Education Quarterly Reviews

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Bringing ICT into the Classroom: Perceptions from Tourism Students on Technology-Enhanced Learning

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Abstract

The advancement of Information and Communication Technology (ICT) can be seen as a blessing in disguise. On one hand, digital information is readily available nowadays, which in turn makes the hardwiring of knowledge less significant and shifts the focus towards competency development. In a digitalized world where information is easily accessible, it is argued that students in higher education need to develop more sensible soft skills that allow them to systematically and critically analyze information. Whilst knowledge can be acquired in a relatively short period, competency development requires more active repetition and patience. Thus, applying relevant and supportive teaching methods is seen as essential. Quantitative data was collected from the participants (n=107) and examined through descriptive analysis. The results of the research revealed that students in higher education generally had a positive perception of technology-enhanced learning (TEL) and considered themselves proficient with the usage of ICT in the classroom. Based on the empirical findings from this paper, a qualitative study was recommended to identify how ICT can be more effectively integrated into the traditional classroom.

Keywords: Technology-Enhanced Learning, Connectivism, Active Learning

1. Introduction

Learning theories and their applications have evolved with time, beginning with the transition from instructivism towards constructivism. With the advances of Information and Communication Technologies (ICT), the connectivism paradigm thus emerged and tied the two theories closer together. ICT became an integral part of everyday life. It has transformed the way we engage, interact, and communicate with each other. The educational sector is no exemption from this development; with the rise and increased usage of ICT, educational institutions have exponentially attempted to adapt to the new norm (Crosslin, 2016). There were a variety of aspects that shaped the learning culture. However, ICT was claimed as an essential factor that influenced and affected the evolution of learning cultures (Porcaro, 2011; Crosslin, 2016). While it was argued that ICT supported the transformation towards active learning (Porcaro, 2011), the research aimed to investigate students' perceptions of the integration of ICT in their classroom activities.

Moreover, it was claimed that traditional instructivism continues as the norm in lesser-developed countries (Elwood & MacLean, 2009). In essence, it can be stated that instructivism is teacher-focused; it is believed that repetition will lead to the hardwiring of experiences, whereas constructivism is student-centered and emphasizes that knowledge transfers are initiated through socialization techniques amongst peers. The primary difference concerning the usage of ICT in constructivism and connectivism is its integration. The former is supported by ICT, whereas the latter depends on the usage of ICT. While it was argued that technology-enhanced learning (TEL) supported the transformation towards active learning (Crosslin, 2016), the research aimed to investigate how students perceived the integration of ICT into their higher education studies. Upon closer examination of the associated mechanisms, the research aimed to examine the role of ICT and what impact it would have in the transformation of education. The goal of the research was to empirically explore how students view the integration of ICT into their classroom and how it was perceived during their studies. On this basis, the following two research questions guided the research:

RQ1. How do students recognize their proficiency concerning the usage of ICT during their studies?
RQ2. How do students perceive the usefulness of ICT during their studies?

The secondary objective of the research was to provide a contemporary review of the relevant literature and introduce industry practices related to the use of ICT in the Digital Age. However, the study primarily sought to collect empirical data to further understand the perspective of the students.

2. Literature Review

This section will introduce and discuss three topics: the role of information and communication technology (ICT) in higher education, active learning as pedagogy, and the collaborative virtual whiteboard as a facilitator of active learning.

2.1. Student-centered education to enhance competencies

Educational theories can largely be differentiated between instructivism and constructivism. The former theory places particular emphasis on the teacher as the center of the learning environment (Bain, 2003). Instructivism supports the ontological belief that repetition leads to the hardwiring of knowledge, wherein the learner is in the passive role (Bain, 2003; Crosslin, 2016). Contrary to that, the educational philosophy of constructivism claims that knowledge is created through experiences and that learners construct their own reality of knowledge (Liu & Matthews, 2005). In this respective learning theory, the emphasis is placed on the learner in an active role wherein the teacher acts as a facilitator or coach (Liu & Matthews, 2005; Porcaro, 2011). Active learning is an emerging approach that can be seen as an enabler of the constructivism learning theory (Waluyo, 2020), wherein the engagement of students is argued as the most important element (Arrosagaray, González-Peiteado, Pino-Juste and Rodríguez-López, 2019). Moreover, active learning emphasizes the core elements of constructivism in that the student is the center of the learning environment (Cassidy, Charles and Slotta, 2019). Furthermore, it highlights the need to develop competencies in higher education rather than knowledge (Johnson & Johnson, 2008; Cassidy, Charles and Slotta, 2019). The accessibility and mobility of Information and Communication Technologies is a blessing in disguise, wherein ICT initiated and accelerated the insignificance of knowledge-based learning. At the same time, it offers a possible solution for the enhancement of competency-based learning, which is seen as a more relevant educational approach (Johnson & Johnson, 2008; Arrosagaray et al., 2019). It can be further argued that a student can access knowledge with a mobile device from virtually any location around the clock. However, the capability to assess, measure, and judge the abundance of information that is available requires more comprehensive development of the students' competencies to critically judge the "knowledge" (Johnson & Johnson, 2008).

2.2. Connectivism as a facilitator for active learning

Connectivism is a theoretical framework for understanding learning in a digital age, as originally argued by Downes (2005) and Corbett and Spinello (2020). It is further argued that connectivism created new opportunities

through the advancement of information technologies, in particular Internet technologies. These emergent technologies have allowed people to readily access information anywhere, anytime (Downes, 2005). Corbett and Spinello (2020) further argued that the learner processes information through their decision-making and makes the connections between information; hence, it is structured like a network. Nevertheless, there were also critical comments which argued that connectivism is not a learning theory on its own (Crosslin, 2016), but should rather be interpreted as a sub-classification of existing and more established learning theories (Kop & Hill, 2008). Kop and Hill (2008) further argued that connectivism can be seen as a branch of instructivism, which sees the teacher as the center of knowledge with the belief that knowledge is gained from repetition. Contrary to instructivism, the constructivism learning theory sees a student-centered approach wherein knowledge is created through peer-interaction (Kop & Hill, 2008). It could thus facilitate connectivism as a sub-theory within the existing paradigm of constructivism.

In studies concerned with the progression of connectivism, it was further argued by Crosslin (2016) and Downes (2020) that using technology-enhanced learning (TEL) as a method to achieve active learning had a positive impact on the retention of knowledge and engagement levels of teachers and students. There is no consensus whether connectivism is a standalone learning theory or purely an extension of existing theories (Mattar, 2018). Speculations and ambiguity accordingly abound, yet multiple arguments claim the effectiveness of connectivism and technology-enhanced learning (Porcaro, 2011; Crosslin, 2016; Mattar, 2018; Downes, 2020). However, there is no recent research to offer insights from the primary beneficiary of this learning theory: the students. This research was built based on existing claims that connectivism supported and facilitated active learning. Furthermore, it was claimed that active learning had a positive impact on learning outcomes, knowledge retention (Crosslin, 2016), and competency development (Mattar, 2018). Thus, analyzing students' perceptions of their proficiency and the perceived usefulness of ICT in the classroom was a sensible and logical avenue to further explore.

3. Methods and Materials

3.1. Sample

A total of 107 undergraduate students responded to the survey, which corresponds to a 39.1% response rate. The participants were enrolled as first- or second-year full-time undergraduate students in a business degree program at the time of sampling. Undergraduate students were specifically targeted as the sample because of their exposure to full-time classroom teaching, whereas graduate studies were conducted as part-time studies at the time. Furthermore, the sample of graduate students would have not sufficed to guarantee reliable results. Out of the total participants (n=107), 74.8% (n=80) were female and 25.2% (n=27) were male. 94.4% (n=101) of the participants were Thai nationals and the remainder originated from East Asian countries (Table 1). There were no significant variances in the age range, whilst the majority of students were 20 years or younger (96.3%; n=103). The students' degree program or field of study did not suggest that the participants would have possessed any particular technical knowledge.

Table 1: Socio-demographic profile

Characteristics		Year 1	Year 2	Total
Students that responded		59	48	107
Students that abstained		81	86	167
Total response rate		42.1%	35.8%	39.1%
Gender	Male	15	12	27
	Female	44	36	80
Nationality	Thai	57	44	101
	Others	2	4	6
Age Range	18 years or below	37	8	45

	19 – 20 years old	21	37	58
	21 – 22 years old	1	1	2
	23 years or above	0	2	2
Average GPA	1.99 or below	12	7	19
	2.00 – 2.49	20	10	30
	2.50 – 2.99	11	13	24
	3.00 - -3.49	11	7	18
	3.50 or above	5	11	16

3.2. Procedure

The Likert-type scale is a psychometric scale commonly used in research projects that employ questionnaires (Likert, 1932; Vonglao, 2017). In contemporary research projects, it is argued that the Likert-type scale is best suited to allow individuals to express their agreement or disagreement with a particular statement (Jamieson, 2004). Using the five-point Likert-type scale allowed the students to report their level of agreement with a total of 16 statements concerning their perception of the usage of Information and Communication Technologies in the classroom. These statements were organized equally into two categories. These categories were: (1) Proficiency with the technology and (2) Usefulness of the technology. Each category contained eight individual statements; the participants were given the choice to express their agreement or disagreement on a five-point scale.

3.3. Analysis

The research project was conducted as part of a prerequisite for a larger project that stretches from 2020 to 2022. The broader aim of the project was to investigate the role and impact of ICT in different learning cultures, specifically technology-enhanced education in instructivism learning environments. The scope and aim of the research project were briefly presented to the students and the link to the anonymous survey was messaged to the students with the appeal to participate. The messaging mobile application LINE chat was used to distribute the link and a total of 274 undergraduate students were reached. Within a week, 39.1% completed the survey and the data collection was concluded. The data were examined using descriptive analysis, calculating the distribution of responses in percentages, the average (mean value), range (lowest and highest value), and the SD (standard deviation).

4. Results and Discussion

In the first section of the survey, the participants were asked to complete a series of questions that allowed for the creation of a socio-demographic profile of the participants. The results are presented (Table 1) by attribute, including gender, nationality, age range, average GPA, and year of study.

The first eight statements (No.1-No.8) were clustered in the first part of the questionnaire (Table 2) and were designed to measure the proclaimed level of proficiency as perceived by the participating students. On a Likert-type scale, the students were able to express their agreement or disagreement, wherein the value 1 would represent strong disagreement, 3 stood for neutral, and the value 5 indicated strong agreement. Even though the contextual importance of individual ICT was not indicated, the results highlighted that the participants perceived a high level of proficiency to navigate through the Internet for information (Mean=4.38). This was followed by communication through a text messaging application (Mean=4.29). The third highest ranked statement corresponded to sending and receiving messages via email (Mean=4.09). Contrary to the findings that received the highest rating of proclaimed proficiency, the lowest-ranked statements were to use spreadsheets (Mean=2.82), to use a word processor (Mean=3.17), and thirdly to access course material in their learning management systems (Mean=3.45). Furthermore, it can be outlined that only one statement received a cumulative result that ranked below neutral (Mean=3.00), i.e. the use of spreadsheets (Mean=2.82) as indicated and visualized in Table 2 below.

Table 2: How participants perceived their ICT proficiency

No.	Question Item	Mean[1]
First Cluster		
Q1	to send and receive messages via email	4.09
Q2	to browse the Internet for information	4.38
Q3	to access course material via LMS, i.e. Moodle	3.45
Q4	to install a new application/ software	3.98
Q5	to use a word processor, i.e. Word or Google Docs	3.17
Q6	to use spreadsheets, i.e. Excel or Google Sheets	2.82
Q7	to communicate via text message, i.e. Line Chat or WhatsApp	4.29
Q8	to communicate via video call, i.e. Skype or Facetime	3.85

[1]*Ratings obtained from a Likert-type five points scale ranging from lowest rating to highest rating, i.e. Fully Disagree (1), Slightly Disagree (2), Neutral (3), Slightly Agree (4), and Fully Agree (5)*

The next eight statements (No.9–No.16) were clustered in the second part of the questionnaire (Table 3) and aimed to gain a more comprehensive understanding of the students' perspectives concerning the usefulness of ICT in the classroom and during their studies. The highest-ranked result by the participants was the statement that students expressed their agreement about ICT helping them to search for information about their studies (Mean=4.12), which is supported by another case study that examined technology-enhanced methods in the virtual classroom (Fuchs, 2021a). This finding was followed by the statement that outlined the participants' comfort level in the use of ICT in the classroom (Mean=4.10). The third highest-ranked statement related to the students' interest in using ICT in the classroom (Mean=3.86). Opposing the highest-ranked statements, the statements that received the lowest approval rating were that "it is easier to keep notes with ICT than with a pencil and paper" (Mean=2.86). The second-lowest ranked statement, according to the participants' perceptions, was that learning is more interesting when supported by ICT (Mean=2.96).

Table 3: How participants perceived the usefulness of ICT

No.	Question Item	Mean[1]
Second Cluster		
Q9	I am interested to use ICT in the classroom	3.86
Q10	ICT helps me to search for information about my studies	4.12
Q11	ICT helps me to achieve my personal learning goals	3.08
Q12	Learning is more interesting when supported by ICT	2.96
Q13	ICT makes the course content more motivating	3.72
Q14	I feel confident to use ICT in the classroom	4.10
Q15	ICT helps me to structure my studies more effectively	3.48
Q16	It is easier to keep notes with ICT than with a pencil and paper	2.86

[1]*Ratings obtained from a Likert-type five points scale ranging from lowest rating to highest rating, i.e. Fully Disagree (1), Slightly Disagree (2), Neutral (3), Slightly Agree (4), and Fully Agree (5)*

Lastly, the third lowest-ranked statement was that ICT helps students to achieve their personal learning goals, which received a mean rating slightly above the neutral line (Mean=3.08). The participants stated that ICT helped them to search for information relevant to their studies and they indicated a high level of confidence to use ICT in the classroom. However, the results also indicated that ICT did not make learning more interesting. A possible explanation could be the usability of ICT in the classroom; the participants specified that using ICT

does not make it easier to keep notes compared to a traditional pencil and paper. A likely clue derived from the findings in the first cluster would suggest that the participants did not use the appropriate ICT to enable a more seamless experience in keeping notes and making the learning more interesting. Here, the participants indicated subpar proficiency for the use of word processors and spreadsheets, wherein the former application in particular had a proven track record of keeping notes more easily (Arboledas, 2019).

It was argued by Crosslin (2016) and Downes (2020) that using technology-enhanced learning (TEL) as a method to achieve active learning had a positive impact on the retention of knowledge and engagement levels of teachers and students. This statement is further supported by a recent case study conducted by Fuchs (2021b). The hypothesis concerning the engagement levels cannot be supported by the findings of this research. The research examined that participants felt neutral about ICT supporting their learning and they could not see the added benefit. Furthermore, the results indicated that the use of ICT enabled the constructivism learning theory, wherein the learning environment was student-centered and geared towards the facilitation of competency development. The participants stated that using ICT helped them to effectively find information on the Internet and confirmed a relatively high agreement (Mean=4.10) to using ICT in the classroom. However, the participants also collectively stated their neutral sentiment towards engagement through ICT (Mean=2.96), wherein learning was not described as more fun when supported by ICT. This finding could either mean that ICT had no impact on their engagement level, or ICT did not help to improve the general appeal of the course content. The former would inevitably beg the question of why students felt that way.

5. Conclusion and Future Works

One possible hypothesis that derived from the results of the research was that students were not fully aware of which ICT is best suited to which situation. Qualitative research to understand the context when students decide to use a certain ICT would help to provide more insight. Moreover, it is unclear if the course instructor introduced the technology to the students, or if the usage of ICT in the classroom was entirely optional for the student. To gain more comprehensive insight into the perceptions of students that use ICT in the classroom, it is recommended that a comparative case study be conducted to collect data from a focus group and clearly define how ICT was used in the classroom, as well as what obstacles or challenges the students were facing. The research questions were answered with the conclusion that students feel relatively confident in the use of various ICT-applications in the classroom, while some applications had a higher or lower impact on their perceived proficiency. Furthermore, it can be stated that the students felt neutral about the usefulness of ICT in the classroom; this research did not offer specific insights as to why the students perceived the usefulness as neutral while considering their level of competence as proficient. However, as stated earlier, the primary difference concerning the usage of ICT in constructivism and connectivism is its integration. Active learning as an emerging approach could be the potential differentiator of how students perceive ICT in an instructivism learning environment as opposed to a constructivism learning environment.

6. Acknowledgement

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