Chen, W. et al. (Eds.) (2016). Workshop Proceedings of the 24th International Conference on Computers in Education. India: Asia-Pacific Society for Computers in Education

Self-paced Learning among Undergraduates: Exploring the Relationship between ICT Utilization and Motivation, Mastery, and Subjective Norm

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Abstract: In this digital era, Information and Communication Technology (ICT) has allowed students to design learning at their own pace. For that reason, this study aims to explore the relationship between ICT utilization and motivation, mastery and subjective norm for self-paced learning among undergraduate students. This research was carried out using the quantitative approach. There were 60 undergraduate students who participated in the survey. Findings from this study show a significant positive correlation between ICT utilization and motivation (r = .27), mastery (r = .36) and subjective norm (r = .34) for self-paced learning among undergraduates. Findings suggest that mastery followed by subjective norm and motivation need to be emphasized in tertiary education to maximize the impact of ICT on students' self-paced learning.

Keywords: Self-paced learning, ICT utilization, motivation, mastery, subjective norm

1. Introduction

Self-paced learning is the student autonomy to decide on the timing and speed of content delivery (Magill, 2008). Learning could be more valuable when the students learn at their own pace and abilities rather than a pace that is determined for them. Learning is effective if the student is able to self-guide his study time (Tullis & Benjamin, 2011) and effective learners have the ability to manage and pace their own learning (Finley, Tullis, & Benjamin, 2009). Studies found that the learners' autonomy to decide on the subjects to study and re-study has positive effects on learning (Benjamin & Bird, 2006; Toppino, Cohen, Davis, & Moors, 2009) and it makes learning a personalized experience that is effective for individuals (Edgar, 2012). Self-paced learning enables the students to enjoy greater personalization of their learning experience with the autonomy to explore and pursue subjects of their interest (Ministry of Education, 2012). With the establishment of online resources, students can access materials on-demand to enable self-paced learning.

ICT is no longer perceived as novelty but it is being observed as a standard feature in the learning process (Moses, Tey, Cheah, Teo, & Wong, 2014). Self-paced learning using ICT allows the student to have learning flexibility from anywhere at any given time at own convenience. ICT utilization refers to processing and sharing of information using any forms of technology tools for communication (Apagu, & Wakili, 2015). Studies on student adoption of technology have found that learners' perception of the education potentials of technology determines whether they are going to adopt these tools for learning (Lai & Gu, 2011; Clark, Logan, Luckin, Mee, & Oliver, 2009; Davis, 1989).

Successful learning requires students to be motivated. Motivation is one of the predicators of students' learning and motivated learners are likely to achieve higher levels of success (Hu, 2008; Mezei, 2008). Motivation refers to "the reasons underlying behaviour" (Hu, 2008) or in other words it is the characteristic that makes us to do or not to do something". Without or with little motivation, self-paced learning might be ineffective. Hashemyolia, Asmuni, Daud, Ayub, and Shah (2014) viewed that motivation is one of the key factor that contributes to use ICT for learning. Previous studies found

a positive correlation between motivation and ICT usage for learning among students (Shonfeld & Aharoni, 2015; Hassanzadeh, Gholami, Allahyar, & Noordin, 2012). They concluded that the higher one's motivation, the greater the chances of students using ICT in their learning.

There is a need to prepare learners for participation in an information society because knowledge is the most crucial resource for social and economic development in the future (Hakkarainen, Ilomaki, Lipponen, Muukkonen, & Rahikainen, 2000). ICT skills are necessary in to solve increasingly complex problems in a variety of knowledge-rich domains, participate in knowledge work and engage in various networked activities. Mastery can be inferred from evident performance on a set of items or tasks related to a particular concept, skill, or subject (Thomas & Eric, 2014). Mastery or competence skills are significantly important for the good utilization of ICT for learning purpose (Vidanagama, 2016; Priyangika & Jayasundara, 2013; Saba, 2013). Students are able to learn according to their capabilities using ICT in higher education institutions (Edgar, 2012 & Hakkarainen et al., 2000). Tasir, Abour, Halim, and Harun (2012) found that mastery of ICT skills had a high positive correlation with ICT usage. They also concluded that 56% of the actual use of ICT can be explained through ICT competence. Another similar study conducted by Buabeng-Andoh (2012) also showed positive correlation between ICT competence and ICT usage.

Another element that plays an important part in the students' independent learning is the subjective norm. Ajzen and Fishbein (1975) defined subjective norm as a person's perception that most people who are important to them think they should or should not perform the behavior in question. People will generally intend to perform a behavior when they have a positive attitude toward it and when they believe that important individuals think they should do so (Ajzen, 1988; Huang, Davison, & Gu, 2008). A meta-analysis by Schepers and Wetzels (2007) reported a correlation between subjective norms and ICT behavioral intention. If a student thinks the family and friends accept and appreciate him engaging in e-Learning, he is more likely to enact it (Schepers & Wetzels, 2007).

2. Purpose of the study

This study aims to explore the relationship between ICT utilization and motivation, mastery and subjective norm for self-paced learning among undergraduate students. The following hypotheses were formulated based on the literature review:

H1: There is a significant relationship between ICT utilization and motivation.
Ho: There is no significant relationship between ICT utilization and motivation.

H2: There is a significant relationship between ICT utilization and mastery.
Ho: There is no significant relationship between ICT utilization and mastery.

H3: There is a significant relationship between ICT utilization and subjective norm.
Ho: There is no significant relationship between ICT utilization and subjective norm.

3. Methodology

3.1 Participants

The sample of this study consists of 60 undergraduate students from a private university in peninsula Malaysia. Purposive sampling method was used as basis for selecting the sample to represent the undergraduates studying in a private university. Purposive sampling is used to focus on people of specific characteristics who will be able to assist in the study (Creswell & Clark, 2011).

The breakdown of undergraduates according to their respective gender is 23 males and 37 females (Table 1). Thus, majority of the undergraduates involved in this study were females (61.7%) compared to males (38.3%).

Table 1: Distribution of Participants by Gender

Gender	Frequency	Percentage (%)
Male	23	38.3
Female	37	61.7
Total	60	100

Table 2 provides a summary of the undergraduates' age. The age of the respondents varied from 19 to 23 years old. The mean age of the participants is 20.50 with a standard deviation of 1.32.

Table 2: Distribution of Participants by Age

Age	Frequency	Percentage (%)
19	13	21.7
20	26	43.3
21	8	13.3
22	4	6.7
23	9	15
Total	60	100

3.2 Instrumentation

The questionnaire consisted of two parts: Section 1 gathers demographic information of the students and Section 2 focuses on the scale items which elicits information on student's usage of ICT for self-paced learning. The students were required to answer the survey using the five point Likert scale. The Likert scale ranged from strongly disagree (1), disagree (2), neutral (3), agree (4) to strongly agree (5).

The questionnaire consists of ICT utilization (7 items), motivation (7 items), mastery (12 items), and subjective norm (6 items). ICT utilization and mastery items were adopted from Albirini (2006), and subjective norm scale was adopted from Venkatesh, Morris, Davis, and Davis (2003). Permissions were sought from the authors to adopt and modify the items. The changes made were to some words and phrases so that the items suit the investigation. However, the scale for motivation was formulated by the researchers based on literature review due to the deficiency of relevant scale for this study.

A panel of experts in education technology field reviewed the questionnaire for its face validity and content validity. The experts examined the items and provided constructive comments on the items that can actually measure the intended measure. Based on their expert feedback, some of the items were further revised and removed from the questionnaire owing to their unclear and ambiguous nature. This was done to avoid confusion among the participants and the questionnaire was revised to be more comprehensible by the participants who were from an undergraduate background.

In this study, 65 questionnaires were manually administrated to the undergraduates. Out of the 65 questionnaires, 60 questionnaires were obtained with complete data. The reliability of the complete instrument was analyzed using Cronbach Alpha to determine the internal consistency coefficient of this study as it is used widely by researchers (Hair, Black, Babin, Anderson, & Tatham, 2006). The reliability value derived for each scale is presented in Table 3. The Cronbach's Alpha coefficient for this study ranges from .763 to .903. As a result, this questionnaire had a very good internal consistency as every alpha level of the scale was higher than .70 (Pallant, 2006).

Table 3: Instrument Reliability

Scales	Number of Items	Cronbach's Alpha
ICT Utilization	7	.763
Motivation	7	.853
Mastery	12	.903
Subjective Norm	6	.808

4. Results and Discussion

4.1 ICT Utilization for Self-Paced Learning

Respondents were asked on their amount of time spent using ICT for self-paced learning. Table 4 shows the distribution of the respondents on ICT usage for self-paced learning per day. A large number of students (46.7%) reported that they use ICT for self-paced learning for more than 30 minutes a day but less than two hours. Some students (30%) spent more than two hours to four hours in self-paced learning using ICT. Nonetheless, a few students (5%) spent more than four hours to six hours whereas others (6.7%) spent more than six hours in using ICT for self-paced learning. The data finding also showed that some students (11.7%) seldom engage in using ICT for self-paced learning.

Table 4: Distribution of Participants According to Amount of Time Spent for Self-paced Learning using ICT Per Day

Amount of Time Spent for Self-paced Learning using ICT	Frequency	Percentage (%)
Seldom	7	11.7
>30 minutes < 2 Hours	28	46.7
> 2 hours < 4 hours	18	30
> 4 hours < 6 hours	3	5
> 6 hours	4	6.7
Total	60	100

4.2 Relationship between ICT Utilization and Motivation, Mastery and Subjective Norm for Self-paced Learning

Scatter plots were used in this study to test out the assumptions and distribution of the variables. The scatter plots show high scores, indicating positive relationships between the variables involved; suggesting that the high scores on the ICT utilization are associated with the high scores on motivation (Figure 1), mastery (Figure 2), and subjective norm (Figure 3).

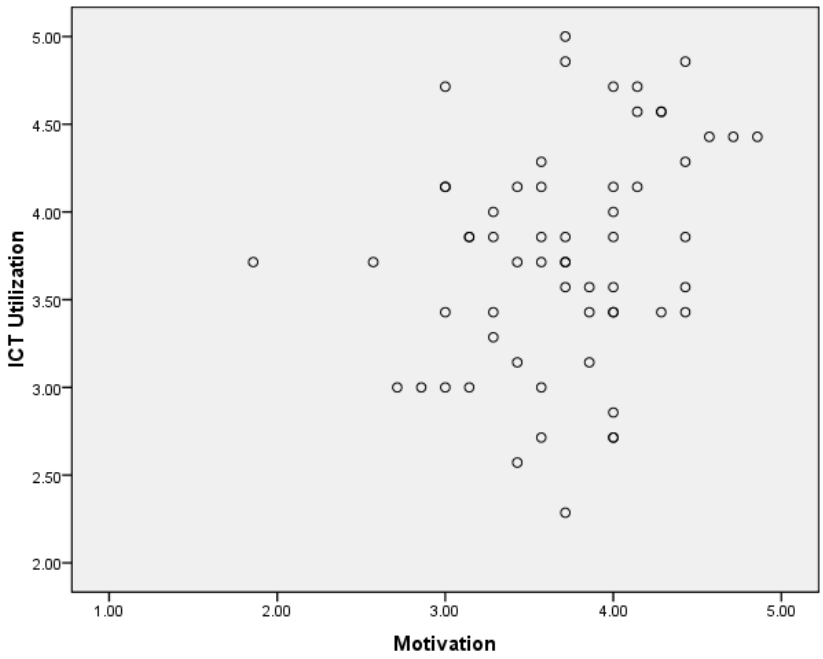

Figure 1. Distribution of ICT Utilization and Motivation for Self-paced Learning among Undergraduates

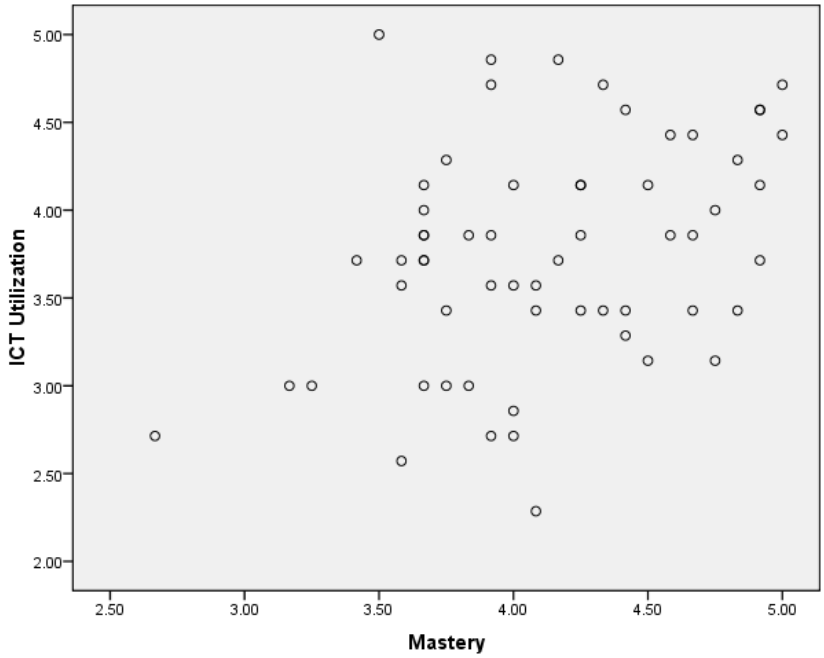

Figure 2. Distribution of ICT Utilization and Mastery for Self-paced Learning among Undergraduates

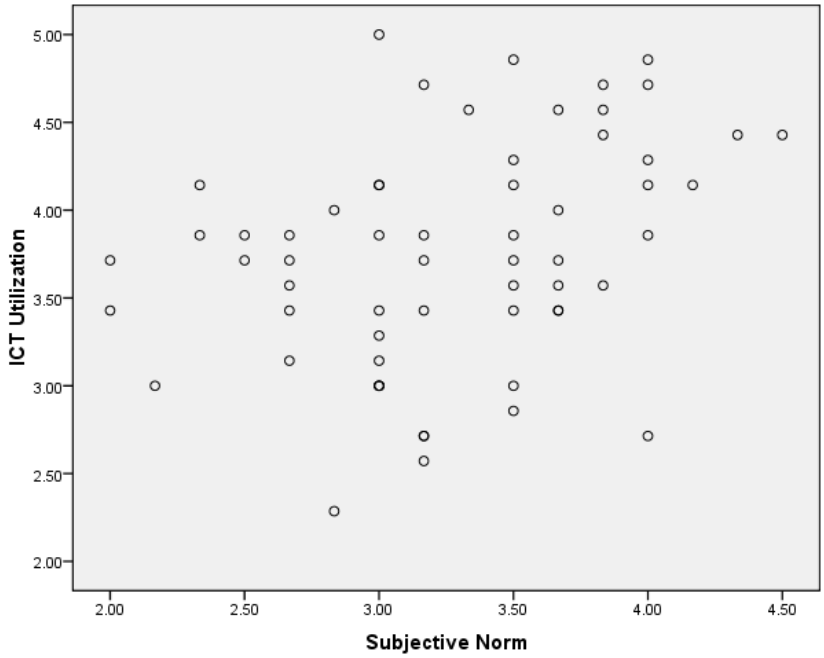

Figure 3. Distribution of ICT Utilization and Subjective Norm for Self-paced Learning among Undergraduates

The relationship between the ICT utilization and the three variables were identified using Pearson product-moment correlation coefficient. The results of the correlation are presented in Table 5. The findings revealed there was a small (Cohen, 1988), positive correlation between undergraduates' use of ICT for self-paced learning and motivation (r = .27, n = 60, $p < .05$). The

correlation coefficient of 0.27 indicates that there is a small linear correlation between ICT utilization and undergraduate students' motivation. It shows as the scores for motivation gradually increases, so will the scores for the utilization of ICT for self-paced learning among the undergraduates and vice versa.

It was found that there was a medium (Cohen, 1988), positive correlation between undergraduates' use of ICT for self-paced learning and mastery (r = .36, n = 60, p < .01). The correlation coefficient of 0.36 indicates that there is a medium linear relationship between both the variables. Thus, as the scores for mastery increase, so do the scores for the utilization of ICT for self-paced learning. Conversely, the mastery skills among the undergraduates decrease when the ICT use decreases.

As for the subjective norm, the results showed that there was a medium (Cohen, 1988), positive correlation with undergraduates' use of ICT for self-paced learning (r = .34, n = 60, p < .01). The correlation coefficient of 0.34 in subjective norm signifies that there is a medium linear association with ICT utilization. As the scores for subjective norm increases, so will the scores for the utilization of ICT for self-paced learning among the undergraduates and vice versa.

Table 5: Pearson Product-Moment Correlation between ICT Utilization and Motivation, Mastery and Subjective Norm for Self-paced Learning among Undergraduates (n=60)

	Motivation	Mastery	Subjective Norm
ICT Utilization (Pearson Correlation)	.274*	.364**	.340**
Sig. (2-tailed)	.034	.004	.008

** Correlation is significant at 0.01 level (2-tailed).
* Correlation is significant at 0.05 level (2-tailed).

The analysis using the Pearson product-moment correlation coefficient in this study produces expected results as supported by earlier studies. The present findings are consistent with findings of previous studies by Shonfeld and Aharoni (2015) as well as Hassanzadeh et al. (2012) which supported the notion that the higher the students' motivation, the greater the probability of them using ICT in their learning process. The present findings are also parallel with studies carried out by Tasir et al. (2012) and Buabeng-Andoh (2012) which found positive connection between mastery and ICT utilization. Furthermore, this study supported the findings by previous researchers (Schepers & Wetzels, 2007)-which suggested that students will be inclined to use ICT if they feel encouraged from people having any association with them such as their family members or friends.

Based on the overall results, each and every hypothesis tested in this study was proven significant. Hence, there is a significant relationship between ICT utilisation and motivation, mastery and subjective norm. This suggests that all the three variables investigated play important roles in persuading the undergraduates to use ICT for self-paced learning. However, mastery and subjective norm reported a stronger relationship with ICT utilization for self-paced learning among the undergraduate students if weighed against motivation which merely revealed a small correlation with ICT usage. This study suggests that mastery followed by subjective norm and motivation needs to be emphasized in tertiary education in order to maximize the impact of ICT on students' self-paced learning.

5. Conclusion

Mastery and subjective norm play more vital roles in determining the use ICT for self-paced learning among the undergraduate students compared to motivation. By knowing the mastery level of ICT among undergraduates by the university practitioners, some measures can be introduced to tackle and overcome it. As a result, it may help to improve and increase the integration of ICT in students' self-paced learning. With the appropriate competency skills and support of certain personnel, it will

definitely allow undergraduates to perform better in exploring and acquiring knowledge independently during their self-paced learning process.

Acknowledgement

We are grateful to Universiti Tunku Abdul Rahman, Malaysia for funding this project.

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