The Application of 21st Century ICT Literacy Model among Teacher Trainees

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ABSTRACT
Malaysian Ministry of Education (MOE) plans to utilize ICT in improving the quality of learning in Malaysia. This aspiration is clearly stated in Malaysian Education Blueprint 2013-2015. Hence, teaching profession of today has demanded teachers to acquire certain ICT skills as a way of exploring, discovering and accessing information besides applying such knowledge for teaching purpose in the classroom. Regardless of how advanced technology is, in ensuring its effectiveness to take place in the classroom, as a teacher, one needs to have a great fundamental of knowledge and confidence. This paper intends to report the level of ICT competency among teacher trainees. In this study, the ICT competency of participants (teacher trainees) was assessed using the *21st Century ICT Literacy Model*. This quantitative study involved approximately 104 teacher trainees who registered at *Universiti Kebangsaan Malaysia (UKM)* (National University of Malaysia) for 2015/2016 session. All data was collected using the determined questionnaire, and statistically analyzed with *Statistical Package for the Social Sciences* (SPSS). The result indicates that teacher trainees in UKM have great ICT skills by scoring well in five out of seven domains in 21st Century ICT Literacy Model.

Keywords: ICT competency of teachers, teachers' ICT skills, ICT literacy among teachers, 21st Century ICT Literacy Model, Rasch Measurement Model

INTRODUCTION
It is undeniable that ICT in modern education context needs certain relevant rectifications and displacements. It requires a progressive evaluation in various aspects including teaching method, administration, approach as well as learner's learning style in both school and higher learning institutions. The effectiveness of selected efforts must also be consistently monitored and studied; therefore, the effectiveness of every determined effort could be ensured. Teacher' ability in managing ICT tools should not be only limited to how it is being implemented in teaching and learning process, but it should encompass all aspects in daily life. Well-prepared technology facility is not perceived as a promising platform to effective teaching and learning process, as it relies heavily on teacher's preparedness in handling and applying the tools in the learning activity. The following are several factors that explain the importance of ICT among teacher trainees.

Becoming a Knowledgeable Workforce

In a national plan called '*Rancangan Rangka Jangka Panjang Ketiga'* (Third Long Term Plan), Malaysia has made significant changes pertaining to economy management. It has put emphasis on the economy development based on knowledge or k-economy (Abdullah Ahmad Badawi, 2001). According to Ramlee *et al.* (2007), k-economy involves a knowledgeable workforce (*knowledge workers*) who could apply and utilize the knowledge effectively for certain purposes. ICT on the other hand, plays pertinent role as a platform in the era of k-economy, as it is seen as a catalyst and stimulator to the existence of knowledgeable and motivated community (OEDC 1996; Mahathir Mohammad, 2001; Abdullah Ahmad Badawi, 2001). In addition, ICT also helps in transforming ordinary workers to better knowledgeable individuals. Skills and information of these working individuals could be easily enhanced via the use of certain systems or applications in daily life besides interacting with other parties using internet. Hence, considering ICT competence has important role in ensuring that k-economy could take place, as the community in this country regardless social background is encouraged to understand and master ICT area by being able to communicate using electronic and computer. (Mahathir Mohammed, 2001).

ICT skill is significantly crucial to many learners in higher learning institutions. Among the reasonable factors of having ICT competency are allowing learners to seek and obtain information from unlimited sources, communicating via computer and manipulating particular information for various purposes such as completing the tasks, presentation and data analysis (Lin, 2000; Norizan and Mohamed Amin, 2003). Information technology is also vital for various learners' social needs such as interacting in social media, enhancing hobby, inventing creative ideas and finding learning-related information. While the nation is accelerating to the creation of information and value-based information society, learners who fail to acquire ICT are seen as 'outdated' learning individuals who have poor knowledge level in academic performance. This indirectly means that each learner in higher learning institution including teacher trainees should acquire certain understanding and ICT skills as a way of allowing them to enjoy and diversify the unlimited information sources apart from creating creative and higher order thinking culture in learning process. Teachers are indeed the agents of transformation who could help to achieve the national vision. Therefore, teacher trainees need to own high level of ICT competency in order to enhance and professionally develop themselves, and simultaneously become a knowledgeable worker. A comprehensive understanding and great ICT competency would benefit teacher trainees in becoming effective educator. This effective educator is seen as an individual who could effectively deliver the teaching process and produce successful learners who could compete and productively work for the betterment of country.

Demand for Human Capital Programs

Developing human capital is indeed one of significant objectives which Education Development Master Plan 2006-2010 (PPIP 2006-2010) would like to achieve (KPM, 2006, 2013), and it is among the vital elements in the Ninth Malaysian Plan. A comprehensive human capital is seen as one who demonstrates the quality of having great knowledge repertoire, skilful and acquires a great personality. Hence, Ministry of Higher Education has advised every public higher institution to implement and conduct the soft-skills based program as a way of producing graduates who own first class mind-set (Aminah Ayob et al., 2007). National strategic plan of higher learning has been altered as a way of ensuring a competent graduate with exceptional capability wherein knowledge use could be effectively produced. This holistic graduate is also seen as one who has a very high cognitive ability with creative-innovative mind and masters various languages for varieties of communication purposes. It is also expected that the changes made in the mentioned strategic plan could lead to the development of an ICT literate graduate who practises good values in life besides being able to contribute to community, nation and world (KPT, 2007).

Nowadays, teaching profession requires teachers to acquire ICT skills for many reasons - exploring, seeking and accessing information for the benefit of teaching and learning process in the classroom. In addition, teachers have also been asked to own knowledge and skills related to the use of computer besides understanding its educational software or applications as well as internet. Teachers should also learn on how to manage and imply the technology tools and understand certain new approaches and skills (Tapscott, 2003; Pachler, 2001). Regardless of the advancement of technology, teachers must be seen as an independent technology practitioner, as technology will not promise any positive change to teacher's learning and teaching without any knowledge and confidence. One should be able to handle and integrate the ICT tools effectively in the classroom (Davis, 2001) besides feeling convenient to use them (Norhayati, 1995).

Human capital based programs have determined ICT skill as one of generic skills which higher learning institution learner must grasp. Such skill needs to be comprehensively mastered aligned with other generic skills such as creative thinking, problem solving, communication, and working in group (Rodiah, 2010). As a future

graduate, teacher trainees from higher learning institution should be portrayed as an individual who own high competency in ICT skill, as it is a part of aspiration of both human capital based programs and PIPP which was introduced in early 2007. PIPP has put a lot of emphasis on the aspect of curriculum as well as teaching courses in order to ensure that teachers could be a competent classroom instructor and able to widely use ICT as a pedagogical approach in both teaching and learning process (KPM, 2006). Including ICT as one of generic skills to be mastered by higher learning institution learners is believed to prepare the teacher trainees with great skill which allows them to maximize the use of ICT in the classroom in the future.

Effective Teacher

Smart school was firstly introduced in 1999, and it mainly aims to produce a comprehensive ICT literate generation apart from maximizing the use of ICT itself in national education system. Smart school also intends to produce knowledgeable workforces for Malaysian high technological industry; as it has been designed to equip national school leavers with certain skills, so hopefully they could manage and cope with possible IT challenges in 21st century. In smart schools generally, a lot of focus has been given to several domains which are optimizing the learner's potential and enhance teaching and learning process with ICT aids (KPM, 2001). Teaching and learning process should be conducted based on the need and learner's preparedness, and it definitely may need substantial different learning resources. With computer and internet connection as aids for instance, various applications and software available at the market could be implied as alternative to help learners to become independent. It would also support and simplify smart learning process in the school. Such sources would indeed assist learners to expand their potential according to their preferences and abilities (KPM, 2004).

The use of ICT in teaching and learning process could be simply defined as a way of applying relevant ICT approach according to the determined plan with an objective of enhancing and creating positive impact in both processes (PPK, 2001). According to Ahmad Fuad (2003), information technology in the context of education is seen as an electronic link which assists the information to be obtained, collected, kept, processed, directed and delivered for certain purposes such as in teaching and learning process. Halimatun Saadiah and Nor Azilah (2003) on the other hand, have discovered that the effectiveness of ICT in education does not only rely on the technology itself, but it depends on several other factors such as pedagogical approach, teaching subject, type of learners, learner's proficiency, learner's need, teachers as well as learning environment.

Pertaining to the consideration given to the big role of ICT in the context of smart school education, all teachers have been advised to maximize and diversify the use of ICT in their teaching; therefore, learners would experience and enjoy effective learning in the classroom. Teachers in addition, should acquire certain ICT skills and master in each of it, so learners could be easily guided to explore the benefits of current ICT technology for their learning process especially outside of the classroom.

Creating Knowledgeable Worker

In the context of education particularly secondary school, teachers should be highly responsible at exposing learners to ICT skills. They should educate and prepare learner's mind to be more creative and critical apart from having employability skills for future purpose (KPM, 2001). By doing so, it would enable learners to pursue their education to higher level and allow them to practice such skills for their future careers (Robiah et al, 2003). Looking at the current and upcoming situation, working in Malaysia seems to not only require workers who have strong fundamental of ICT knowledge, but it might demand one to be able to apply and practice the knowledge and skills effectively at the workplace. Therefore, it is indeed challenging for teaching trainee institutions to prepare professional teaching courses which help in producing future effective secondary teachers who could ensure that learners would acquire at least ICT skill before they enter higher learning institutions.

21ST CENTURY ICT LITERACY MODEL

Great assessment always begins with clear learning objectives and measuring domain (Nitko, 2003; McMillan, 2007). Learning objective or measuring domain will definitely help in determining elements to be assessed and ways of assessing learner's performance. They will clearly explain and provide explicit information which needs to be known, understood and what could be done by learners as a part of evaluating learner's performance.

Previous researches related to ICT competency have shown that the level of ICT competency is commonly measured based on knowledge and skill according to variety of relevant domains. However, many identified studies measure the level of ICT competency using popular domains such as word analysis, electronic presentation, electronic database, Internet and email.

In 2001, a group of ICT experts called International ICT Literacy Panel has invented a literacy model called 21st century ICT Literacy Model (ETS, 2002). This model determines the level of ICT competency based on learner's ability in seven different domains – defining, accessing, evaluating integrating, inventing and communicating (ETS, 2002). These seven skills are significantly crucial, and appear as keys for one to become successful in the community (ETS, 2002). According to International ICT Literacy Panel, the use of effective ICT, at the moment, requires several important skills namely cognitive and technical skills. Therefore, it is understood that the assessment of ICT competency does not only focus and rely on the technical skills such as tools, software and connection, but it also highly considers certain cognitive skills for the purpose of managing, integrating and evaluating information (ETS, 2002). In this 21st century, assessing ICT should be more on cognitive oriented. It should focus heavily and emphasize on problem solving and thinking skill where each emphasis should be related to the use of technology across seven achievement aspects (domains) (Kazt dan Macklin, 2006).

In table 1, the researcher has adapted the definition of domains of 21st century ICT Literacy Model as its operational definition.

Table 1: Domain Definition and Operational Definition

Cognitive Skills	**Technical Skills**
Defining Understanding and explaining the concern which needs to be solved using ICT. **Operational Definition** 1. Identify problem which needs to be addressed and solved using ICT . 2. Identify ICT tools which appear appropriate to be used in managing the problem. 3. Identify ICT operations which appear appropriate for problem solving.	
Accessing Identifying information sources in digital environment. **Operational Definition** a. Identifying sources of information in digital environment such as website, group discussion, email and other possible online sources. b. Producing and combining keywords to fulfill the need of task. c. Determining the type of source that could possibly produce useful information for the need of task.	**Accessing** Using ICT tool for the purpose of collecting and discovering information in digital environment. **Operational Definition** a. Using internet as a way of discovering information in digital environment such as website, electronic database, group discussion, email and other possible online sources. b. Using search engine to find data for the requirement of task. c. Browsing the sources effectively in seeking for required information. d. Download the required information as a way of solving the problem.
Evaluating: Evaluating type of information which matches the problem by determining the power, unfairness,	

Cognitive Skills	Technical Skills
relations and other aspect of material. **Operational Definition** a. Identifying source of information such as website and database which matches the need of problem solving. b. Determining whether information such as article, picture or music is recent and relevant with problem intended to be solved. c. Determining the amount of information sources, so it would be adequate in completing task,	
Managing: Standardizing the information, so it could be easily retrieved in future. **Operational Definition:** a. Arranging the source of information such as files, email, pictures and music according to certain classification. This includes tasks and types of information based on critical assessment towards the content of information source. b. Using the file name, email or database which is relevant to the content and easily to be understood.	**Managing:** Using operational system to store the information, so it could be effectively retrieved in future. **Operational Definition:** a. Formulating an organizational folder according to identified classified information. b. Apart from having relevant content. Creating the file name correctly, email, presentation, sheets, database or folder, so it would be easier to comprehend.
Integrating: Synthesizing the information from various sources in order to invent something new and in decision making. **Operational Definition** a. Combining and simplifying information from varieties of sources as a way of producing answers to the task. b. Comparing the information from different sources for task completion purpose. c. Arranging the information according to certain criteria based on the requirement of task.	**Integrating:** Using certain operations in application or software to synthesize the information such as: **Operational Definition:** a. Using operation in Microsoft Access to generate report based on certain criteria. b. Using operation in Microsoft Word and Microsoft Excel for the purpose of arrangement according to certain criteria.
Creating: Designing and adapting information in digital environment.	**Creating:** Using ICT tools in creating information in digital native environment.

Cognitive Skills	Technical Skills
Operational Definition: a. Designing products according to the specifications which have been determined in task.	**Operational Definition:** a. Creating products relevant to the task requirement such as document file, electronic presentation, database, email and so forth. b. Using certain operations which could be found in particular application in producing products parallel to the specification of required task.
Communicating: Spreading effectively the information in digital form. **Operational Definition:** a. Determining the method of digital communication relevant to the requirement of task.	**Communicating:** Using ICT tools to effectively spread information. **Operational Definition:** a. Spreading information via email, electronic group discussion, tele-conference or social website.

Adapted from 21st Century ICT Literacy Model (ETS, 2002)

21st Century Literacy Model determines the level of ICT literacy based on seven different domains namely defining, accessing, evaluating, managing, integrating, creating and communicating. This study however, measures the aspect of technical skill based on solely five domains of ICT competency – accessing, managing, integrating, creating and communicating – with the integration of ICT components such as applying the word processing, electronic presentation, electronic sheet, electronic databased, Internet, e-mail and search engine in provided tasks as major part of developing ICT competency assessment. These components were selected mainly because of previous studies which used knowledge and skills of six domains – software, tool, internet, connection and etiquette in ICT – in measuring the level of ICT competency (Hullick dan Velentine, 2008; Morris 2010). These six domains are also seen as fundamental ICT skills which need to be acquired by learners in effective learning (Morris, 2010), besides playing major role in informational society (Hullick dan Velentine, 2008; Morris 2010) especially in education and business. Important skills such as word processing, electronic sheet, electronic databased and electronic presentation are seen pertinent which most university learners are advised to master (Hardy, 2005,; Wilkinson, 2006; Hullick dan Valentine, 2008; Morris 2010). However, research has found that unfortunately majority of learners fail to pass in ICT competency test (Hardy, 2005; Wilkinson, 2006; Hullick dan Valentine, 2008; Grant *et al*., 2009). As such, this study hope to see the dimension of learner's technical skills based on knowledge, capability of using word processing, electronic presentation, electronic sheet, electronic database, the Internet, email and search engine.

OBJECTIVE

This study intends to survey the level of ICT competency among new teacher trainees who registered for 2015/2016 session. It is specifically aimed to:

1. Identify the level of ICT competency among teacher trainees in the domain of accessing, managing, creating, integrating and communicating,
2. Recognize the level of ICT competency among teacher trainees, and
3. Find the difference of ICT competency level of teacher trainees according to courses.

METHODOLOGY

This study is a quantitative study, and it utilized survey as its research design. The questionnaires were distributed to 130 students of 2015/2016 session who were registered at Faculty of Education, National Universiti of Malaysia.

The questionnaire consists of 44 items designed by the researcher based on determined operational definitions of ICT competency. The capability of teacher trainees in performing the determined operations or process was measured according to Likert Scale. The following is the Likert scale used in this study:

Table 2: Likert Scale of ICT competency

Scale	Level of Skill		Definition of Skill
1	Not At All Skilled	:	CANNOT or NEVER perform before
2	Not Very Skilled	:	CAN perform WITH guidance.
3	Somewhat Skilled	:	CAN perform INDEPENDENTLY but require guidance at times.
4	Skilled	:	Can perform independently WITHOUT guidance.
5	Highly Skilled	:	Can perform independently without guidance and able to TEACH others.

The quality of item in the questionnaire had been analyzed based on The Rasch Measurement Model. Statistical measurement of Rasch model could be seen below in Table 4:

Table 3: Statistical measurement of Rasch model towards item in each domain.

Domain	Amount of Item	Index of Item Reliability
Accessing	4	0.96
Managing	5	0.95
Creating	26	0.98
Integrating	2	0.82
Communicating	7	0.81
ICT Competency	44	0.98

Level of ICT competency among teacher trainees in each domain as well as overall domains were measured using the descriptive analysis – mean, frequency and percentage. Meanwhile, comparison of ICT competency among teacher trainees according to program was measured and analyzed using one-way ANOVA. Table 5 shows the interpretation of mean level for ICT competency of teacher trainees.

Table 4: Level of ICT competency among teacher trainees.

Range of Min	Competency Level
0.00 – 1.88	Not At All Skilled
1.89 – 2.60	Not Very Skilled
2.61 – 3.40	Average Level of Skill
3.40 – 4.20	Skilled
4.21 – 5.00	Highly Skilled

FINDINGS

There were approximately 104 students who have completed the questionnaire; 45 students of Special Education program, 29 students of Sport and Recreational program and 30 students of TESL program.

Identifying the Level of ICT Competency among Teacher Trainees in The Domain of Accessing, Managing, Creating, Integrating and Communicating

Table 6 shows the level of ICT competency of 105 teacher trainees of UKM in four different domains – access, manage, create, integrate and communicate. Information in table 6 shows that there is one teacher trainee (1%) who does not have the capability to manage and communicate. 6.7% which equals to 7 teacher trainees do not have capability or skill to create and integrate ICT.

Table 5: Level of ICT competency among teacher trainees in each domain

Level of Skill	Access	Manage	Create	Integrate	Communicate
Highly Skilled	38.5	30.8	8.7	12.5	40.4
Skilled	37.5	44.2	32.7	31.7	39.4
Somewhat Skilled	20.2	19.2	39.4	26.0	14.4
Not Very Skilled	3.8	4.8	12.5	23.1	4.8
Not At All Skilled	-	1.0	6.7	6.7	1.0

Table 6 shows that the teacher trainees have average level (*somewhat skilled*) in creating and integrating domain, seem skillful in both accessing as well as managing domain and highly skillful in using ICT to communicate. Overall, the level of ICT competency among teacher trainees of UKM is marked at *skilled* level.

Table 6: Mean of ICT competency in each domain

Domain	Mean	Level of Competency
Access	3.96	Skilled
Manage	4.13	Skilled
Create	3.23	Somewhat Skilled
Integrate	3.20	Somewhat Skilled
Communicate	4.24	Highly Skilled
ICT Competency	3.46	Skilled

Identifying the Level of ICT Competency among Teacher Trainees

Overall, the level of ICT competency among teachers could be seen in table 7. Generally, half of the teacher trainees have various ICT competency levels – *highly skilled* (11%), *skilled* (47%) and *somewhat skilled* (30%). There were only 14% of teacher trainees who were marked as *not very skilled* and *not at all skilled* in ICT competency level.

Table 7: Overall ICT competency among teacher trainees of UKM

Level of Competency	Quantity (%)
Highly Skilled	11 (10.6)
Skilled	49 (47.1)
Somewhat Skilled	30 (28.8)
Not Very Skilled	12 (11.5)
Not at All Skilled	2 (1.9)

Determining Possible Significant Difference of the Level of ICT Competency among Teacher Trainees based on Courses

Faculty of Education in UKM offers three undergraduate programs namely Special Education program, Sport and Recreation program and Teaching English as Second Language (TESL). There were 45 teacher trainees who managed to complete the questionnaire. They came from different groups – 45 from Special Education program, 29 from Sport and Recreational program and 30 from TESL program.

Table 8: Level of ICT competency among teacher trainees according to courses

Program	N	Min	Standard Deviation
Special Ed.	45	3.36	.65
Sport and Recreational	29	3.55	.59
TESL	30	4.03	.56
Total	104	3.61	.67

One-way ANOVA test was conducted to determine the mean difference for three different programs apart from identifying if it is significant. Result of one-way ANOVA test is presented in Table 10.

Table 9 shows F ($df_{(2,101)}$, α=0.05) is 11.326 and its significant value is 0.00 ($p < 0.05$). This indicates that there is a significant difference of mean values of ICT competency among the three programs – Special Education, Sport & Recreational and TESL.

Table 9: ANOVA Test of ICT competency of UKM teacher trainees based on program

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8.511	2	4.255	11.326	.000
Within Groups	37.949	101	.376		
Total	46.460	103			

Next, in Table 11, it is indicated that the mean of ICT competency for TESL teacher trainees is higher than the other two groups which are Special Education (mean difference: 68081, sig=0.00) and Sport & Recreational (mean difference: .49807, sig=.007).

Table 10: Tukey Table

(I) program	(J) program	Mean Difference (I-J)	Sig.
Special Education	Sport and Recreational	-.18274	.426
	TESL	-.68081*	.000
Sport and Recreational	Special Education	.18274	.426
	TESL	-.49807*	.007
TESL	Special Education	**.68081***	**.000**
	Sport and Recreational	**.49807***	**.007**

DISCUSSION

This study intends to survey the level of ICT competency among UKM teacher trainees based on five out of seven domains which are highlighted in 21st Century ICT Literacy Model.

In the aspect of accessing, there is only 3.8% of 104 teacher trainees who seem not very skillful (*not very skilled)* to retrieve information in digital environment. Conversely, the other teacher trainees do not have issue to get information especially from the internet. It is also found that about 38.5% of teacher trainees are highly skilled in using ICT as a way of looking for information in digital environment.

Less than 5% of 104 teacher trainees are not very skilled or not at all skilled in managing information as well as ICT tools in digital environment. Most teacher trainees have skills, and in fact there are 31% of teacher trainees who seem to be highly skilled in standardizing and managing information aspects using ICT in digital environment.

However, this study has also found that teacher trainees have slight problems to use ICT in creating and integrating aspects. Collected data has shown the percentage of teacher trainees who are not skillful in both aspects which is 6.7%. It was also found that about 12.5% of teacher trainees were identified to have no skill in integrating and 8.7% for creating aspect. This research data has indirectly implied that lecturers should be able to design activities that could enhance the competency of teacher trainees in managing ICT. This is because, by doing so, it could hopefully encourage these teacher trainees to create new products which could be used in their teaching and learning process.

In this study, the data has also shown that there are about 40.4% of teacher trainees who are highly skilled in the aspect of communication. Although there might be 1% of teacher trainees identified as not skillful in using ICT to communicate, many teacher trainees in this study are still capable to share the information in digital environment.

In the five identified domains which have been mentioned earlier, it is shown that many teacher trainees were marked to have the highest competency in communication domain. It is then followed by the domain of managing, accessing, creating and integrating. Although the overall competency of ICT is only ranked at the 'skilled' level, analysis of collected data has reflected that teacher trainees could be categorized as *highly skilled* in communication domain, *skilled* in accessing domain and *somewhat skilled* in both creating and integrating domain.

Comparison of ICT competency among teacher trainees based on learning courses has shown that there is a significant mean difference of ICT competency among three programs namely Special Education, Sport and Recreational as well as TESL. TESL teacher trainees managed to obtain higher mean than teacher trainees of the other two programs – Sports and Recreational as well as Special Education. There are many factors which might contribute to the individual capacity. Gagne (2013) has highlighted several factors such as natural talent, environment and intrapersonal factor which could be the possible reasons. However, further studies might be needed if the researcher intends to discover the actual factor which might contribute to such level of ICT competency in this study.

CONCLUSION

In 2013-2025 Malaysia Education Blueprint, MOE has highlighted their hope to imply ICT as a way of enhancing the quality of learning in Malaysia. This aspiration is stated as the seventh shift in the program of transforming the education as aspired by MOE. The finding of this study in many ways might provide guidance in improving the ICT competency of teachers; therefore, the hope of MOE could be realized by the end of 2025.

Also, the finding of this study has found that teacher trainees who recently registered at the Faculty of Education already have the skills to imply ICT in several aspects namely communicating, accessing and managing information in digital environment. However, to ensure teacher trainees would have great ICT competency as aspired by MOE, the faculty has been encouraged to:

a. Improve the ICT module in education by focusing on way of enabling teacher trainees to produce materials or products which could be beneficial for teaching and learning purpose in the future.
b. Enhance ICT facilities in faculty, so the learner's ICT competency could be continuously developed.
c. Offer various courses which involve or are related to the use of ICT, so teacher trainees would be exposed more to opportunities to enhance their ICT skills.
d. Conduct further studies in order to identify certain factors which contribute to the level of competency among teacher trainees.

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