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THE EFFECT OF SOCIAL NETWORKS ON STUDENT'S ACADEMIC GROUP PERFORMANCE IN A COLLABORATIVE LEARNING ENVIRONMENT

[1]ARASH BAYAT SHAHBAZI, [2*]NOORMINSHAH A.IAHAD, [3]NORASNITA AHMAD, [4]ABDELSALAM BUSALIM

[1]Student, Faculty of Computing, Universiti Teknologi Malaysia, Malaysia
[2*]Associate Professor, Azman Hashim International Business School, Universiti Teknologi Malaysia. Malaysia (Corresponding Auhor)
[3]Doctor, Professor, Azman Hashim International Business School, Universiti Teknologi Malaysia. Malaysia
[4]Doctor, National College of Ireland, Ireland
Email: [1]arash.bsh@gmail.com, [2*]minshah@utm.my , [3]norasnita@utm.my, [4]busalim.86@gmail.com.

ABSTRACT

For years universities and colleges have been proposing new methods to enhance students' skills for team working. The development of information and communication technology plays an important role in increasing the effectiveness and efficiency of tasks such as teaching and learning. One of the factors that have been proven to affect performance using information technology (IT) is Task Technology Fit. It has also been shown that Collaborative Technologies such as social networks can be an effective tool to encourage students to engage in communication, express their opinions and challenge the ideas of others. This study attempt to alleviate the literature gap, regarding the effect of social networks on student's academic group performance in computer supported collaborative learning (CSCL) environment in the context of Malaysia. A questionnaire was developed based on the Technology to Performance Chain model and it was used as the main data collection method for this study, in order to investigate how social networks can influence students' group performance in a CSCL environment. The questionnaire was distributed among 129 students in one of the Malaysian public universities. User Satisfaction was added to this model as a new construct, and instead of the common learning management systems, a Social Network (SN) platform (Edmodo) was used. Edmodo was introduced to the students in the beginning of the semester and they were asked to use it in their studies as an e-learning platform. The result obtained from this study, showed that task technology fit has a strong influence on performance impact. Expected consequences of the use did not affect the performance, and social norm plays an important role in performance impact, contrary to common belief. However, user satisfaction did not have a direct influence on performance but an indirect one by increasing SN Utilization.

Keywords: *Information Technology, Technology to Performance Chain, Task Technology Fit, Collaborative technology, Computer supported collaborative learning.*

1. INTRODUCTION

Over recent years, advances in and the popularity of the social networks has encouraged universities and lecturers to use this technology in the educational process. Recent developments including advances in internet and social network sites, have influenced the methods of teaching and learning worldwide [1][2]. Social networking technologies have been used to create a knowledge-based learning environment and improve the students' experience in collaborative learning [3]. Educators (instructors) are focusing on using social networking applications to establish a knowledge-based environment for students to enhance their learning experience [2][3][4].

Nowadays, Learning Management Systems (LMS) are widely used to enhance the process of teaching and learning [5]. For example, Moodle is a popular LMS used by educational organizations and universities. Moodle can be customized according to the organization's needs, and it is open source [6]. Lack of human resources, not being user

friendly and not encouraging student collaboration hinder students' sense of belonging to a community; however, it is very important that e-learning platforms motivate students to communicate and participate.

Moodle is mostly used for uploading and file sharing and students do not always use the study materials available; students prefer to use this LMS for email integration, scheduling and calendar [7]. They need proper motivation to hold their interest and continue learning [8]. Millions of people worldwide use social media every day for various reasons; most of them young people and college students. Because of their popularity, social networks are used by some universities as a tool for communicating with current and potential students. Lecturers employ social media to create an effective academic environment for their students by having a better communication method and also engaging them in a community [9]. Students can use social networks to learn how to solve problems collaboratively with other members of their group or to create collaborative study groups [10]. They can expand their relationships with fellow students through active communication, in order to achieve a particular goal [10].

Many researchers have discussed the benefits of using social networks (SNs) in the learning environment, as these sites are an increasingly important part of students' everyday lives, so understanding the influence that technology has on the learning process is necessary [11]. Even though most universities have the infrastructure to support a social network presence, some are still sceptical about adopting and accepting this technology as an educational tool [12]. Social network sites such as Facebook are not considered as an appropriate and useful asset for teaching and learning because the main purpose of their design is socialization [13]. Moreover, students tend not to use SNs for academic purposes, mainly because they prefer to separate their learning experience from their social life. Balakrishnan and Fanda [14] concluded that the rate of student dissatisfaction with their e-learning systems is high. Other studies on online learning systems indicated that the most important barrier to student learning is the lack of social interaction when they are asked to use LMS [15][1][16].

A constant concern in information systems use and research has been how to better understand the linkage between information systems and individual performance [17].

In computer supported collaborative learning (CSCL), teams are defined as groups of people working interdependently with a shared purpose, not necessarily in the same space or at the same time. However, the team's success and members' satisfaction are positively correlated to the appropriate selection of enabling technology. In virtual environments when the offered technology is a good match for the task in hand more knowledge is shared and performance is higher [18].

Prior research on technology and team performance concludes that fitting the technology to the tasks influences team performance. The results show that the fit predicts performance: teams with better-fitting technology perform better that teams using poor-fitting technology [19].

Studies have also found that many students who perceived e-learning courses as being difficult reported technical challenges to their learning experience [20], indicating that the technology is a critical aspect of the online learning experience.

To choose a suitable technology for the CSCL environment, it is important to consider the CL objective and CL task, to identify the level of complexity and sophistication, so the appropriate fitting technology can be determined, supporting the CL process and further affecting the CL outcomes [21].

Jang et al. [22] found no significant differences in performance between students enrolled in two environments, with and without virtual learning, except that the former group reported being less satisfied with the learning process. Conversely, Chou and Liu [23] showed that students in the virtual learning environment achieved better learning performance and higher levels of satisfaction.

Johnson and Randall [24] concluded that there was a gap between students' preferred approach to learning and the approach which was implemented in LMS. They participated less in online discussion, were less satisfied with the course, and performance was low.

Learning performance in different learning management systems has been captured through a

variety of measures with conflicting results. In other studies [25] it was found that students using an Asynchronous Learning Network submitted higher quality and longer reports than those working individually. However, Franklin and Nahari [26] found that students who worked face-to-face outperformed those who used e-learning for their activities.

Nowadays social networks have become one of the most popular e-learning platforms for collaborative learning [9]. These sites are vital to create a collaborative environment for learners in order to share their ideas and knowledge and increase their engagement and interaction [27][28]. For example SN are being used in virtual classrooms instead of traditional classrooms particularly for teaching language, and to encourage students skills such as communication, problem solving and etc. [29].

There are many studies regarding social networks which most of them focused on privacy [30], psychology [31], health [32], marketing [33] and etc. Regardless of all the studies regarding social networks, studies that investigate the effect of social network on student academic group performance in computer supported collaborative learning environment is still lacking, especially in Malaysia, so far the focus of the studies were on developed countries such as United states, Australia and United kingdom [9] (Al-Rahmi et al., 2018).

The above mentioned facts are the main reason that the authors decided to conduct this research in Malaysian context. This study tries to mitigate the gap in the literature by examining the factors that affect students' academic group performance in CSCL environment using social networks.

There is a lack of research in social network utilization in collaborative learning which use an instrument model to measure the factors [9][34][35][36] and there is also lack of models utilization in order to understand the effect of social network usage on academic group performance in higher education in Malaysia [37][9].

The main research question for this study is therefore how students' group academic performance in an online collaborative environment can be affected by Task Technology Fit.

The main purpose of the research is to develop a model that can present the factors influencing students' performance in a collaborative learning environment, especially the impact of using social networks as an e-learning platform. Edmodo is employed as the social network learning platform in this study for its popularity, many features and its similarity to Facebook which makes it easy for the students to connect with. These advantages have transformed an e-learning platform into a pleasant environment for users.

This study focus on the factors that influence academic group performance in CSCL environment and the effectiveness of social network learning platforms which are designed for teaching and learning on performance impact.

2. LITERATURE REVIEW

The rapidly accelerating progress of IT worldwide [38][39] includes sophisticated advances in data storage and transmission in various sectors, including education [40][41].

In line with these developments, learning activities are steadily progressing towards the digital world [18]. The impact of technology on the learning process and learning methods is increasing; therefore, a system is needed that brings together several skills in one place.

Using technology in the learning process, especially in group learning, encourages the creation of innovative learning models [42]. In fact, technological progress in the world of education can develop students' abilities and one of these technologies is e-learning [19].

Through e-learning, learning transactions can be innovative and interesting; the learning process has changed from students only listening to their lecturers and the course materials, to an interactive process in which students and lecturers cooperate in and out of the classroom [18][43]. Collaborative learning can facilitate students' learning process.

2.1 Social Networks and Learning

Social network (SN) is a web-based service which allows users to create public or private relationships with others based on their interests. Nowadays everybody knows SN because of Facebook, Twitter, LinkedIn, etc. although it became popular as early as 1997 with

Sixdegree.com. SNs' popularity and their users have grown significantly since 2003. Hundreds of millions of people are using SN technologies which are free, fun to use and engaging. Using this technology for teaching and learning could be useful and can increase social interaction [10][44][45].

In the context of higher education the functionalities such as ease of access, flexibility, ease of use, etc. have made social networks an appealing learning tool [45][46]. Some researchers have suggested that social network technologies can create a useful approach in learning, offering greater potential than the traditional learning environment [47]. They create flexible learning; make publication easy and enable reuse of learning content and materials; lecturers and students can follow links to related sources, and all of these will be in an environment that can be managed by the students and lecturers [10][48][45].

Hamid et al., [10] stated that social network sites can directly and indirectly support learning, for example through validation of creative work, and school life transition by peer alumni. They also mimic civic and social benefits. Popescu and Ghita [49] concluded that social networking can lead to a successful teaching and learning experience, showing that social network sites have educational potential. The findings of another study [50] showed that using Facebook in classes can increase both students' bonding and learning and it is important for social affiliation and productive learning.

Social networking plays a major role in enhancing academic activities. Many studies (including those mentioned above) have discussed the element of using social networking in both academic and social environments [9]. Social networks are used in the academic context in different ways. Undergraduate Information Technology students confirmed that social networks enhanced their academic achievements, and other studies also showed the effectiveness of social networks in education [49][50][51]. Using social networking technologies increases interaction and educational access, reducing the learning gap between the lecturer and students [50].

2.2 Edmodo a Social Media Learning Platform

Edmodo, available at www.Edmodo.com, was introduced by Borg and O'Hara in 2008. It is a private and free social network website similar to Facebook and therefore easy for students to connect and work with their teachers and other students online [52]. It offers privacy to both teachers and students by allowing only the teacher to create and manage a classroom and only their students to register and access the class materials. Third-party participation and spying are not possible [52].

There are different interfaces for students and teachers. General interface and tools are the same, but there is some extra functionality on the teacher's side. The first action that the teacher is offered is creating a classroom or group and asking the students to join it with their unique code. For teachers each group has different kinds of options that can be managed, such as: the ability to delete or archive a group, and whether a comment or post can be shared by all the students or by a specific sub-group. Communication is the same; the board (communication tool) can be shared by a group or by individual students [53].

There are four kinds of communication available for teachers: (1) message, (2) alert, (3) assignments and (4) vote. From a digital library, a link or a file can be attached to each type of communication. However, communication is different and more limited in the student's section. There is a calendar section that both parties can use; students can see due dates of deliverable material set by the teacher. Each student has 100 MB of storage space. Erdemir and Eksi [54] used Edmodo in their research to evaluate the perception of teachers and students about using an online learning environment in a flipped classroom. The result shows that Edmodo is good at training both students and teachers, increasing their collaborative working and controlling their learning environment. Trisniawati, et al. [5] Used Edmodo for teaching mathematics in an elementary school, and concluded that students' learning interest in mathematics was increased through its use.

2.3 Technology to Performance Chain and Task Technology Fit

Goodhue and Thompson [17] stated that "for information technology to have a positive impact on individual performance it must be utilized and also it should fit the task in hand". Generally, Task Technology Fit (TTF) is the perception of each individual of how technology supports a task and how useful it is. The most important link between Information Systems and

performance is TTF. When the technology provides features which are required to complete a task, and it also meets the user's expectations, utilization will increase and influence the user's performance.

In order to understand which factors can influence and change students' outcomes from a learning management system, using a model that has shown great potential for prediction of IS success is important and useful. The Technology to Performance Chain (TPC) presented by Goodhue and Thompson [17] is one such model.

Goodhue and Thomson [17] mentioned that a successful information system must consider both the task that users are using the technology to perform it and the fit between the technology and task. Based on their definition, the TTF is defines as the degree that a technology can help users in performing a task and achieving their goals. In the scenario of social network learning platform (SNLP) utilization, TTF refers to the ability of social network learning platform to support and help the students in their learning activities. TPC model was developed in order to make an effective use of IT [55].

Technology to performance chain uses the knowledge from studies on user attitude toward the use as a utilization predictor combine with the idea of TTF as a performance predictor. In basic it can be described as: "for technology to have a positive effect on performance it must be a good fit to the task and also it must be used.

There are different models that can be used in order to evaluate the utilization of social network learning platforms, such as Technology Acceptance Model (TAM) that at the end measures the actual use of a system. TAM is one of the most wildly used models in information system research to examine the attitude toward use and intention to use of a system. But in this research the authors decided to use Goodhue and Thompson [17] Technology to Performance Chain model that predicts the effect of technology and precursors of utilization which includes attitude toward using a system. By using TPC model, authors were able to measures the social network learning platform utilization as well as the effect of technology and utilization on performance impact.

McGill and Klobas [55] conducted a study to understand the influence of TTF on students' performance in LMS using the TPC. They found a strong relationship between TTF and performance, which had a huge influence on the impact of LMS on learning. Goodhue and Thompson [17] explained that for an information system to succeed, it needs to recognize both the task and the fit between the task and the technology that is being used. They defined TTF as "the degree to which a technology assists an individual in performing his or her portfolio of tasks". Goodhue and Thompson developed TPC to give users and organizations a better understanding of IT and make better use of it.

3. RESEARCH MODEL AND HYPOTHESES

The research model tested in this study was developed by extending the Technology to Performance Chain model which McGill and Klobas [55] used in their research. Two constructs were added to the original model and their effects on group performance were evaluated: social network utilization and user satisfaction. The former was used because this study aims to identify the effect of social networking on group learning, and the latter was added in order to examine its effect on performance and utilization. Based on the previous studies [56][9] satisfaction has a positive effect on students' outcomes.

This model aims to identify the factors that affect students' academic performance in group work using SN as an e-learning platform. Research questions and hypotheses are presented below, based on previous research that used TPC. The initial model for this study is presented in Figure1, following presentation of the hypotheses.

One of the construct of precursor of utilization is the Expected Consequence of the use. Triandis [57] introduced the effect of expected consequence on behaviour. Goodhue et al.[58] did not test this effect but later it was confirmed that expected consequence of use has a strong positive effect on utilization. In 2004 Staples and Seddon [59] concluded that this relationship only exists when the usage is voluntary.

Expected consequence of use refers to the user's expectation and results from using the system. It explains what users will receive and accomplish from the system [55]. The concept of expected consequence of use to affecting behaviour was introduced by Triandis [57], although Goodhue and Thompson did not test this relationship [58][17] In the research conducted by Thompson et

al. [60] it was discovered that expected consequence of use has a strong influence on utilization; it was later shown by Staples and Seddon [59] that where the use is voluntary the expected consequence of the use has a positive impact on utilization. Thus, it is hypothesized that:
H1: Expected consequence of use has a positive influence on SNLP utilization.

Attitude explains the unfavourable and favourable behaviour of people towards a certain object [61]. Although attitude towards an object does not necessarily guarantee a specific behaviour toward that object, the thing that can predict a specific behaviour toward a subject is attitude toward specific behaviour. So instead of attitude toward SNLP we have used attitude toward SNLP use. In the technology to performance chain, Goodhue and Thompson [17] proposed that attitude toward the use of the system can be a predictor of utilization. The results of previous studies are mixed. It was discovered that attitude toward the use affected intention to use the World Wide Web at work [62]. Staples and Seddon [59] considered the use of a library cataloguing system by staff and the use of spreadsheet and word processing software by students, but did not find any relationship. Based on Goodhue and Thompson's TPC and despite the different opinions and results regarding the role of attitude, it is hypothesized that:
H2: Attitude towards SNLP has a positive influence on SNLP utilization.

Social Norm represents the users' belief about whether the important people in their lives expect or want them to perform a certain behaviour. These other people, in the case of students using social network sites, could be other students, friends and family and etc. As with the role of attitude in the success of information systems, the results about social norm are mixed. Venkatesh and Davis [63] found that utilization can be influenced by social norm, while other authors have found that it does not influence intention to use [64]. It was argued by Venkatesh and Davis [63] that social norm can only influence the result in cases where usage is mandatory. This finding is consistent with the research Staples and Seddon [59], who also found that when usage is mandatory utilization can be influenced by social norm, but in the voluntary environment it does not have any effect.

There have been few investigations regarding the role of social norm in e-learning, since generally it is unclear how social norm can influence a system [65]; investigation of its role is therefore considered important in this study. So, it is hypothesized that:
H3: Social norm has a positive influence on SNLP utilization.

Usage and performance can be influenced by many conditions regarding the support that users receive for the system, such as relationship of the user with support staff, ease of access to the system, etc. DeLone and McLean [66] discussed the importance of facilitating condition in their updated information system success model. The role and importance of support in e-learning success has been discussed by other authors [67][68]. Chang and Cheung [62] found that a facilitating condition has a positive influence on utilization, although no similar effect was found by Staples and Seddon [59].

In another study by Ngai et al. [69] regarding the adoption of LMS in the e-learning domain, it was found that a facilitating condition has a strong influence on attitude towards use (although the effect was indirect). So, it is hypothesized that:
H4: Facilitating conditions have a positive influence on SNLP utilization.

Performance impact is described as how the system affects the user's outcome or their behaviour. The key component of TPC is the influential role that TTF plays in performance impact, and many researchers have confirmed this [70][71][72]58][17][59]. The impacts most commonly considered in information systems success research relate to management performance and decision making [73]. Performance impact in the LMS realm can be considered as a change in academic results or the student's perception regarding how successful they are among their peers in the classroom. Measures like performance impact are frequently used as surrogates to measure the actual performance [73]. So, it is hypothesized that:
H5: Task technology fit has a positive influence on performance.

User satisfaction is referred to the user's evaluation of their experience in using IS. User satisfaction can be increased by any technology that can meet the users' needs [74]. In previous studies [75][74][65], the relationship between user satisfaction and system usage has been discussed,

with mixed results; some researchers believe that when users are satisfied with the system performance or generally with the system interface etc., they will continue to use it; if they are not satisfied they will stop and not come back, unless the usage is mandatory. In this research we decided to test the effect of satisfaction on utilization, so it is hypothesized that:

H6: User satisfaction has a positive influence on SNLP Utilization

As already explained, when users are satisfied with the system, they tend to use it more; from TPC we know that utilization directly influences user performance, so we can conclude that higher, voluntary utilization means higher performance [74][75][76]. It is therefore hypothesized that:

H7: User satisfaction has a positive impact on performance.

Another key component of TPC is the positive effect of utilization on performance, although the results regarding this relationship are also mixed. Goodhue and his colleagues support the existence of this relationship [58][17], as do D'Ambra and Wilson [70].

Therefore, it is hypothesized that:

H8: SNLP utilization has a positive influence on performance.

In TPC we can see that TTF positively influences expected consequence of use, meaning that a good task technology fit can create a more positive expected consequence of use. In the SNLP usage context, the expected consequence of students could be improving their performance and the ability to complete their study easily and quickly.

The relationship between TTF and expected consequence of use was not tested in the original study by Goodhue and Thompson [17], nor in their later study [58]. They assumed the existence of the relationship between TTF and expected consequence of use and drew a direct link between them [55]. The relationship was tested many years later by Staples and Seddon [59], who confirmed that TTF positively influences expected consequence of use. Hence it was it is hypothesized that the same relationship can be shown in the SNLP utilization context.

H9: Task technology fit has a positive influence on expected consequences of SNLP use.

Fishbein and Ajzen [77] declared that "An attitude is a positive or negative evaluation of an object or behaviour". They argued that a behaviour towards an object cannot specifically be predicted by the attitude towards that object, the thing that predicts whether the behaviour is performed or not, is the attitude toward a specific behaviour. Based on their argument, rather than the attitude towards SNLP, it is the attitude toward the use of SNLP that is investigated in this research. The relationship between TTF and attitude toward use was not proposed in the original model of Goodhue and Thompson [17], although it was covered later by Goodhue [58].

This relationship was later tested by Staples and Seddon [59], confirming Goodhue's theory that attitude toward use can significantly be affected by task technology fit, in the environment that the usage of the system is mandatory and not optional. Use of LMSs in the classrooms is increasing significantly and it is becoming a part of the teaching and learning process, so students' use of LMSs is largely mandatory in universities [55]. Thus, it is hypothesized that:

H10: Task-technology fit has a positive influence on attitude towards SNLP use.

One of the factors that can measure the quality of a system is user satisfaction. It has been identified as one of the factors that can determine the effectiveness and success of an academic program.

Based on the previous study technology can play an important role in determining user satisfaction [21]. With advancement in the usage of internet and information technology in teaching and learning, e-learning opens new doors for communication, collaboration and has changed the methods of delivering course materials and etc. Usage of LMS has increased the students ability to access the materials and its flexibility, reduced the geographical barriers, and improved convenience and effectiveness for individual and collaborative learning.

However, LMS has some negative points such as lack of interaction and peer contact, high initial costs, substantial costs for system maintenance and updates, and students in virtual learning environment can experience the feeling of isolation, not belonging to a community, frustration and confusion and subsequently lose interest in the subject matter [21][78][79]. With the concerns and

dissatisfaction with e-learning, educators are searching for alternative instructional delivery solutions to relieve the above problems. Thus it was hypothesized that:
H11: task-technology fit has a positive effect on user satisfaction.

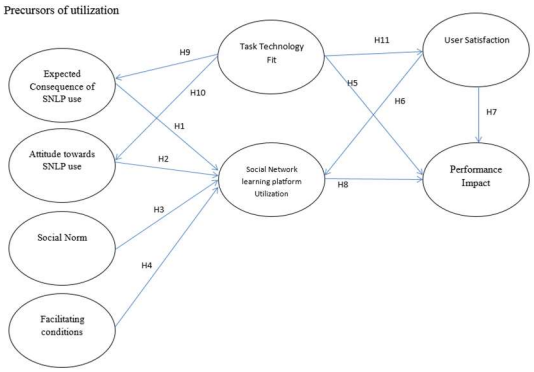

Figure 1: Research model

4. RESEARCH METHODOLOGY

4.1 Data collection

The data collection for this study was performed using a survey questionnaire method. The questionnaire was distributed among 129 students in one of the Malaysian public universities, who were familiar with Edmodo and had experience using it for e-learning. The students were asked to offer their opinion regarding their experience in using Edmodo as an e-learning platform and its impact on their performance throughout their use. At the beginning of the semester a seminar was conducted and Edmodo was presented to students in different classes; later, students were enrolled in Edmodo for the same subject using their unique class id. As in their actual classroom, they were divided into different groups to work and communicate with each other. The questionnaire was divided into eight sections, each representing a construct in the research model. All the questions were adopted from previous research. The instrument was validated by three experts. A 5-point Likert scale was used, from 1 (strongly disagree) to 5 (strongly agree).

4.2 Data analysis

The data analysis was performed using Partial Least Square-Structural Equation Modelling (PLS-SEM), in two stages: assessment of the measurement model and assessment of the structural model using SmartPLS v.3 [80].

5. RESULTS

5.1 Measurement Model Assessment

Measurement model assessment was used to examine the reliability and validity of the model constructs and their associated items. The internal consistency reliability, convergent validity and discriminant validity were tested. The constructs' average variance extracted (AVE) values and Composite Reliability (CR) were tested to assure the convergent validity of the model; their values should exceed Fornell and Larcker's criterion of 0.70 and 0.50, respectively. Table 1 show that the AVE and CR met the minimum threshold. For discriminant validity, the Fornell Larcker criterion was again used. The value of the AVE of each construct should be higher than 0.5 [81], and the square root AVE of each construct should be higher than inter-construct correlations (IC) associated with that factor. The results of the measurement model assessment indicate that the constructs and the items are reliable and valid. Tables and 2, shows that all the measurements met the threshold values.

Table 1 AVE, Composite Reliability, and Cronbach's α

Construct	Cronbach's α	CR	AVE
Task Technology Fit	0.862	0.897	0.593
Attitude Toward Social Network Learning Platform Use	0.739	0.735	0.636
Satisfaction	0.843	0.854	0.694
Impact on Performance	0.872	0.958	0.531
Expected Consequences of Social Network Learning Platform Use	0.862	0.891	0.507
Social Norms	0.834	0965	0.602
Facilitating Conditions	0.802	0.858	0.574
Utilization	0.713	0.835	0.689

Table 2: Discriminant Validity

	TTF	ATSU	STF	IOP	ECSU	SN	FC	UTL
TTF	**0.770**							
ATSU	0.486	**0.797**						
STF	0.449	0.616	**0.833**					
IOP	0.307	0.317	0.304	**0.728**				
ECSU	0.691	0.583	0.627	0.597	**0.712**			
SN	0.536	0.684	0.627	0.410	0.618	**0.775**		
FC	0.434	0.429	0.509	0.111	0.467	0.383	**0.757**	
UTL	0.391	0.512	0.579	0.409	0.578	0.463	0.510	**0.830**

As it was mentioned before the present study measured discriminant validity based on the following criteria. The AVE values for each construct must be equal or higher than 0.5. The

square root AVE of each construct should be higher than inter-construct correlations (IC) associated with that factor (Fornell and Larker, 1998). Added to the above criteria, the constructs, items and crematory factor analysis results with factor loading of 0.5 or over, are considered acceptable, with Cronbach's Alpha ≥0.70 and composite reliability ≥0.70 [81] (Hair et al., 2013).

5.2 Structural model assessment

Assessing the structural model examines the path between the constructs based on the proposed hypotheses. We used bootstrapping with 5,000 sub-samples and two-tailed tests to generate e standard error, and t value. The results are presented in Table 3.

Table 3: Hypothesis Testing

Hypotheses	Path coefficient	T-value	P-value	Significance level	Result
H1	0.007	0.714	0.480	P>0.10	Not supported
H2	0.182	4.113	0.003	P<0.01	supported
H3	0.641	8.307	0.000	P<0.01	Supported
H4	0.262	4.498	0.001	P<0.01	Supported
H5	0.213	4.214	0.003	P<0.01	Supported
H6	0.581	8.319	0.000	P<0.01	Supported
H7	0.006	0.934	0.470	P>0.10	Not supported
H8	0.271	5.508	0.000	P<0.01	Supported
H9	0.183	3.781	0.006	P<0.01	Supported
H10	0.290	4.602	0.003	P<0.01	Supported
H11	0.381	6.427	0.000	P<0.01	Supported

The Hypothesis 1 express that Expected consequences of use (ECSU) has a positive influence on SNLP utilization. Based on the values from figure 5.1 it can be concluded that ECSU does not has a positive and significant effect of SNLP utilization (β = 0.007, t = 0.714, P>0.10). This result shows that ECSU statistically is not related to SNLP utilization. Therefore Hypothesis 1 is not supported.

Hypothesis 2 states that Attitude towards SNLP Use has a positive influence on SNLP utilization. Based on the result presented in figure 5.1 it can be said that ATSU has a positive influence on SNLP utilization ($\beta = 0.182$, t = 4.113, P<0.01). It can be concluded that ATSU ids statistically related to SNLP utilization, Thus the H2 is supported.

Hypothesis 3 predicts that Social norms have a positive influence on SNLP utilization. The result supports this hypothesis and shows that social norm has a positive influence on SNLP utilization (β = 0.641, t = 8.307, P<0.01). Therefore, the hypothesis 3 is supported.

Hypothesis 4 examines the relationship between facilitating condition and SNLP utilization. H4 posit that Facilitating conditions has a positive influence on SNLP utilization (β= 0.262, t = 4.498, P<0.01). It is concluded that facilitating condition does have a positive influence on SNLP utilization. So, hypothesis 4 is supported.

Hypothesis 5 that presents Task technology fit (TTF) has a positive influence on performance Impact is supported (β = 0.213, t = 4.214, P<0.01). The results show that TTF is significantly related to performance impact.

Hypothesis 6 states that User satisfaction has a positive influence on SNLP Utilization (β = 0.581, t = 8.319, P<0.01). Based on the outcome of the test it can be concluded that user satisfaction positively effects SNLP utilization, therefore hypothesis 6 is supported

Hypothesis 7 predicts that performance impact can be affected by user satisfaction (β = 0.006, t = 0.934, P>0.10). As it can be seen from the result user satisfaction is not related to performance impact and does not influence it. Hence this hypothesis is rejected.

Hypothesis 8 that states SNLP Utilization has a positive influence on Performance Impact is supported (β = 0.271, t = 5.508, P<0.01). The presented result shows that performance impact is positively influenced by SNLP utilization. Therefore hypothesis 8 is supported.

Hypothesis 9 predict that Task technology fit has a positive influence on expected consequences of SNLP use (β =0.183, t = 3.781, P<0.01). The result show that task technology fit is related to expected consequence of the use and positively affect it. Thus the hypothesis 9 is supported.

Hypothesis 10 investigates the relation between task technology fit and attitude toward SNLP use (β =0.290, t = 4.602, P<0.01). The assessment shows that there is a relationship between Task technology fit and attitude toward SNLP use and TTF positively influence ATSU. As a result, the hypothesis 10 is supported.

Hypothesis 11 predicts that Task Technology Fit has a positive influence on user satisfaction (β =0.381, t = 6.427, P<0.01). The

result shows that there is a positive relationship between TTF and User satisfaction. Therefore hypothesis 11 for this study is supported.

5.4.3 Assessment of Coefficient Determination (R^2)

Figure 5.1 presents the result of the structural model testing. As it is shown the coefficient of dependent constructs which are determined by all independent constructs are identified. The R^2 value for expected consequence of SNLP use, attitude toward SNLP use, SNLP utilization, user satisfaction and performance impact are respectively: 0.571, 0.589, 0.538, 0.653 and 0.682. However, expected consequence of the use does not influence SNLP utilization and neither user satisfaction influenced performance impact.

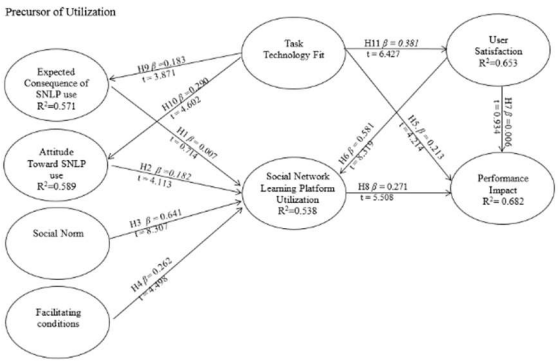

Figure 2: Results of the structural model assessment

6. DISCUSSION

The result presented in this study provides an insight into the relationship between factors that affect students' academic group performance in computer supported collaborative learning environment such as: precursor of utilization, task technology fit, SNLP utilization and satisfaction. This study shows that using social networks designed for teaching and learning have a positive effect on performance impact in CSCL and facilitates the student's collaboration in order to achieve their goals. Using social network made it easier for students to collaborate and communicate with their fellow students and their lecturers and increased the level of their satisfaction. The result is in line with some of the previous studies which reported positive effect of social networks on student's performance [29][82].

Based on the result of the present study social network can create pleasant learning environment which is crucial for students engagement and collaboration. It enriches the learning environment by encouraging student interaction and group discussions facilitation.

This study contribute to the literature by proposing a modified technology to performance chain model which shows how social network learning platform can influence academic group performance in CSCL environment. This model also presents other factors that can be effective, factors such as task technology fit and user satisfaction.

Effect of TTF on precursor of utilization

As presented in the technology to performance chain [17] task technology fit had a substantial impact as a precursor of utilization, which is expected consequence of SNLP use and attitude toward SNLP use. The effect on expected consequence of use is in line with the results of the previous research [59][61], even though the relationship between attitude toward use and task technology fit was not considered by Goodhue and Thompson [17]. This research has discovered that task technology fit has a positive impact on attitude towards use. As it is presented in figure 2 the R^2 value of ECSU in this study is 0.571. The value for the same construct in the study performed by Mcgill and Klobas is 0.336.

The R^2 value of Attitude toward SNLP use in the present study was determined 0.589, the value for the same construct in the previous studies is 0.608, as it is shown the value for this construct in the present study is slightly lower than the study that used LMS instead of social network, this can be due to the fact that the social network that was proposed in this study is strictly for teaching and learning and students might be less eager to use it, but in the Mcgill and Klobas study, using LMS which is offered by the university is mandatory. This could be the reason for slight difference.

Expected consequence of use (ECSU) and attitude toward use (ATSU)

As hypothesized, ATSU has a positive effect on social network learning platform utilization. This outcome is in line with that of Chang and Cheung [62], who discovered that attitude to use influenced intention to use WWW in the working environment; however, in a study conducted by Ngai et al. [69] regarding the adoption of WebCT, this relationship was not found. The result of this research confirms that this relationship exists and that ATSU has a positive

influence on SNLP Utilization [65][61]. However, ECSU was found not to have any effect on SNLP Utilization. This result is consistent with the research of McGill and Klobas [65] and Staples and Seddon [59].

Social Norms

Previous study on the effect of social norms on utilization has produced conflicting results [55][83]. McGill and Klobas [55] showed that in the context of e-learning, social norm does not affect utilization; however, in this study, unlike previous studies, social norm was found to have a positive influence on utilization. This result is consistent with research conducted by Yi et al. [61].

Facilitation Condition

The last precursor of utilization is facilitating conditions (FC). FC have been found to have a positive and significant role on the success of e-learning [67][68][61]. The result of the present study is in line with most of the previous studies, finding a positive relationship between FC and SNLP Utilization. The finding of this study is different from Mcgill and Kloba [55] which found no strong relationship between FC and LMS utilization. This research focused on accessibility, a factor that was discussed in previous studies [84][55] and involves quality of infrastructure and technical or personal support. The accessibility factor for Edmodo is high and it is accessible anytime and anywhere with laptop or with phone. Most of the student these days are familiar with the concept of social networks and how they work and operate, but in case of need for any help, the amount of support that the students receive from Edmodo is high. Users can ask for help from the Edmodo user community or from the Edmodo support team which in both cases the response time is very short.

Impact on performance

Task technology fit and SNLP Utilization have a significant positive influence on performance. The findings of this study confirm that better task technology fit can lead to higher performance, and that higher utilization can lead to higher performance impact [17][55][85]. This study confirms that TTF and SNLP Utilization have a positive effect on performance impact. The R^2 value for SNLP Utilization in the current study is higher than the value of the LMS utilization in Mcgill and Klobas [55] research and the value of the study performed by Yi et al., [61]. This finding confirms that using social network specialized in teaching and learning is more effective than using learning management systems.

User satisfaction

In this research it was hypothesized that user satisfaction has a positive impact on both SNLP Utilization and performance impact. The result shows that satisfaction can increase utilization, consistent with some of the previous studies. However, this research could not find a strong relationship between utilization and performance impact. The R^2 values of performance impact construct in this study (0.682) is higher that the R^2 value of the same construct on the previous study which use technology to performance chain model in the subject of: effect of LMS on performance impact (0.448) and the effect of smart phones on learning performance (0.102). The main difference between these studies is the platform that was used (social network, LMS, Smartphone) the highest R^2 value for performance belongs to the present study that used the social network as a learning platform and the satisfaction construct was added to the original model. Therefor it can be concluded that using social network that is designed for teaching and learning, in the context of education can affect the performance impact more than other platforms that were used for e-learning and user satisfaction affect the performance impact indirectly by increasing the SNLP utilization.

7. CONCLUSION

The findings of this study showed that using social networks which are designed for teaching and learning can positively influence the performance impact in a computer support collaborative environment. This research also confirmed that user satisfaction plays an indirect role in effecting the performance impact in the CSCL by positively influencing the SNLP utilization and TTF has a positive effect on performance impact. It was also presented that social norm, attitude toward the SNLP use and facilitating condition influence SNLP utilization and ultimately the performance impact. Moreover it was concluded that social networks that are designed for teaching and learning are a suitable platform for collaborative learning and can encourage student's collaboration and engagement. Using technology to performance chain model in order to examine the factors that influence academic group performance in CSCL environment was validated by the findings of this study.

This study confronted a few limitations that should be addressed while contributing to theory and practice. The limitations are significant points that other scholars must be aware of when planning to conduct a research in the similar field. This study was restricted by the fact that data collection and analysis came from subset of students that were familiar with using Edmodo in a public universities in Malaysia, hence it cannot be applied to all the universities and other educational institutions. The sample size for this research was 129, the reason for the small sample size was that, most of the universities and lecturers were resistant to changing their current method of study and it was hard to find lecturers that were willing to use Edmodo instead of their university e-learning platform. The author had to hold a presentation for the classes that were not familiar with the new e-learning platform in order to introduce the Edmodo and ask them to use the system for a certain period of time. This process was very time consuming.

The model can further be tested with different respondent from different groups, having adequate sample size would have given opportunities for this study to be analysed with different type of SEM software. For the future studies it is recommended that to repeat the same study with more respondents from different educational institutions and different cultures.

REFERENCES

[1] Heather Kauffman, A review of predictive factors of student success in and satisfaction with online learning, *Research in Learning Technology,* Vol. 23, 2015.

[2] K.Syamala Devi, E.Gouthami, V.Vijaya Lakshmi, Role of social media in teaching-learning, *Journal of Emerging Technology and Innovative Research*, volume6, Issue 1,2019.

[3] Doaa M. Bamasoud, Noorminshah A.Iahad, Azizah Abdul Rahman, Academic Researchers' Absorptive Capacity Influence on Collaborative Technologies Acceptance for Research Purpose: Pilot Study, *Modern Applied Science*, Vol. 8, No. 6. 2014.

[4] Vimala Balakrishnan, Teik Kooi Liew, Shiva Pourgholaminejad, Fun learning with Edooware -A social media enabled tool, *Computers & Education,* 80, 2015, 39e47.

[5] Trisniawati, Mahmudah Titi Muanifah, Sri Adi Widodo, Martalia Ardiyaningrum, Effect of Edmodo towards interests in mathematics learning, *Journal of Physics: Conf. Series* 1188, 2019 ,012103.

[6] Magdalena Cantabella, Raquel Martínez-España, Belén Ayuso, Juan Antonio Yáñez, Andrés Muñoz, Analysis of student behaviour in learning management systems through a Big Data framework, *Future Generation Computer Systems* 90, 2019, 262–272.

[7] Leda Link, Branimir Jurić,Ljubo Barać, Moodle and Elgg Functionalities Comparison: Advantages and Disadvantages, *Central European Conference on Information Intelligent Systems, 24,* 2015, 126 of 296.

[8] Florica Paragina, Silviu Paragina, Alexandru Jipa, Tom Savu , Andrei Dumitrescu, The benefits of using MOODLE in teacher training in Romania, *Procedia Social and Behavioural Sciences* 15, 2011, 1135–1139.

[9] Waleed Mugahed Al-Rahmi, Akram M. Zeki, A model of using social media for collaborative learning to enhance learners' performance on learning, *Computer & Education,* vol.121*,* 2018, 59-72.

[10] Hamid, S., Waycott, J., Kurnia, S., Chang, S., An empirical study of lecturers' appropriation of social technologies for higher education," *Australian Journal of Educational Technology*, 30(3), 2014, 295e311.

[11] Kirschner, A., Karpinski, C., Facebook and academic performance, *Computer Human. Behaviour*. 26 (6), 2010, 1237–1245.

[12] Tess, P. A, The role of social media in higher education classes (real and virtual) a literature review. *Computers in Human Behavior*, 29, 2013, A60–A68.

[13] Y. Ariani, Y. Helsa, S. Ahmad, and R. C. I. Prahmana, Edmodo social learning network for elementary school mathematics learning, *Journal of Physics: Conference Series*, vol. 943, no. 1, 2018, pp. 1–5.

[14] Balakrishnan, V, Fanda, H. A, Social networks and e-learning: perceptions of students and academicians in tertiary institutions in Malaysia, In M. Hamada (Ed.), *E-learning: New technology, applications and future trends*, chapter 10, 2013, (pp. 195e207).

[15] Anat Cohen, Orit Baruth, Personality, learning, and satisfaction in fully online academic courses, *Computer in Human Behaviour*, 72, 2017, 1-12.

[16] Muilenburg, L. Y., Berge, Z. L, Student barriers to online learning: a factor analytic study, *Distance Education*, 26(1), 2005, 29e48.

[17] Dale L. Goodhue, Ronald L. Thompson, Task Technology Fit and Individual Performance, *MIS Quarterly*, Vol. 19, No. 2, 1995, pp. 213-236.

[18]Andika Bagus Nur Rahma Putra, Amat Mukhadis, Eko Edi Poerwanto, Edmodo-Based Makerspace as E-Learning Technology to Improve the Management Project of Vocational Students in the Disruptive Technology Era, *International Conference on Sustainable Information Engineering and Technology (SIET)*, Malang, Indonesia, 2018, pp. 302-307.

[19] S. Mohammadyari, H. Singh, Understanding the effect of e-learning on individual performance: The role of digital literacy, *Computer & Education*, vol. 82, 2015,pp. 11–25.

[20] Bowers, J., Kumar P, Students' perceptions of teaching and social presence: A comparative analysis of face-to-face and online learning environments. International, *Journal of Web-Based Learning and Teaching Technologies*, 10(1), 2015, 27–44

[21] Hsu, H. K., Wang, C. V., Levesque-Bristol C, Re-examining the impact of self-determination theory on learning outcome in online learning environments. *Education and Information Technologies*. 2019, 24:2159 – 2174.

[22] Jang, H., Kim, E. J., Reeve, J, Why students become more engaged or more disengaged during the semester: A self-determination theory dual-process model. *Learning and Instruction*, 43, 2016 27–38.

[23] Chou, S.-W, Liu C.-H, Learning effectiveness in a web-based virtual learning environment: A learner control perspective, *Journal of Computer Assisted Learning*, 21(1), 2005, 65–76.

[25] Benbunan-Fich, R Hiltz, S. R, Harasim L, The online interaction learning model: An integrated theoretical framework for learning networks. In S. R. Hiltz R. Goldman (Eds.), *Learning together online; Research on asynchronous learning networks*, 2005, (pp. 19-37

[26] Franklin, U. E., Nahari, A. A, the Impact of E-Learning on Academic Performance: Preliminary Examination of King Khalid University. *International Journal of Academic Research in Progressive Education and Development*, 7(1), 2018, 83–96.

[27] Al-Rahmi, W. M., Zeki, A. M, A model of using social media for collaborative learning to enhance learners' performance on learning. *Journal of King SaudUniversity-Computer and Information Sciences*, 29(4), 2017, 526–535.

[28] Greenhow, C, Online social networks and learning. On the Horizon, 19(1), 2011, 4–12.

[29] Kabilan, M. K., Ahmad, N., Abidin, M. J. Z, Facebook: An online environment for learning of English in institutions of higher education? *The Internet and Higher Education*, 13(4), 2010, 179–187.

[30] Mohamed, N., Ahmad, H, Information privacy concerns, antecedents and privacy measure use in social network sites. *Computer in Human Behaviour*, 28(6), 2012, 2366–2375.

[31] Wang, Q., Woo, H. L., Quek, C. L., Yang, Y., Liu, M, Using the Facebook group as a learning management system: An exploratory study. British *Journal of Educational Technology*, 43(3), 2012, 428–438.

[32] Lauckner, Carolyn, Jan, Ryan, Kang, Facebook for health, an examination into the solicitation and effects of health related social support on social network sites. *Computers in Human Behaviour*, 2012, 29(5).

[33] Fuciu, M., Gorski, H, Marketing research regarding the usage of online social network sites by high school students. *Procardia Economics Finance*, 6, 2013, 482–490.

[34] Lee, C., Krilavi, T., Zhang, N., Wan, K., Man, L, Using web 2. 0 tools to enhance learning in higher education: A case study in technological education. *Proceedings of the International multi conference of engineers and computer scientists*, Vol. 2, 2012, pp. 1153–1156.

[35] Lin, Y., Lu, P, Why people use social networking sites: An empirical study integrating network externalities and motivation theory. *Computers in Human Behaviour*, 27(3), 2011, 1152–1161.

[36] Yeh, N., Lin, C., Lu, P, The moderating effect of social roles on user behavior in virtual worlds. *Online Information Review*, 35(5), 2011, 747–769.

[37] Zakaria, H., Watson, J., Edwards, L, Investigating the use of Web 2.0 technology by Malaysian students. *Multicultural Education & Technology Journal*, 4(1), 2010, 17–29.

[38] Marniati, S. C, Wibawa, The impact of fashion competence and achievement motivation toward college student's working readiness on ' Cipta Karya ' subject, in *IOP*

Conference Series: Materials Science and Engineering, vol. 296, 2018, pp. 1–4.

[39] M. Jakubik, I. Berazhny, Rethinking Leadership and Its Practices in the Digital Era, *Management International Conference*, 2017, pp. 471–483.

[40] W. Irdianto, A. B. N. R. Putra, The Influence of Education and Economic Background Towards The Training Participants ' Motivation and Study Result of UPT-PK Singosari Malang, *AIP Conference Proceeding*, vol. 030061, 2016,pp. 1–7.

[41] Hary Suswanto et al., Development of Mobile Academic Exhibition Information System to Support Achievement of Job Hiring Graduate Vocational High School, *Journal of Physics. Conference Series*, vol. 1028, no. 1971, 2018, pp. 1–7.

[42] D. Pandit, M. P. Joshi, R. K. Gupta, A. Sahay, Disruptive innovation through a dynamic capabilities lens: an exploration of the auto component sector in India 'Disruptive innovation through a dynamic capabilities lens: an exploration of the auto component sector in, *International Journal of Indian Culture and Business Management,* vol. 14, no. 1, 2017,pp. 109–130.

[43] M. G. Violante, E. Vezzetti, Virtual interactive e-learning application: An evaluation of the student satisfaction, *Comput. Appl. Eng. Educ*., vol. 23, no. 1, 2015, pp. 72–91.

[44] Moran, M., Seaman, J., Tinti-Kane, H.: Teaching, Learning, and Sharing: How Today's
Higher Education Faculty Use Social Media (2011).

[45] Brown, S. A., Dennis, A. R., and Venkatesh, V. Predicting collaboration technology use: Integrating technology adoption and collaboration research. *Journal of Management Information Systems*, 27(2), 2010, 9e54.

[46]] Schroeder, A., Minocha, S., and Schneider, C, The strengths, weaknesses, opportunities and threats of using social software in higher and further education teaching and learning. *Journal of Computed Assisted Learning*, 26(3), 2010, 159–174.

[47] Schroeder, J., Greenbowe, T.J.: The Chemistry of Facebook: Using Social Networking to Create an Online Community for the Organic Chemistry Laboratory. *Innovate: Journal of Online Education* 5(4) 2009.

[48] Kaplan, M., Haenlein, M., Users of the world, unite. The challenges and opportunities of Social Media. *Business. Horizon*. 53 (1), 2010, 59–68.

[49] Elvira Popescu and Dorian Ghita, Using Social Networking Services to Support Learning, International Conference on Web-Based Learning, Vol 8167, 2013, pp 184-193.

[50] Jaël Muls, Free De Backer, Valérie Thomas, Chang Zhu, Koen Lombaerts, Facebook class groups of high school students: their role in establishing social dynamics and learning experiences, *Journal of Learning Environments Research*, 2019.

[51] Al-Rahmi, W., Othman, M., Musa, M, The improvement of students' academic performance by using social media through collaborative learning in Malaysian higher education. *Asian Social Science*, 10(8), 2014, 210–221.

[52] H Khoirunnisa, N Umamah , Sumardi" Edmodo as a media for history learning in the digital era" *IOP Conference Series: Earth and Environmental Science,* 243 (2019) 012087.

[53] Sri Wahyuni, Edmodo-Based Blended Learning Model as an Alternative of Science Learning to Motivate and Improve Junior High School Students' Scientific Critical Thinking Skills, *International Journal of Emerging technologies in Learning*, Vol 14, 2019, 07.

[54] Nihan Erdemir, Gonca Yangın Ekşi, The Perceptions of Student Teachers About Using an Online Learning Environment 'Edmodo' in a 'Flipped Classroom', *SDU International Journal of Educational Studies,* Vol 6, 2019, Number2.

[55] Tanya J. McGill, Jane E. Klobas, A task–technology fit view of learning management system impact, *Computer & Education*, 52, 2009, 496–508.

[56] Wang, Feng Hsu., An exploration of online behaviour engagement and achievement in flipped classroom supported by learning management system. Journal of *Computers & Education. 114, 2017, 79-91.*

[57] Triandis, H. C, Attitude and attitude change. New York, NY: John Wiley and Sons, 1971.

[58] Goodhue, D., Littlefield, R., Straub, D. W,The measurement of the impacts of the IIC on the end-users: The survey. *Journal of the American Society for Information Science*, 48(5),1997, 454–465.

[59] Staples, D. S., Seddon, P,Testing the technology-to-performance chain model. *Journal of Organizational and End User Computing*, 16(4), 2004, 17–36.

[60] Thompson, R. L., Higgins, C. A., and Howell, J. M, Personal computing: Toward a conceptual model of utilization. *MIS Quarterly*, 15(1), 1991, 125–143.

[61] Yong Jeong Yi, Soeun You, Beom Jun Bae, The influence of smartphones on academic performance. The development of the technology-to-performance chain, *Library Hi Tech,* Vol. 34 No. 3, 2016, pp. 480-499.

[62] Chang, M. K. Cheung, W, Determinants of the intention to use Internet/WWW at work: A confirmatory study. *Information & Management*, 39(1), 2001, 1–14.

[63] Venkatesh, V, Davis, F. D, A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, 46(2), 2000, 186–204.

[64] Dishaw, M. T, Strong, D. M, Extending the technology acceptance model with task–technology fit constructs. *Information & Management*, 36(1),1999, 9–21.

[65] McGill, T, Klobas, J, User developed application success: Sources and effects of involvement. *Behaviour and Information Technology*, 27(5), 2008, 407–422.

[66] DeLone, W. H, McLean, E. R., The DeLone and McLean model of information systems success: A ten-year update. *Journal of Management Information Systems*, 19(4), 2003, 9–30.

[67] Sumner, M, Hostetler, D, Factors influencing the adoption of technology in teaching. *Journal of Computer Information Systems*, 40(1), 1999, 81–87.

[68] Williams, P, The learning web: The development, implementation and evaluation of Internet-based undergraduate materials for the teaching of key skills. A*ctive Learning in Higher Education*, 3(1), 2002, 40–53.

[69] Ngai, E. W. T., Poon, J. K. L, Chan, Y. H. C, Empirical examination of the adoption of WebCT using TAM. *Computers & Education*, 48(2), 2007, 250–267.

[70] D'Ambra, J, Wilson, C. S, Use of the World Wide Web for international travel: Integrating the construct of uncertainty in information seeking and the task–technology fit (TTF) model. *Journal of the American Society for Information Science and Technology*, 55(8), 2004, 731–742.

[71] Goodhue, D, Understanding user evaluations of information systems. *Management Science*, 41(2), 1995, 1827–1844.

[72] Goodhue, D., Klein, B. D., March, S. T, User evaluations of IS as surrogates for objective performance. *Information & Management*, 38(2), 2000, 87–101.

[73] DeLone, W. H, McLean, E. R, Information systems success: The quest for the dependent variable. *Information Systems Research*, 3(1), 1992, 60–95.

[74] N Nabilla Rosita, Nilo Legowo, The use of Delone and Mclean IS success model and UTAUT approach in reviewing any factor which influence Kominfo portal system, *Journal of Theoretical and Applied Information Technology,* Vol 97, 2019, 24.

[75] Christy Angeline Rajan, Rupashree Baral, Adoption of ERP system: An empirical study of factors influencing the usage of ERP and its impact on end user, *IIMB Management Review,* 27, 2015, 105 e 117.

[76] Al-rahmi, W. M, Othman, M. S, Yusof, L. M, Musa, M.A, Using social media as a tool for improving academic performance through collaborative learning in Malaysian higher education. Review of European Studies, 7(3), 2015b, 265–275

[77] Fishbein, M., Ajzen, I. (1975). Belief, attitude, intention and behaviour: An introduction to theory and research. Reading, Ma: Addison-Wesley, 1975.

[78] Wu, J. H., Tennyson, R. D., Hsia, T. L, A study of student satisfaction in a blended e-learning system environment. *Computers & Education*, 55(1), 2010,155–164.

[79] Wu, J. H., Tennyson, R. D., Hsia, T. L, Liao, Y. W, Analysis of e-learning innovation and core capability using a hypercube model. *Computers in Human Behaviour*, 24, 2008,

[80] Hair, J. F., Hult, G. T. M., Ringle, C. and Sarstedt, M , A primer on partial least squares structural equation modeling (PLS-SEM). Sage Publications, 2016.

[81] Hair Jr, J. F., Hult, G. T. M., Ringle, C. and Sarstedt, M, A primer on partial least squares structural equation modelling (PLS-SEM). SAGE Publications, Incorporated. *European Journal of Tourism Research*, 6(2): 211, 2013.

[82] Li, X., Chu, K. W., Ki, W. W., Woo, M. M, Using a wiki-based collaborative process writing pedagogy to facilitate collaborative writing among Chinese primary school students. *Australasian Journal of Educational Technology*, 28(1), 2012, 159–181.

[83] van Raaij, E. M, Schepers, J. J. L,The acceptance and use of a virtual learning environment in China. *Computers & Education*, 50(3), 2008, 838–852.

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

[84] Guo, Z., Lu, X., Li, Y. and Li, Y, A framework of students ' reasons for using CMC media in learning contexts: a structural approach , J*ournal of the American Society for Information Science and Technology*, Vol. 62 No. 11, 2011, pp. 2182-2200.

[85] D ' ambra, J., Wilson, C.S. and Akter, S, "Application of the task technology fit model to structure and evaluate the adoption of e-books by academics ", *Journal of the American Society for Information Science and Technology*, Vol. 64 No. 1,2013, 48-64.

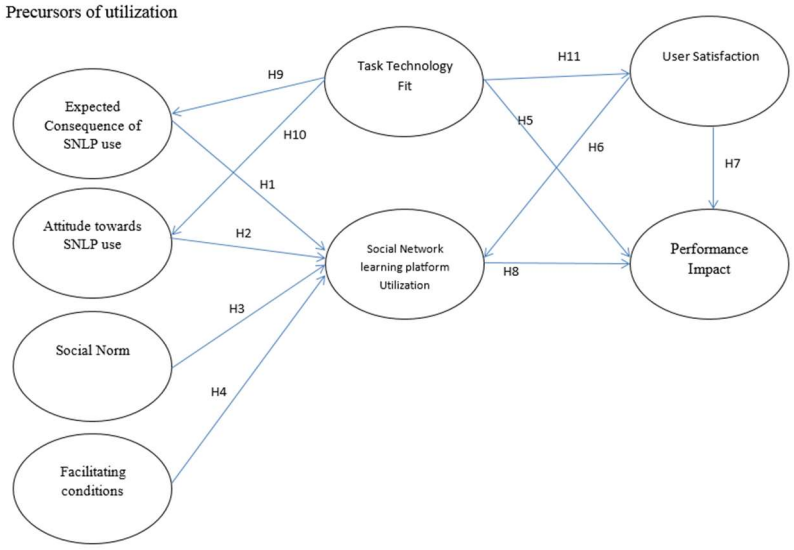

Figure 1: Research Model

Table 1 AVE, Composite Reliability, and Cronbach's α

Construct	Cronbach's α	CR	AVE
Task Technology Fit	0.862	0.897	0.593
Attitude Toward Social Network Learning Platform Use	0.739	0.735	0.636
Satisfaction	0.843	0.854	0.694
Impact on Performance	0.872	0.958	0.531
Expected Consequences of Social Network Learning Platform Use	0.862	0.891	0.507
Social Norms	0.834	0965	0.602
Facilitating Conditions	0.802	0.858	0.574
Utilization	0.713	0.835	0.689

Table 2: Discriminant Validity

	TTF	ATSU	STF	IOP	ECSU	SN	FC	UTL
TTF	**0.770**							
ATSU	0.486	**0.797**						
STF	0.449	0.616	**0.833**					
IOP	0.307	0.317	0.304	**0.728**				
ECSU	0.691	0.583	0.627	0.597	**0.712**			
SN	0.536	0.684	0.627	0.410	0.618	**0.775**		
FC	0.434	0.429	0.509	0.111	0.467	0.383	**0.757**	
UTL	0.391	0.512	0.579	0.409	0.578	0.463	0.510	**0.830**

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Table 3: Hypothesis Testing

Hypotheses	Path coefficient	T-value	P-value	Significance level	Result
H1	0.007	0.714	0.480	P>0.10	Not supported
H2	0.182	4.113	0.003	P<0.01	supported
H3	0.641	8.307	0.000	P<0.01	Supported
H4	0.262	4.498	0.001	P<0.01	Supported
H5	0.213	4.214	0.003	P<0.01	Supported
H6	0.581	8.319	0.000	P<0.01	Supported
H7	0.006	0.934	0.470	P>0.10	Not supported
H8	0.271	5.508	0.000	P<0.01	Supported
H9	0.183	3.781	0.006	P<0.01	Supported
H10	0.290	4.602	0.003	P<0.01	Supported
H11	0.381	6.427	0.000	P<0.01	Supported