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Differences in Students' Receptiveness towards ICT-Enhanced Constructivist Approach in the Principles of Accounting

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Abstract

This paper aims to examine the impact of ICT-enhanced constructivist approach in learning Principles of Accounting for different types of secondary school students by exploring the differences of receptiveness between the high and low ICT proficiency learners, and under- and high-achievers. The research was conducted by the Ministry of Education of Malaysia through a 'try-out' project conducted at 150 national and technical secondary schools nationwide. A Lesson Plan Guidebook which prescribes the use of ICT through the combination of an educational accounting software with constructivist learning pedagogical approach which emphasises on student-centred learning was provided to guide all accounting teachers who were involved in the project. Receptiveness of students was obtained through a close-ended questionnaire which consists of 34 items measuring eight dimensions including Skill Acquisitions, Teaching Competency, Cooperative Learning, ICT Liking and Utility, ICT Success, Confidence with Technology, Anxiety and Aversion. A total of 1,322 students' responses were collected and analysed. The overall findings indicate a positive tendency in each dimension of receptiveness of each type of students with moderate levels of anxiety and aversion. There is no significant difference between students with high and low ICT proficiency level for various dimensions. However, the under-achievers demonstrate relatively higher receptiveness for many dimensions.

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Introduction

A business or organisation communicates its results and position to its stakeholders through the use of financial statements. Given that financial statements are among the deliverables of an accounting task, accounting is widely referred to as the 'language of business'. The American Accounting Association defines accounting as "the process of identifying, measuring, and communicating economic information to permit informed judgements and decisions by users of the information (as cited in Sofat & Hiro, 2008; p.3).

In view of the important function of accounting for business, the profession of accounting is widely needed. Hence, accounting education plays an important role to foster the successors for the accountancy field. Moreover, the interest towards accounting and business has to be cultivated from young so that students will continue to pursue this path until the tertiary and professional levels. Thus, the accounting education at elementary level is an important corner stone for preparing young people to advance into this profession.

With the advent of Information and Communication Technology (ICT) and globalization where the computerised accounting have taken over manual accounting methods, there is a great need to revise, expand the accounting curriculum to nurture critical thinkers and life-long learning (Arthur Anderson & Co. et al, 1989). In this vein, elementary accounting education must be revamped so that a solid foundation could be laid for school leavers to be more ready for the further challenges in the real world.

In Malaysia, the official elementary level of accounting education is in the curriculum of Form 4 and Form 5 (equivalent to Grade 10 and 11) of high school through the introductory subject of 'Principles of Accounting'. This course covers the application of the double-entry bookkeeping system which is the fundamental of accounting principles. In line with the global changes, the curriculum of this course have been revised by the Ministry of Education (MOE) to move into ICT and skilled-based pedagogical approach with the renewed aim to foster individuals who are "having accounting skills, accountable, able to think critically and reflectively, practising ethical working culture, proficient in Information Technology, enculturing lifelong learning, and having good communication skills, through meaningful learning approach and integration of theory and practices of accounting" (KPM, 2009, p.vi). In other words, the renewed educational objectives of Principles of Accounting are not merely aimed at the transfer of the technical knowledge, but to cultivate of good skills, attitudes and values through quality accounting education which promotes relevant and suitable pedagogical approach, contents and assessment.

The aforesaid endeavour started since 2005 where the MOE purchased and installed the educational accounting software known as the ASSETBase (version 2) in 1,365 national and technical secondary schools throughout the nation. Following this, a total of more than 2,500 accounting teachers and government officials were trained to use the software as preparation for teachers to start integrating the new ICT tool into their classroom teaching and learning (KPM, 2006a). To ensure the successful implementation of the revised curriculum, a 'try-out' project was conducted in 150 technical and national secondary schools nationwide since May 2007. The accounting teachers involved were required to conduct their lessons based on the the Lesson Plan Guidebook which prescribes an ICT-enhanced constructivist approach. It incorporates the use of ICT including the educational accounting software in the classroom together with the constructivist approach that emphasised on student-centred learning activities.

This new approach, nevertheless, raised the concern in terms of students' readiness for acceptance, particular in the aspect of technology and academic readiness. In terms of technology readiness, there is a doubt whether students can adapt to the technological learning environment, especially those who have less experience with ICT. This concern is raised from the fact that ICT is still considered new in the Malaysian education system (KPM, 2006b). In the study of Lai (2008) which examined for the technology readiness, Internet self-efficacy and prior ICT experience of Malaysian professional accounting students, it was found that students were at the moderate level for each of the aforementioned variables. These students were those who have undergone the education change in their school time [1] and the results reflect that the impact of ICT integration in education was still at the moderate level. Thus, it could be foreseen that the current students who are exposed to the ICT-enhanced constructivist approach are not necessarily technologically ready.

On the other hand, in terms of academic readiness, accounting is always seen as the least loved and most feared elements of the business curriculum (Fawcett, 1996). In the context of Malaysia, the failure rate of this subject remained around 20% for the past five years i.e. from 2004 to 2008 (KPM, 2004-2008). It is believed that students who were weak in mathematics or generally, in logic thinking were unable to perform well. In this case, it is vital to ensure that the new pedagogical approach will have positive impact on students, especially among the under-achievers. In view of the above mentioned concerns, it is important to investigate the impact of the new pedagogical approach for different types of learners, particularly the low ICT proficiency learners and under-achievers. Thus, the aims of this paper are to:

[1] These students registered for the Malaysian Institute of Certified Public Accountants (MICPA)'s advanced stage examination. Majority were graduates who were 21- 25 years of age. Thus, they were high school students who could have experienced ICT integration in their learning environment which was implemented in the late 1990's.

1. compare the differences of receptiveness between high and low ICT proficiency learners towards the ICT-enhanced constructivist approach in learning Principles of Accounting; and
2. compare the differences of receptiveness between under-achievers and high-achievers towards the ICT-enhanced constructivist approach in learning Principles of Accounting.

Literature Review

Cognitive Load Theory

Learning is closely related to a person's prior knowledge or experience to a subject matter. According to Bartlett (1932) and Piaget (1963), one of the functions of learning relies on the mechanism of 'schema acquisition' which is described as the network of concepts that individuals have in their memories. These schemas determine how new information is dealt with in congruence with the existing knowledge. The process of 'schema acquisition' requires a deliberate effort, and it thus produces a burden to the brain or cognitive load to process information, especially for the part of Working Memory which has limited capacity (Sweller, 1988). However, when schemas are acquired, efficiency of information processing occurs in tandem with reduced cognitive load. It is because schemas enable the efficiency dealing of information by chunking individual elements into a single element and allow problem solvers to recognise a problem state as belonging to a particular category of problem rather than many detailed information e.g. seeing an elephant as a whole, not each of its particular part such as ears, nose, tail or legs to be remembered. Thus, new or inexperience learner would suffer from high cognitive load as there is no schema or prior knowledge available to process novel information (Moreno, 2004; Sweller, 1989; Sweller, 1988).

In the context of learning accounting by students who have low ICT proficiency and weak academic foundation (particularly for the subjects of Mathematics and Science) were thus, expected to experience high cognitive load in the process of learning. In this case, it is believed that adding in the element of ICT into the learning process will be even more confusing if these students do not possess sufficient prior knowledge and experience. For instance, many studies found that those who have more experience with computers have less anxiety in learning (Chen, 1986; Heinssen, Glass, & Knight, 1987; Howard and Smith, 1986). Similarly, Taylor (2003) revealed that learners who had more experience in learning ICT skills, had a more sophisticated mental framework of how software normally worked previously, which speeded up the learning process.

However, there is another belief that by concretely presenting the subject contents through ICT, particularly through the use of educational accounting software, the cognitive load for 'scheme acquisition' will be reduced. This notion is supported by Noyes and Garland (2003) and Moreno (2004) who claimed that humans are more capable of dealing with concrete information that appears salient in the environment than abstractly generating inferences. In other words, knowledge construction through computer-based representation which is a more concrete external model is more influential in problem solving than making an abstract mental representation as learner does not have to maintain as much information in Working Memory. In the similar vein, to overcome the learning problems of under-achievers, several researchers have studied the use of simulation and gaming to develop learners' financial skills. For example, Fawcett and Lockwood (2000) found that business simulations have the capacity of reducing students' fears and barriers when dealing with accounting and financial issues. The study also reported that students had high level of enthusiasm when they are involved in the highly competitive and realistic simulations.

Thus, in view of the past studies discussed earlier in the paper, it is pertinent to conduct the present research to understand the impact of ICT-enhanced constructivist approach on learning, particularly among low ICT literacy learners and under-achievers.

Constructivist Approach

This new pedagogical approach which is constructivist-oriented encourages a transformation of teaching approach from teacher-centred to student-centred learning. Constructivist learning theories originated from the works of Dewey (1933), Barlett (1932), Piaget (1963), Bruner (1963), and Vygotsky (1978) who examined the intellectual or mental aspects of learning that emphasised the knowledge construction processes. This learning approach advocates that knowledge is meaningfully constructed by individuals through his or her interactions with the environment. Based on the mechanism of 'schema acquisition' (Piaget, 1963; Barlett, 1932) in learning, constructivist learning further explains various aspects in improving knowledge construction which include experiential learning, authentic learning, and interaction. In this vein, Dewey (1933) emphasised that education should not be the teaching of mere dead facts, but that the skills and knowledge learnt by students should be integrated fully into their lives. Hence, teachers should not only provide facts and drill, but also the aunthencity of real-world experiences and activities that centre on the real life experience of the students. Thus, the practice of 'Leaning by Doing' is the central approach for learning.

On the other hand, Vygotsky (1978) highlighted that a person depends on the sign systems during the process of growing up to think, communicate and solve problems e.g. a culture's language, writing systems, or counting system. Hence, a person's development is guided by the role of culture and interpersonal communication which are acquired through interaction with people around them. This theory gives implication for education in terms of implementing cooperative learning and scaffolding where students with differing level of ability work together for a task by taking more and more responsibility for their own learning (Slavin, 2003).

In short, the common features of constructivist learning are student-centred learning, authentic learning and cooperative learning (Wilson & Cole, 1991; Jonassen, 1994). The student-centred learning aspect relates to the belief that knowledge is constructed by learners rather than given to them, while authentic learning stresses the importance of the learning content relative to the actual environment. Lastly, cooperative learning underlies the social aspect of learning. In this case, ICT is claimed as an optimal medium for the application of constructivist principles to learning (Patokorpi, 2007). For example, the state-of-the-art of simulation software which helps learners to construct new understandings through exploratory activity has a huge potential for authenticity for learners.

In the context of the present study, it is important to observe to what extend the ICT- enhanced constructivist approach is able to impact learning especially for the under-achievers and low ICT proficiency learners. In relation to this, some researchers found that under-achievers who have the potential to perform better but need help through applying suitable pedagogy demonstrate poor self-concept (Lau & Chan, 2001; Tuss, Zimmer and Ho, 1995; Rimm, 1997). Underachievers have been found to be poor believers of their own abilities, thus they spend little effort on studying and will give up easily when they encounter problems (Lau & Chan, 2001).

In this regard, Dart (1997) claimed that the student-centred learning strategy would develop students' deep approach to learning, whereas the teacher-centred learning strategy would lead to surface approach. According to Lee, Johanson and Tsai (2008), students who employ deep approach have the tendency to focus on understanding the meaning of the contents and will attempt to relate different parts with one another, while those who opt for surface approach will perceive the tasks as a demand to be met and tend to memorize separate facts. Thus, it has been recognized by many researchers that deep approaches would lead to higher quality learning outcomes (Cano, 2007; Trigwell & Prosser, 1991).

Similarly, it is hoped that by applying the constructivist approach in learning Principles of Accounting in the present study, the under-achievers will be stimulated to employ the deep approach in the process of learning and attain better learning outcomes.

On the other hand, the constructivist approach which emphasises on cooperative learning where students with differing level of ability work together to achieve a goal or to complete group tasks (Slavin, 2003) would also benefit those who are low in ICT proficiency. Schulz-Zander, et al (2002) claimed that increased cooperation among students would have a positive impact on students' ICT competency because those who are more ICT-skilled will more likely to peer-tutor their colleagues who had less ICT competency. In turn, students who assume the role of a 'technical expert' would tend to have higher self-esteem (Schulz-Zander et al, 2002).

Methodology

This study adopted an exploratory descriptive approach to obtain different types of students' receptiveness of learning Principles of Accounting through the ICT-enhanced constructivist approach. The participants of the study were selected from the 150 technical and national schools that were enlisted in the 'try-out' project. The participants were Forms 4 and 5 students. They were further categorised according to levels of ICT proficiency and academic achievement.

A close-ended questionnaire was designed to obtain students' receptiveness (see Table 1). It consists of 34 items which were factor analysed into eight dimensions of receptiveness by Tan, Wong, Arfah, Rashidah, and Kamariah (2010) i.e. Skills Acquisition, Teaching Competency, Cooperative Learning, ICT Liking and Utility, ICT Success, Confidence with Technology, Anxiety, and Aversion. Each item was measured by a 5-point Likert scale which indicates different levels of agreement by respondents, namely: 1: Strongly disagree; 2: Disagree; 3: Unsure; 4: Agree and 5: Strongly Agree. Table 1 exhibits some examples of items for each dimension with reliability (measured by Cronbach Alpha) and factor loading values:

Table 1 Dimensions of Receptiveness extracted by Exploratory Factor Analysis

Skills Acquisition (Reliability, α = .873)	**Factor loadings**
1. This subject has improved my ability to search for information.	0.703
2. This subject has improved my ability to understand information.	0.754
3. This subject has improved my ability to analyse information.	0.738
Teaching Competency (Reliability, α = .675)	
1. I hope other teachers will implement teaching and learning techniques which are similar to this Principles of Accounting class.	0.615
2. The class was more under controlled when the educational accounting software was used by the teacher in his or her teaching.	0.621
Cooperative Learning (Reliability, α = .745)	
1. Each of my group members cooperates with one another to complete group task successfully.	0.763
2. Each of my group members is able to complete the assigned group task.	0.632
ICT Liking and Utility (Reliability, α = .767)	
1. My friend always give positive response when the educational accounting software was used.	0.553
2. The educational accounting software assists me in my learning of Principles of Accounting.	0.571
3. Students' activities are easy to be monitored with the integration of the educational accounting software in class.	0.706
ICT Success (Reliability, α = .643)	
1. I want to master the educational accounting software skills.	0.636
2. The integration of educational accounting software in the subject of Principles of Accounting can increase my competitiveness in the future.	0.618
Confidence with Technology (Reliability, α = .854)	
1. The educational accounting software enhances my confidence in facing	0.737

examination.	
2. I am able to complete my assignments by using computers.	0.758
3. The use of educational accounting software is able to improve my academic performance.	0.676
Anxiety (Reliability, α = .833)	
1. Learning by using the educational accounting software made me trembled.	0.798
2. I hesitated to use the educational accounting software because I am scared of making mistakes.	0.807
Aversion (Reliability, α = .815)	
1. I do not need to use the educational accounting software to learn the Principles of Accounting.	0.772
2. The use of the educational accounting software is too new to be considered a value learning tool for Principles of Accounting.	0.776

In addition, students' ICT proficiency level was investigated through adopting and adapting the instrument of ICT Skills Audit Scale (Taylor, 2003), whereas their academic achievements were measured through the grades achieved for the subjects of Mathematics and Science in the summative examinations of the Primary School Achievement Test (UPSR) and Lower Secondary Assessment (PMR) examinations. The ICT Skills Audit Scale (Taylor, 2003) consists of 20 items measured by a 5-point scale which reveal a respondent's experience level to deal with ICT hardware or software. The 5-point scale consists of scores from 0 to 4 i.e. 0: No experience at all; 1: Little experience and need support; 2: Sufficient experience, need some support; 3: Good experience and do not need support most of the time; and 4: Very good experience, do not need any support at all. The points of each student were averaged and later categorised into two groups i.e. High ICT proficiency (average point of 2 and above) and Low ICT proficiency (average point of below 2). On the other hand, a 5-Point scale was employed to transform the academic performance grade into scores i.e. Grade A: 5 (points); B: 4; C:3; D:2; E:1. The points of all the subjects were later averaged up and students were categorised as high-achievers (average point of 4 and above) and under-achievers (below average point of 4).

Findings

Respondents' Profile

A total of 1,322 students participated in answering the questionnaire which consists of 78.7% of Malays, 9.8% of Chinese, 1.3% of Indians, and 10.2% of other races. The majority of the respondents were females 74.4%, while 25.6% were males. In addition, the sample was made up of about 90% of Form 4 students and 10% of Form 5 students.

In terms of ICT proficiency, 48% of students were categorised as those with Low ICT Proficiency; and 52% as High ICT Proficiency. Furthermore, there were 38% and 62% of students who were identified as under-achievers and high-achievers respectively.

Receptiveness by ICT Proficiency Levels

The independent t-test was conducted to compare the receptiveness between students with low and high ICT proficiency. The results are presented in Table 2.

Table 2 Receptiveness of Low and High ICT Proficiency Learners

Receptiveness dimension	ICT Proficiency	Mean	Standard Deviation	*t*	*p*-value
Skills Acquisition	Low	3.797	0.614		
	High	3.712	0.748	2.273*	0.023
Teaching Competency	Low	3.648	0.683		
	High	3.676	0.879	-0.652	0.515
Cooperative Learning	Low	3.754	0.567		
	High	3.705	0.745	1.357	0.175
ICT Liking & Utility	Low	3.717	0.614		
	High	3.672	0.801	1.161	0.246
ICT Success	Low	4.005	0.643		
	High	3.987	0.850	0.432	0.666
Confidence with Technology	Low	3.573	0.602		
	High	3.615	0.840	-1.036	0.300
Anxiety	Low	3.035	0.815		
	High	2.824	1.067	4.048*	0.000
Aversion	Low	2.866	0.805		
	High	2.846	0.937	0.42	0.674

Note. Independent t-test, *p < .05, two-tailed.

The findings demonstrate that generally students tended to be receptive toward the new pedagogical approach where the mean values for Skills Acquisition, Teaching Competency, Cooperative Learning, ICT Liking & Utility, ICT Success and Confidence are above 3.5, while the level of Anxiety and Aversion dimensions are moderate with mean values around 3.0. for both types of students who were low or high in ICT proficiency.

Apart from the dimensions of Skills Acquisition and Anxiety having significantly different receptiveness between the two groups, there were no significant differences for the rest of the dimensions. Based on the information in Table 2, the mean scores for the Skills Acquisition dimension showed significant difference between the low and high ICT proficiency groups. On the other hand, for the dimension of Anxiety, significant difference was also found between the low and high ICT proficiency groups.

Receptiveness by Academic Achievements

The receptiveness of students was further analysed by comparing the under and high-achievers for the subjects of Mathematics and Science. The results are displayed in Table 3.

Table 3 Receptiveness of Under and High-Achievers

Receptiveness dimensions	Academic Achievement	Mean	Standard Deviation	*t*	*p*-value
Skills Acquisition	Under-achievers	3.818	0.522		
	High-achievers	3.714	0.768	2.913*	0.004
Teaching Competency	Under-achievers	3.755	0.707		
	High-achievers	3.606	0.832	3.464*	0.001
Cooperative Learning	Under-achievers	3.778	0.553		
	High-achievers	3.699	0.723	2.240*	0.025
ICT Liking & Utility	Under-achievers	3.819	0.587		
	High-achievers	3.618	0.776	5.316*	0.000

ICT Success	Under-achievers	3.950	0.673		
	High-achievers	4.023	0.803	-1.706	0.088
Confidence with Technology	Under-achievers	3.693	0.658		
	High-achievers	3.536	0.773	3.920*	0.000
Anxiety	Under-achievers	2.946	0.869		
	High-achievers	2.913	1.011	0.640	0.522
Aversion	Under-achievers	2.822	0.785		
	High-achievers	2.876	0.927	-1.112	0.266

Note. Independent t-test, *p < .05, two-tailed.

The overall results were similar with the findings of ICT proficiency where both the under- and high-achievers tend to be receptive towards the new approach of learning with mean values above 3.5 for the dimensions of Skills Acquisition, Teaching Competency, Cooperative Learning, ICT Liking & Utility, ICT Success and Confidence. Simultaneously, moderate level of Anxiety and Aversion were demonstrated by both group with mean values around 3.0.

Based on the information in Table 3, it was found that there are significant differences for both under-achievers and high-achievers in five dimensions-- Skills Acquisition, Teaching Competency, Cooperative Learning, ICT Liking & Utility, and Confidence with Technology. Meanwhile, no significant differences were found between both groups for ICT Success, Anxiety, and Aversion dimensions.

Discussion

From the results of this study, it was found that in terms of ICT proficiency, the dimension of Anxiety and Skills Acquisition exhibited significant differences between students with low and high ICT proficiency, while the rest of the dimensions remained indifference. Hence, the results show that generally, students' ICT proficiency may not have much impact on the dimensions of receptiveness.

High ICT proficiency learners exhibited significantly lower receptiveness in Skills Acquisition dimension which denotes for abilities in searching, reading, understanding, analysing information as well as the ability to make decisions and being more productive in learning. This suggests that this group of learners could have already acquired the related skills. In other words, the ICT-enhanced constructivist approach may have more impact on the low ICT proficiency learners as this new approach might be an opportunity for them to acquire various skills through the use of ICT.

At the same time, the low ICT proficiency learners also demonstrated significantly higher anxiety compared to the high ICT proficiency learners. This is in congruent with the claim made by Chen (1986), Heinssen et al (1987), and Howard and Smith (1986) who found that those who have more computer experience have less anxiety in learning. It could be further explained by Taylor (2003) who revealed that learners who had more experience in learning ICT skills, are able to learn more efficiently as they have a more sophisticated mental framework of how to deal with software. In the similar vein, this mental framework is also termed as 'scheme' which facillitates knowledge acquisition (Piaget, 1963; Bartlett, 1932). Hence, it is not surprising that the low ICT proficiency learners may have exhibited higher anxiety due to lack of 'scheme' to facilitate learning which is formed by previous experience. However, there is no significant difference between the high and low ICT proficiency groups for the dimension of Aversion. Thus, the lack of ICT proficiency is not likely to cause students to reject any new learning approach.

Furthermore, no significant differences were found for the rest of the dimensions (e.g. ICT Liking & Utility, Confidence with Technology, and ICT Success). It is possible that the constructivist learning approach may have benefited students in both the low and high ICT proficiency groups because they were exposed to cooperative learning activities. Schulz-Zander et al (2002) stressed that increased cooperation among students can improve the students' ICT competence which in turn can overcome individual differences.

It is believed that the under-achievers with poor foundation in Mathematics and Science would not be receptive towards learning accounting with the new pedagogical approach due to high cognitive load which results from the lack of schema (which is formed by prior knowledge) to process novel information (Moreno, 2004; Sweller, 1989; Sweller, 1988). Surprisingly, most of the findings in this study show the opposite results, where the under-achievers were relatively more receptive in most of the dimensions compared to the high-achievers e.g. Skills Acquisition, ICT Liking & Utility, and Confidence with Technology. This could possibly be due to the affordances of ICT in making the learning process easier where students are able to have a more concrete external model to understand about the contents than abstractly generating the information. Another possibility is that the computer-based representations could have reduced the high cognitive load in their Working Memory for 'scheme acquisition' e.g. students can have a better understanding of what is being learnt when documents, journal or ledger were presented vividly through computer screens and have hands-on practice on financial recording. In the similar vein, the findings of this study also echo the findings by Fawcett and Lockwood (2000) that ICT-enhanced learning through business simulations were able to alleviate students' fear in handling accounting and financial data. On the other hand, the impact on high-achievers was relatively lower possibly because they possess better foundation to facilitate the construction of knowledge and hence, the computer-based representation became just an assisting tool for them.

Furthermore, both the under- and high-achievers show moderate levels in the dimensions of Anxiety and Aversion with no significant differences also reveal that the problems of anxiety and aversion were not severe in them, especially for the under-achievers who could have benefited from the new approach which mentioned above.

It is worth to note that the constructivist approach which emphasised on cooperative learning, problem solving, and student-centred learning also may have contributed to the students' receptiveness. This is reflected in the results for the Cooperative Learning dimension where the under-achievers exhibited better response which could be attributed to the improvement of their sense of belonging as they were able to complete tasks through cooperation with others and, subsequently their self-esteem was enhanced. Thus, it is believed that this ICT-enhanced constructivist approach was able to overcome the 'poor self-concept' problem among under-achievers which was highlighted in the studies by Lau and Chan (2001), Tuss et al (1995) and Rimm (1997).

Finally, as the under-achievers were more receptive towards ICT-enhanced constructivist approach, the dimension of Teaching Competency, congruently, reflected higher receptiveness by the under-achievers. This is because the effective application of the new approach is acutely dependent upon the very knowledge, skill and attitude of the teacher or the Teaching Competency. Hence, for the successful implementation of the new approach in Principles of Accounting, it is important that accounting teachers to further enhance their Technological Pedagogical Content Knowledge (TPCK) that demonstrates an understanding of how technology constructively relates to pedagogy and content (Mishra & Koehler, 2006). It stresses that good teaching requires the knowledge to use technologies to present concepts and pedagogical techniques that use technologies in constructive ways to teach content.

Conclusion

Indeed, it is timely to introduce the constructivist pedagogical approach which is enhanced by ICT for the subject of Principles of Accounting. Though it needs time to prove the effectiveness in learning, this study shows that students were generally receptive towards the new attempt, particularly it had more positive impact on students who were considered as under-achievers.

However, since the project was at the 'try-out' phase, further research has to be conducted to prove concretely the effectiveness of the ICT-enhanced constructivist approach on the learning of the Principles of Accounting on under-achievers and low ICT proficiency learners. Thus, it is advisable to conduct a

longitudinal study to ensure that students' receptiveness is not merely aroused by the novel attempt in teaching and learning with ICT. For example, Borthick and Clark (1986) found initial enthusiasm for computer use was reduced as students acquired computer experience. Therefore, the research should be extended to the second phase or third phase in order to investigate for any possible changes and even study for the quality of learning outcomes to justify of the effectiveness of the new pedagogical approach.

Last but not least, further studies have to be conducted to investigate the interrelatedness among all the dimensions of receptiveness in order to have a better understanding of students' receptiveness. In addition, more variables have to be observed in the course of research e.g. students' learning approach and achievement and their relationships with students' receptiveness, individual's characteristics and teaching competency. Through this, a better understanding on learning could be expected and ultimately can contribute towards the corpus of knowledge.

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