the findings, SNFs such as wall post, photo, and video sharing in the system positively influence perceived ease of use ($M_{PEU}=3.83$) and perceived usefulness ($M_{PU}=3.82$) of the participants. This indicates that the participants’ perceived usefulness and perceived ease of use will have a positive impact on the acceptance level of SNFs as a learning tool. According to Tan and Low (2010), perceived usefulness and perceived ease of use will affect user’s attitude towards using the technology, which in turn determines the behavioral intention to use that technology. Therefore, it also indicates that the participants have positive acceptance towards the NLS. Besides that, Wong (2008) also pointed out that ease of learning is critical for beginners while ease of use becomes more important while users gain experience over time. Certainly, the system has to satisfy the learners when using the system so that it can motivate and engage the learners. The participants agree that the system is easy to access and navigate even though there is no guidance from instructor. Besides that, the participants are also satisfied with the flexible accessibility.

Figure 34: Participants' comments in a video sharing page
of the system. According to Wang (2008), availability and easy access are initial requirements for an effective online learning environment. Overall, the participants are satisfied with the system with average mean score of $M_{PS}=3.80$.

Overall, the participants have positive attitudes towards the use of the system and are willing to use it in the future with average mean score of $M_{WFU}=3.62$. However, its average mean score is the lowest mean score among the other measurements due to some negative attitudes towards the system from some of the participants such as “I’m more used to Blackboard system. Any change in learning or managing system will only mean that I have to start all over again”. They also commented that “Not many people are aware of the system”. Therefore, some of the participants suggested that “The system should get more users to make the system more active”, “It would be more effective if a lot of people are aware of this system”.
Chapter 7: Conclusions

7.1 Summary of the Research

In general, e-learning is defined as learning through electronic means. E-learning is delivered and managed by LMS, which is a software that is often utilized in education to deliver course contents to learners. E-learning has been increasingly used by many universities to support their learning activities such as making learning materials online to the learners. However, e-learning via LMS has put heavy emphasis on content delivery and technology without focusing on the social aspects of learning (Chatti et al. 2008). Van Harmelen (2006) also agreed by pointing out that traditional LMSs are not flexible enough or are not addressing to the individual learners’ needs such as their learning needs, goals, and interests. Furthermore, the nature of the learning content that is delivered by the traditional e-learning is still in a lecturer-directed and delivery-centered concept (Sharma & Kitchens 2004).

The changes of technologies and environment have eventually affected our learning methods, styles and characteristics. For example, the Internet has changed the way we obtain information through search engine. It also affects the way we interact and communicate with others. Today’s learning characteristics is becoming more social, personal, distributed, flexible, dynamic and lifelong in nature. This formation has been largely due to the availability and popularity of Web 2.0 and social software.

Web 2.0 is an umbrella term for a host of recent internet tools whilst different in form and function, all these tools share a common characteristic of supporting Internet-based interaction between and within groups, which is why the term ‘social software’ is often used to describe Web 2.0 tools and services (Selwyn 2008). The emergence of Web 2.0 and social software has changed e-learning into e-learning 2.0 where learning is perceived as a networking, social process, in which Web 2.0 and social software are used to develop a learning process through collaboration and communication in a community. Downes (2005) explained that the emergence of Web 2.0 and social software is not a technology revolution, it is a social revolution. Ehlers (2009) also further explained that e-learning 2.0 is not a replacement of e-learning, it refers to a
number of developments, trends and point of view, which require change from teaching and learning.

The main aim of this research is to develop a NLS that integrates social software tools (i.e. SNS) based on the CALP approach by Klamma et al. (2007). The CALP approach helps to overcome the limitations of traditional e-learning that is designed, authored, delivered, and managed via LMS as a statically package online and modules without focusing on the social aspects of learning such as collaboration, sharing, and community building and has put heavy emphasis on content delivery and technology (content and technology-centric model) instead. As social software continues to expand, it influences not only the learners’ learning styles and learning behaviors, but also the theories and concepts of learning processes’ design and approach. Thus, this research also studies some of the theories and concepts which are to be addressed to ensure that the NLS design will be endured.

The growing interest of social software has increased influences to the universities in making use of its tools to support their learning activities. Evidences collected from literature also show that social software affordances in relation to education. Many published research studies have so far primarily focused on the effectiveness of social software tools such as SNS, blogs, and wikis in education (Judd, Kennedy & Cropper 2010; Budhrani & Espiritu 2010; Idris & Wang 2009). However, there is a knowledge gap on perceptions of learners’ readiness and acceptance in adapting towards the NLS. Thus, there is a need to study the learners’ perceptions towards their readiness and acceptance in adapting these tools in their learning experiences, in order to benefit from the NLS. This area of study has not been studied in-depth as there are still issues regarding the learners’ readiness and acceptance in adapting towards a system that integrates social software tools. For the success of a NLS implementation there is a need to study the knowledge gap. Therefore, more focused subsidiary aims have been defined in order to achieve the main research aim: (1) to examine learners’ perceptions and readiness towards adapting the NLS, (2) to examine learners’ perceptions and acceptance towards using the NLS.

This research consists of two stages; theoretical analysis and empirical research (refer to Figure 7). The empirical research was conducted by using survey questionnaire. A
prototype system named “StackBuffers” was developed as the NLS by using open source CMS called Joomla with integration of JomSocial which is a new component that provides social networking platform and tools for Joomla. It was then implemented for usability testing on the participants in SUTS. The NLS was also used to compare with the current system (Blackboard) which has been used in SUTS. NLS is a system that integrates SNS features such as messaging, media sharing, discussions, social tagging, and social sharing and groups. To effectively integrate software tools into the NLS, the generic model proposed by Wang (2008), which consists of three fundamental elements, namely pedagogy, social interaction and technology was used as a guide and with respect to the theories and concepts discussed in the literature.

7.2 Discussions

7.2.1 Research Findings

This section provides a summary of the findings to the research questions as discussed in Section 1.4. This research’s main aim is to develop a NLS to the learners that integrates SNS and applying CALP approach. This research seeks to answer the following main research question:

What is needed to successfully implement the NLS that integrates SNS and applying CALP approach?

As social software continues to expand, it influences not only the learners’ learning styles and learning behaviors, but also the theories and concepts of learning processes’ design and approach. Thus, this research seeks to answer the following subsidiary research question in stage 1 of this research:

(A) What elements are needed in which SNS can provide to ensure that NLS design will be endured?

Social software has been becoming a great potential in teaching and learning due to its affordances. Many published research studies have discussed the affordances of social software in relation to education (refer to Section 2.2.1). This research found that the affordances of social software share some common characteristics such as it supports social network, content sharing, communication and interaction, and collaboration between individual learners in the process of gaining knowledge and learning as
illustrated in Figure 3. In this learning model, learners’ social network is mediated through the following communication and interaction nodes:

- One-to-one (learner and learner)
- One-to-many (learner and learners)
- Many-to-many (learners and learners)

With these communication and interaction nodes, learners will consequently form a CoP. CoP is a concept by Wenger (2006). It is a group of communities that shares a concern or a passion in something they do. In a learning practice, the relational aspect of knowledge and learning processes pointed out by Chatti, Jarke and Frosch-Wilke (2007) are revolving around the three components, namely knowledge and information repositories, communities and networks, and experts and knowers. In addition, to provide quality online learning experiences, Strand (2009) suggested that it is needed to intentionally facilitate an online learning environment where community components are built into. With the affordances of social software, it helps in building a supportive online learning community.

In a learning context, learner-centric model means the creations of self-organized and self-directed learning that goes beyond course and classroom centric models, and learner-directed model. It moves away from LMS to PLE, to provide a personalized learning experience to the learners. Miligan (2006) defined PLE as a system with a set of tools which is more fully supportive towards the learning process, and is more closely matched to the needs of an individual learner. These tools would give the learners greater control over their learning experience and managing their own learning. This includes providing support for learners to set their own learning goals, manage their learning, communicate with others that helps in building their own CoP, and thereby achieve their learning goals.

In addition, in today’s e-learning concept, the challenges that lie ahead are not just about bringing the course to an online learning community, but also to break through the lecturer-directed and delivery-centered limitation to create a true networked learning environment. Thus, connectivism as a learning theory which has been introduced by Siemens (2005) presents learning as a connection/network-forming process. Through connectivism, learning and knowledge are no longer restricted to a classroom and
course, but also form a CoP with experts and knowers and resources; it leads to a more resourceful learning and provides an education without boundaries to the learners.

These lead to CALP approach which integrates elements that social software affordances meet with the need in designing the NLS. The main aims of CALP are to deliver quality learning resources that are tailored to the learner’s needs, preferences, interests, skills, and learning goals. On the other hand, CALP will support knowledge sharing and community building. CALP encompasses elements discussed in Section 2.5. These elements are implemented in the NLS design and are categorized into the NLS key elements (refer to Table 6). The design of the NLS is broken into the following key elements:

1. *Personal tools and social networks* – this element is based on the PLE approach where learning tools are controlled by the individual learners based on their interests.

2. *Community building* – this element creates a social knowledge network from a group of people with similar interest to eventually form a CoP.

3. *Knowledge-pull model* – this element brings learning content to a learner’s personal space. It also enables a wide access to learning resources, both the people and the material. Therefore, the learning’s learning space is expanded and not only restricted within the classroom boundaries.

Unlike the traditional LMS (Blackboard), NLS is no longer a system for delivering learning content to the learners only (content and technology-centric model). Furthermore, the nature of the learning content that is delivered by the traditional LMS is still in a lecturer-directed and delivery-centered concept. The learners’ learning areas are limited between their educators, friends, and classmates; their learning areas are limited within their university only (refer to Figure 1). With the affordances of social software, NLS focuses on a more ‘user-centered’, ‘social networked and open communication’ learning approach (Downes, cited in Lam et al. 2009). NLS designs to engage learners into learning as a community, in which they share, exchange knowledge, interact, and collaborate with others in CoP that they have mutual learning interests and needs. In conclusion, NLS focuses on supporting the following learning elements: interaction, collaboration, community building, sharing, real-world learning, and lifelong learning. In this learning approach, it no longer depends on a single system
such as LMS as a one-size-fits all content, but it is a system which made up of learner-centric model that puts the learners at the center and gives them control of what, who, and how to learn.

In order to successfully implement the NLS, it is needed to assess readiness and acceptance of the learners in adapting to these tools. Therefore, a series of more focused subsidiary research questions have been further defined in stage 2 of this research. The subsidiary research questions are developed into two sets. The first set of subsidiary research questions measure the learners’ experiences towards e-learning and social software tools (i.e. SNS), and their level of readiness towards the NLS:

(B) What are the learners’ experiences in e-learning (LMS)?
(C) What are the learners’ experiences in social software tools (i.e. SNS)?

According to Dwyer (cited in Wong 2008), experience is needed when measuring perceptions. Therefore, the learners’ experiences in e-learning and social software are addressed to provide relevant feedbacks for the development of the NLS.

Blackboard is a good system to obtain information such as announcements and learning materials that are provided by the lecturers. However, in terms of communications, majority of the participants claim that it is difficult to communicate with others in Blackboard mainly due to the low participants. The participants commented that it is difficult to communicate in Blackboard and feel less motivated to participate in the communications in Blackboard due to its formality of context.

Besides using LMS as their learning tool, the participants also attempt to use social software tools to support in their learning activities. SNS especially Facebook is one of the highest social software tools that the participants have used as a learning tool. Participants commented that SNS plays a better learning system compared with Blackboard as SNS provides a place to share ideas and experiences with others. It also supports community building. They also suggested that Blackboard should implement SNS, which may help in enhancing their learning experiences. This shows that the participants have potential interests in using SNS in their learning activities.
(D) What are the learners’ readiness levels towards the NLS?

Four measurements that were used to examine the learners’ readiness are: online skills, self-directed attitudes, social software tools, and success factors. According to Guglielmino (in Aydin & Tasci 2005), technical readiness and readiness for self-directed learning are the two major components necessary for successful e-learning to occur. It is crucial to examine both these readiness. From the findings obtained, the participants have high level of online skills and moderate level of self-directed attitudes. The participants perceive that social software tools bring support to their learning process. They also perceive positive readiness towards the success of their learning through the NLS. In conclusion, the findings have shown that the participants are generally ready for the NLS.

In the second phase of stage 2, the following subsidiary research questions were addressed by conducting survey questionnaire after the usability testing on the prototype system (StackBuffers):

(E) What are the learners’ perceptions on the NLS compared to the traditional LMS (Blackboard)?

It is important to measure the learners’ perceptions as it will influence on their acceptance towards the NLS. The participants have shown positive perceptions towards the system than the Blackboard. The participants were easily adapted to the system due to its functionality which is relatively similar to the SNS. Functions include wall posts, messaging, media sharing, and social tagging which are very recognized by the participants in SNS. This may also due to their positive experiences in using SNS. Therefore, the participants agree that by integrating SNFs into the system makes a better learning environment than Blackboard because of its potentials to support various learning elements unlike Blackboard. Learning elements include collaborative learning, knowledge sharing, exchanging ideas, networking, and community building. In addition, SNFs provide greater benefits for those with low self-esteem to a great level that enable them to be more willing to present themselves by posting comments on each other’s’ walls, join groups based on common interest, and etc. The participants show great interests in this learning environment by using new technologies to share information and communicate in an informal way. With this learning environment, the participants agree that it enhances their informal learning experiences and increases their interests, motivations, and learning achievements.
What are the learners’ acceptance levels towards the NLS?

Survey questionnaire was created based on a reduced TAM model that was adopted by Masrom (2007). It is then modified to measure the learners’ acceptance towards the NLS based on Su et al.’s (2010) four measurements, namely perceived usefulness, perceived ease of use, perceived satisfaction, and willingness for future use. The findings have shown that SNFs such as wall post and media sharing in the system positively influence perceived ease of use and perceived usefulness of the participants. This indicates that the participants have a positive impact on the acceptance level of SNFs as a learning tool and it also indicates that the participants have positive acceptance towards the NLS. Since StackBuffers is a new system to the participants, Wong (2008) pointed out that ease of use is important while users gain experience over time. The participants commented that the system is easy to access and navigate even though there is no guidance from instructor and also its flexible accessibility of the system. Therefore, the participants have positive attitudes towards the use of the system in the future. However, the lacking of the system is the low awareness of the system to the public. Therefore, the participants perceive the system appears less active if it is to be compared to SNS such as Facebook which has been very well-known. However, this does not influence the participants’ acceptance towards using the system. The participants commented that the system should increase its awareness to make the system more active.

7.2.2 The New Learning System (NLS) Implementation

The NLS design has been based on the theoretical analysis and the findings on the learners’ readiness as discussed above. As social software continues to expand, it influences not only the learners’ learning styles and learning behaviors, but also the theories and concepts of the learning processes’ design and approach. Therefore, this research studies the theories and concepts as discussed above to ensure that the NLS design are endured.

NLS introduces the CALP approach by Klamma et al. (2007). The main goals of CALP are to place the learners at the center of their learning environment, give learners control in their learning process and deliver quality learning resources from the experts and knowers which are formed from CoP, tailoring to their needs, preferences, interests, skills, learning goals, etc. Klamma et al. (200&.) has specifically focused in using blogs
on the approach. However, Social software tools are not only restricted to blogs. According to Pettenati and Cigognini (2007), SNS is deeply rooted in our daily behaviors, interactions and conversations. This supports informal learning practices, contributing to the creation and transmission of knowledge. The social behavior and the support of its technologies and applications enable network building, which is made by the learners to form a CoP, a network which tailors their needs, common learning goals, interactions, communication, collaboration, etc within the CoP. From the findings, SNS especially Facebook is one of the highest social software tools that the participants have used as a learning tool. Participants also commented that SNS provides a place to share ideas and experiences with others and it also supports community building. With that, the participants commented that SNS plays a better learning system compared with the traditional LMS (i.e. Blackboard). Therefore, this research proposed using SNS to be included in the CALP approach.

A prototype system named “StackBuffers” was developed as the NLS. Although Facebook has proven to be one of the popular SNS among the participants in this research (refer to Section 4.3.5), Facebook was not used as the prototype system of the NLS mainly due to its complexity in learning and pedagogical context for this research. Google Wave\(^9\) is a good example of a system that has failed due to its complexity. Google wanted to enter the booming social software market and wanted to compete with Facebook and Twitter. However, the concept behind Google Wave was never clear (Akasaka 2010; Hans 2010). Akasaka (2010) also further explained the reasons why Google Wave failed because it was too complicated and contained too many features and not having the opportunity to use them has made the product even more obsolete. Therefore, a prototype system was developed to only focus its purpose in the learning context. Joomla was used as a platform for StackBuffers mainly because Joomla is an open source CMS that provides Facebook-like platform. Therefore, participants were easily adapted and familiar to StackBuffers. In addition, Joomla is claimed by Driouech, Park and Jun (2008) that it has high efficiency and good design that can be extended to be an effective educational tool.

The affordances of NLS have followed the key components of the generic model for an education system that is proposed by Wang (2008) with respect to the theories and
concepts discussed. An education system is a unique combination of pedagogical, social, and technological components as shown in Figure 5.

**Pedagogical Affordances**

The NLS has the potential to support various learning elements such as interaction, collaboration, community building, sharing, real-world learning, and lifelong learning. From the findings on learners’ acceptance, the participants agree that the NLS has the potential to support the learning elements with the support of the SNFs such as wall post, photo and video sharing. In addition, it also helps in sharing knowledge and exchange ideas with others (refer to Section 6.4).

**Social Affordances**

In terms of social affordances, the NLS supports social interaction through various types of SNFs. It supports social interaction and communication in different nodes:

- One-to-one (learner-to-learner) by using private messaging, instant messaging
- One-to-many (learner-to-learners) by using groups, discussions
- Many-to-many (learners-to-communities) by using media sharing, social tagging

From the findings, the participants commented that the NLS gives opportunities to them in communicating with others such as course mates, lecturers, peers, and etc through various types of SNFs. Features include wall posts, instant messaging, media sharing, and group. Besides that, through these different nodes, it provides broader information to the learners that are not restricted within classroom and course boundaries.

**Technological Affordances**

The NLS is a system functioning relatively similar to a SNS (i.e. Facebook). Therefore, it is easy to learn and use. Although the NLS is a new system to the participants, they were easily adapted and familiar to the system even without guidance from instructor. Besides that, it can be customized to meet the users’ various needs. For example, users can add or remove additional applications and even rearrange the position of the applications. Moreover, the NLS is free of charge and it is open to public. From the findings, the NLS with the use of SNFs has positively influenced perceived ease of use and perceived usefulness of the participants.
Based on the affordances of the three components of the generic model above, the differences between the traditional LMS (Blackboard) and the NLS are presented in Table 22.

<table>
<thead>
<tr>
<th>Pedagogical Affordances</th>
<th>Traditional LMS (Blackboard)</th>
<th>NLS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lecturer-directed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Promote content and technology-centric model</td>
<td>Learner-directed</td>
</tr>
<tr>
<td></td>
<td>Support delivery-centered concept</td>
<td>Promote learner-centric model</td>
</tr>
<tr>
<td></td>
<td>Owned by the university</td>
<td></td>
</tr>
</tbody>
</table>

| Social Affordances      | Private space, can only be accessed by a selected group of people | Public space, share by a group of people (community) |
|                        | Limited content             | Broader content |
|                        | Lecturer as peer            | Community as peer |

| Technological Affordances | Fixed interface and features | Customize interface and features |
|                          | Private                      | Public |
|                          | Use for a certain period     | Permanent use |

Table 22: Comparison of the traditional LMS (Blackboard) and LMS

In conclusion, the NLS that integrates SNS and applying CALP approach gives learners a more collaborative, community building, knowledge sharing, real-world learning, lifelong learning, and interactive learning experiences in an online learning environment which are rarely available in the traditional LMS (Blackboard). From this research, several findings were derived.

Firstly, this research found that the social software (i.e. SNS) supports social network, content sharing, communication and interaction, and collaboration which help to overcome the limitations of traditional e-learning (Blackboard) with the collaborative adaptive learning platform (CALP) approach. Therefore, SNS can be integrated into the NLS with the CALP approach to provide for a more effective collaborative learning system.
Secondly, this research also studied the importance of assessing the learners’ readiness and acceptance. The learners’ readiness and acceptance provides a better understanding on the learners’ needs for the development of the NLS and how they come to accept the NLS as well. The findings show that the participants carry positive attitudes and perceptions towards using SNS which supports sharing, interaction, collaboration, community building, personal online learning environment and experiences in the NLS. Furthermore, the participants have a positive perception on the acceptance level towards the NLS because it integrates social software (i.e. SNS) as a learning tool. The findings show that prior positive experiences and familiarity using other social software such as Facebook are the key factors that facilitate the learners’ readiness and acceptance. Therefore, to effectively design and implement a learning system, learners’ readiness and acceptance have to be seriously taken into consideration.

7.3 Recommendations for Future Research

This research was limited to one university where learners are primarily in SUTS, Kuching, Sarawak, Malaysia. Therefore, results may not be generalizable to a more culturally diverse population. Future research could look into possible findings in other countries and make a comparison of studies in learners’ readiness and acceptance. The same survey questionnaire could be used for this purpose to see how similar or different responses are from different countries. Learners in different countries might have different perceptions.

Future research could also include qualitative methods such as interviews, observations, and case studies to enable researchers to get a more in-depth view of the learners’ perceptions rather than just numerical data by using quantitative methods. Besides that, instead of using non-probability sampling method, future research could also use probability sampling methods such as stratified sampling, and cluster sampling to make details research findings more possible.

Due to time constraint, the usability testing was only conducted for a period of 12 study weeks. Future research should conduct in a longer period to obtain more information from the participants. Besides that, it could also help the system to gain more awareness from the participants to participate in the system. This helps in creating higher participations in the system and build wider networks. A further research could also
look into learners’ learning behaviors and styles. This might be beneficial to identify ways to motivate the learners to participate in the system more actively.

Since this study has now identified that the learners have positive attitudes towards the readiness and acceptance of the NLS, the future research could investigate the effectiveness on the use of the NLS. A further research could measure whether the effectiveness on the use of the NLS would help the learners in obtaining good achievement in their academic results.
Notes

1. Google Docs: www.docs.google.com
2. StackBuffers: www.stackbuffers.com
4. JomSocial: www.jomsocial.com
7. Mahara: http://mahara.org/
8. Xoops: http://www.xoops.org/
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Appendix A
Learners’ Readiness Survey Questionnaire

Social Software for Collaboration Adaptive Learning in E-learning

This survey is to investigate on the learners’ experiences in e-learning and social networking sites and also to study their perception towards the new learning system to create a collaboration adaptive learning platform (CALP) in e-learning with social software. We would like your cooperation to help us in providing information by kindly filling in the following questions.

We greatly appreciate your cooperation and time to participate in our survey.

The data gathered in this survey questionnaire will be analysed and published in academic conferences and publications such as journals. Your participation will remain anonymous and your identity will not be recorded nor revealed in any form or association.

Please ☒ that is applicable and fill or type in all the answers.

Section A: Personal Information

1. Age
   ☐ 16 – 19 (double click to activate the checkbox) ☐ 20 – 24
   ☐ 25 – 29 ☐ 30 and above

2. Gender
   ☐ Male ☐ Female

3. What is your major?
   ☐ Computing
   ☐ Multimedia and Design
   Others (please specify): _________________________

Section B: General Information on Internet Usage

4. How often that you spend time on the Internet per week? Please circle your most applicable answer.

   1  2  3  4  5
   Never Everyday

5. What is your purpose of using Internet? Please select all that apply.
   ☐ For educational purposes
   ☐ For research purposes
   ☐ For personal purposes
   Others (please specify): _________________________
6. How do you mostly search information from? Please select all that apply.
   - Internet
   - Library
   - Experts
   Others (please specify): ___________________________

Section C: Experiences in E-learning and LMS
E-learning is defined as learning through the use of networked and communication technology. E-learning is delivered through learning management system (LMS), example like Blackboard.

7. How often that you log into Blackboard per week? Please circle your most applicable answer.
   - 1 2 3 4 5
   Never          Everyday

8. What is your purpose of logging into Blackboard? Please select all that apply.
   - It’s required by the lecturers
   - Access learning materials
   - Able to connect with my other classmates and lecturers
   - To update on announcements
   Others (please specify): ___________________________

9. How easy/difficult is it for you to communicate with others in Blackboard?
   - Easy
   - Somewhat easy
   - Somewhat difficult
   - Difficult
   Why?
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________

10. What limitations or problems did you encounter while using Blackboard?
   ____________________________________________________________
    ____________________________________________________________
    ____________________________________________________________

11. What benefits have you gained from learning through Blackboard?
    ____________________________________________________________
    ____________________________________________________________
    ____________________________________________________________

12. What other improvements or features would you like to suggest to be implemented in LMS to enhance learning?
    ____________________________________________________________
    ____________________________________________________________
    ____________________________________________________________
Section D: Experiences in Social Networking Site(s)
Social networking site (i.e. Facebook) is an example of social software tools that helps to enable people to meet, connect or collaborate with other users through computer-mediated communication and to form online communities.

13. Are you a user of any social networking site(s)?
   □ Yes (please continue)
   □ No (please proceed to Section E)

14. Which social networking site(s) user are you? Please select all that apply.
   □ Facebook
   □ MySpace
   □ LinkedIn
   □ Twitter
   □ Multiply
   □ DeviantART
   Others (please specify): _________________________

15. How often that you log into your social networking site(s) per week? Please circle your most applicable answer.

   1  2  3  4  5
   Never    Everyday

16. What is your purpose of owning the social networking site(s)? Please select all that apply.
   □ Keep in touch with friends
   □ Meeting new friends
   □ Reunion with old friends
   □ Building professional community and networks
   □ Build profile CV
   □ Commercial opportunity
   □ Communicate and share ideas with others
   □ It is interesting and fun
   □ It is a necessity
   Others (please specify): _________________________

17. How easy/difficult is it for you to communicate with others in your social networking site(s)?
   □ Easy
   □ Somewhat easy
   □ Somewhat difficult
   □ Difficult

   Why?
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________

18. What limitations or problems did you encounter while using any of the social networking site(s)?
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
Appendix A Learners’ Readiness Survey Questionnaire

19. What benefits have you gained from social networking site(s)?
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________

20. What other improvements or features would you like to suggest to be implemented in social networking site(s) to enhance learning?
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________

21. What do you think of the privacy issue in social networking site(s)?
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________

Section E: Learners’ Readiness
This section will be testing on the learners’ readiness in adapting to the new learning system.

Please read the following statements below carefully and select (X) only one of your most applicable answer.

1 – Strongly Disagree  2 – Disagree  3 – Not Sure  4 – Agree  5 – Strongly Agree

<table>
<thead>
<tr>
<th>Online Skills</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have the basic skills of finding my way around the Internet.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I think that I would be comfortable using a computer several times a week participate in an online discussion.</td>
<td></td>
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<tr>
<td>I think that I would be able to express myself better (i.e. mood, emotions and humor) through online writing.</td>
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<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Self-Directed Attitudes</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I think that I would be able to remain active and motivated even though there is no guidance from instructor.</td>
<td></td>
<td></td>
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<tr>
<td>I think that I would be able to control over my learning process and deliver quality learning resources based on my needs and interests.</td>
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</tr>
<tr>
<td>I think that I would be able to learn more effectively through online interaction and collaboration with others (i.e. experts).</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>I think that I would have the ability to interact online with others even though I might not know them in the first place.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>I think that I would have the ability to interact with others even though physical contact is not available.</td>
<td></td>
<td></td>
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<tr>
<td>I think that I would be able to follow and learn along with an online discussion created by others.</td>
<td></td>
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<tr>
<td>I think that I would be able to provide timely responses to others.</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Social Software Tools Support</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I think that I would be able to use online social software tools</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

129
(i.e. blogs, forums, social networking, etc) to communicate and work on an assignment with others who are in different time zones.

I think that I would be able to ask questions and make comments through online social software tools.

I think that I would be able to carry on a conversation with others using online social software tools.

I think that learning through online social software tools enable me to access wider learning resources both people and materials.

I think that I would be able to form a wider network with a group of people with similar knowledge and interests through online social software tools.

I think that online social software tools allow for interaction, sharing and thinking together with others.

I think that online software tools are an efficient means of communicating with others.

I think that online social software tools will enable learning to be more social, personal, distributed, flexible and lifelong in nature.

<table>
<thead>
<tr>
<th>Success Factors</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular contact and support from the others (i.e. experts, peers, etc) is important to my success in learning.</td>
<td></td>
<td></td>
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<tr>
<td>Experts not only a source of knowledge as they are also advisers who can provide guidance, corrective feedback and performance assessment.</td>
<td></td>
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<tr>
<td>Frequent participation throughout the online learning process is important to my success in learning.</td>
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<tr>
<td>I feel that integrating my learning experiences with real-world and lifelong learning is important to my success in future.</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

22. What are the social software tools have you used in learning? Please select all that apply.

- [ ] Discussion forums
- [ ] Chats or Video conferencing (i.e. MSN Messaging, Skype)
- [ ] Blogs or Online Space (i.e. Blogger)
- [ ] Social networking sites (i.e. Facebook, Twitter)
- [ ] Wikis or other collaborative writing tools (i.e. Writely)
- [ ] Social bookmarking (i.e. del.icio.us, digg)
- [ ] Multimedia (i.e. Flickr, YouTube)
- [ ] No, I don’t use any

23. How important is it to you to have the following elements in learning. Rate each of the following, with 1 being not important and 5 being very important.

- [ ] Collaboration and Interaction
- [ ] Interests and Needs
- [ ] Knowledge and Ideas Sharing
- [ ] Networking and Community Building
- [ ] Real-world Learning
- [ ] Lifelong Learning
24. What features would you like to suggest to be implemented in this new learning system (social software that relate to learning) to enhance learning?

______________________________________________________________________
______________________________________________________________________
______________________________________________________________________

25. Do you think this new learning system should be private or publicly accessible?
   □ Private    □ Public

26. Would you like to try this new learning system if offered?
   □ No       □ Maybe    □ Yes

~Thank you for your collaboration~
Appendix B

Learners’ Acceptance Survey Questionnaire

Social Software for Collaboration Adaptive Learning in E-learning (II)

First of all, thank you for participating in the usability testing on the system, StackBuffers (www.stackbuffers.com). This second part of the survey is to evaluate your experiences in using the system and your acceptance towards the system as a learner. We would like your cooperation to help us in providing information by kindly filling in the following questions. We greatly appreciate your cooperation and time to participate in our survey.

The data gathered in this survey questionnaire will be analysed and published in academic conferences, publication in journals and Masters Dissertation. Your participation will remain anonymous and your identity will not be recorded nor revealed in any form or association.

Please ☑ that is applicable and fill or type in all the answers.

Section A: Personal Information

1. Age
   - ☐ 16 – 19
   - ☐ 20 – 24
   - ☐ 25 – 29
   - ☐ 30 and above

2. Gender
   - ☐ Male
   - ☐ Female

3. What is your major?
   - ☐ Computing
   - ☐ Multimedia and Design
   - Others (please specify): _________________________________

Section B: Learner’s Feedback on the System

This section is to evaluate on the learners’ experiences on the system in comparison with Swinburne's current learning management system (i.e. Blackboard). Please read the following statements below carefully and select (X) only one of your most applicable answer.

1 – Strongly Disagree  2 – Disagree  3 – Not Sure  4 – Agree  5 – Strongly Agree

<table>
<thead>
<tr>
<th>Statement</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I think create an online collaborative learning environment through social software is a good idea.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>I think the system supports collaborative learning, knowledge sharing, exchange ideas, networking and community building.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>I think the system helps me to organise and exchange my personal knowledge with others (i.e. course mate, lecturers, peers, etc).</td>
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<td></td>
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</tr>
<tr>
<td>I think the system gives me opportunity to communicate with others.</td>
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</tbody>
</table>
I think the system supports personalised learning resources which are able to connect people with right knowledge and deliver quality resources that are tailored to my learning preferences and goals.

I think the system gives me more control over my learning process.

I think the system delivers enhanced informal learning experiences.

I think the system increases my interest, motivation and learning achievement in a collaborative learning environment.

I prefer the system better than the current learning management system (i.e. Blackboard).

4. Please give your overall opinions on the system.

5. Please give your overall opinions on the system in comparison with Blackboard.

Section C: Learner’s Acceptance of the System
This section is to evaluate how learner comes to accept and use of the system.
Please read the following statements below carefully and select (X) only one of your most applicable answer.

1 – Strongly Disagree  2 – Disagree  3 – Not Sure  4 – Agree  5 – Strongly Agree

<table>
<thead>
<tr>
<th>Perceived Usefulness</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I think using social networking features (SNFs) (i.e. wall post, photo and video sharing) in the system are useful to share knowledge and exchange ideas with others (i.e. course mates, lecturers, peers, etc).</td>
<td></td>
<td></td>
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<tr>
<td>I think using SNFs in the system are useful for conversation and interaction through discussions (i.e. ask questions and make comments on a topic) with others.</td>
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<tr>
<td>I think using SNFs in the system are useful to support networking and community building with others.</td>
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</tbody>
</table>
Appendix B

Learners’ Acceptance Survey Questionnaire

Overall, I think using SNFs in the system are useful to my learning activities and performances.

For all the answers above, please state your overall reasons why?

<table>
<thead>
<tr>
<th>Perceived Ease of Use</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I think it is easy to share knowledge and exchange ideas in the system through video and photo sharing.</td>
<td></td>
<td></td>
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<tr>
<td>I think it is easy to communicate and interact with others in the system through wall postings, discussions and chats.</td>
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</tr>
<tr>
<td>I think it is easy to network and create a community with others in the system.</td>
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<tr>
<td>I think the system is easy to access and navigate to find my way (i.e. to find the right buttons) in the system.</td>
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<tr>
<td>I think it is easy to use the system even though there is no guidance from instructor.</td>
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</tbody>
</table>

For all the answers above, please state your overall reasons why?

<table>
<thead>
<tr>
<th>Perceived Satisfaction</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am satisfied with the sharing knowledge and exchanging ideas features in the system (i.e. wall post, photo and video sharing).</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>I am satisfied with the communication and interaction with others in the system through discussions, wall posts and chats.</td>
<td></td>
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</tr>
<tr>
<td>I am satisfied with the networking and community with others in the system.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>I am satisfied with the flexible accessibility of the system anytime and anywhere.</td>
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</tr>
</tbody>
</table>

For all the answers above, please state your overall reasons why?

<table>
<thead>
<tr>
<th>Willingness for Future Use</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would like to keep using the system for learning purposes in other units.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would like to keep using the system for networking amongst my friends in the future.</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
I would like keep using the system for networking and sharing knowledge with new students when I’m already working in the industry.

I would like to keep using the system for learning and accumulating knowledge even after graduating.

For all the answers above, please state your overall reasons why?

6. Any other suggestions or improvements would you like to recommend on the system?

- Thank you for your collaboration -
Appendix C

Ethics Clearance Approval Letter

SUHREC Project 2010/064 Ethics Clearance
Kaye Goldenberg [KGOLDENBERG@groupwise.swin.edu.au]
Sent: Tuesday, June 08, 2010 12:42 PM To: Gregory Lik Hoo Wee; Serena Shing Yin Sim

To: Mr Gregory Wee Lik Hoo, Sarawak; Ms Serena Sim Shing Yin,

Dear Mr Wee Lik Hoo and Ms Sim Shing Yin,

SUHREC Project 2010/064 Social Software for Collaboration Adaptive Learning in E-Learning
Mr Gregory Wee Lik Hoo Sarawak; Ms Serena Sim Shing Yin Approved Duration: 08/06/2010 To 08/06/2011 [Adjusted]

I refer to the ethical review of the above project protocol undertaken on behalf of Swinburne’s Human Research Ethics Committee (SUHREC) by SUHREC Subcommittee (SHESC4) at a meeting held on 30 April 2010. Your response to the review, as e-mailed on 13 May was put to a nominated SHESC4 delegate for consideration.

I am pleased to advise that, as submitted to date, the project has approval to proceed in line with standard on-going ethics clearance conditions here outlined.

All human research activity undertaken under Swinburne auspices must conform to Swinburne and external regulatory standards, including the National Statement on Ethical Conduct in Human Research and with respect to secure data use, retention and disposal.

The named Swinburne Chief Investigator/Supervisor remains responsible for any personnel appointed to or associated with the project being made aware of ethics clearance conditions, including research and consent procedures or instruments approved. Any change in chief investigator/ supervisor requires timely notification and SUHREC endorsement.

The above project has been approved as submitted for ethical review by or on behalf of SUHREC. Amendments to approved procedures or instruments ordinarily require prior ethical appraisal/ clearance. SUHREC must be notified immediately or as soon as possible thereafter of (a) any serious or unexpected adverse effects on participants and any redress measures; (b) proposed changes in protocols; and (c) unforeseen events which might affect continued ethical acceptability of the project.

At a minimum, an annual report on the progress of the project is required as well as at the conclusion (or abandonment) of the project.

A duly authorised external or internal audit of the project may be undertaken at any time.

Please contact me if you have any queries about on-going ethics clearance. The SUHREC project number should be quoted in communication. Chief Investigators/Supervisors and Student Researchers should retain a copy of this e-mail as part of project record-keeping.

Best wishes for the project.
Yours sincerely

Kaye Goldenberg
Secretary, SHESC4
******************************************************************************
Kaye Goldenberg
Administrative Officer (Research Ethics) Swinburne Research (H68) Swinburne University of Technology