

Tracing the Implementation of a National ICT Policy: A Case Study of the Implementation of an ICT Curriculum in a Teacher Training Program

Alvin Auh Min Han (alvinauh@hotmail.com)
Universiti Malaysia Sabah, Malaysia
Tan Choon Keong (cktanums@gmail.com)
Universiti Malaysia Sabah, Malaysia
Lee Kean Wah (KeanWah.Lee@nottingham.edu.my)
University of Nottingham Malaysia, Malaysia

Abstract

This study examines the implementation of the National E-learning Policy within a Malaysian Higher Education Institution (HEI) along the implementation staircase of an ICT curriculum, viewed through the theoretical lens of the technology acceptance model (TAM) against a backdrop of a number of reports which have alluded that Malaysian teachers are apathetic in using ICT in their classrooms. In an attempt to better understand this conundrum, a case study was carried out to investigate the viewpoints of the key stakeholders, in particular the head of E-learning, as well as the teacher trainees who had experienced first-hand the enactment of the policy implementation in that HEI. The main data elicitation tools were a survey questionnaire and interviews. The overall findings indicated a tacit acceptance of the policy by the head of E-learning and the teacher trainees. However, the lack of support and weak infrastructure were posited as the main obstacles in implementing the policy successfully.

Keywords: Technology acceptance, Policy implementation, Curriculum

Introduction

The E-learning policy of a nation is a crucial part of the information that needs to be taken into account when a nation is considering the format of its ICT curriculum. Cullen & Hassall (2016) in a report on Vanuatu's ICT policy implementation pointed out the importance of a curriculum in helping to drive the policy and agenda of a school forward. The report pointed out the importance of ICT curriculum in schools, which could drive ICT implementation in other sectors.

The Malaysia National E-Learning Policy or Dasar E-Pendidikan Negara (DEPAN) is the main subject of this study. DEPAN was originally created with the objective of guiding the implementation of technology in teaching and learning in all public institutions of Higher Education in Malaysia (Ministry of Higher Education, 2011). Such teaching and learning are carried out in higher learning institution courses. This comes under the purview of the Ministry of higher education.

This study is a case study aimed at investigating how DEPAN has been implemented in the form of a curriculum at a local higher learning institution situated in Kota Kinabalu Sabah. The curriculum was examined using the training of lecturers or teacher trainees as a vehicle for that examination. By studying the way in which DEPAN has been implemented via the curriculum, the researchers would be able to gauge how well the policy of DEPAN has been carried out at the targeted institution in Kota Kinabalu, Sabah. The process mentioned is supported in research by Albugarni & Ahmed (2015) who associated the delivery of the curriculum with policy implementation. Albugami & Ahmed investigated this with an implementation staircase like method, using the technology acceptance model. The conclusion indicated that if teachers were given adequate training the implementation of the E-learning policy in Saudi Arabia could be better realized.

Thus, one method that can be used to assess how DEPAN was implemented was to explore the acceptance of E-learning methods by teacher trainees and lecturers. An example of this can be found in the study by Fathema, Shannon & Ross (2015). In that study, the respondents of the study had seen and perceived how useful a particular product could be. This has led the respondents to accept and eventually use that product more often. In the context of this study, if the respondents are able to accept the inclusion of the policy in their professional development courses, as well as in the curriculum, it could be argued that the policy had been successfully implemented.

Policy implementation can, additionally, be interpreted as a form of assessment and thus used to implement a curriculum and programme (Tobin, Lietz, Nugroho, Vivekanandan & Nyamkhuu, 2015). Tobin, et.al conducted a literature review on the relationship between large-scale assessment and policy implementation. One of the points mentioned was the use of reading assessment to determine which students needed help and provide the reading support needed. In addition, Pesonen, Itkonen, Jahnukainen, Kontu, Kokko, Ojala &

Pirttimaa (2015) suggested that different groups of implementers, such as teachers and administrators, will interpret a particular policy differently. In Pesonen, et.al, the special education policy was interpreted differently by local schools. As such, the curriculum produced may vary depending on how the policy was interpreted. Since curriculum is determined and formulated based on the policy of the authorities, the trainers and teachers implementing this curriculum should be trained well enough to teach it. In the case of this study, the teachers should be trained well enough to teach a curriculum that is based upon the National E-learning policy, this can be in the form of implementing technology or using technology effectively to enhance learning.

It is seen as important for teacher training to encourage and prepare future teachers' technology use in the classroom. An example of this is outlined in an article by Hooker (2016) with the use of better teacher training courses and support by master teachers in Tanzania and Kenya has helped improved the teachers' technology use in the class. Hooker's study is similar to this study's context, as seen in the study by Mat-jizat, Osman, Yahaya and Samsudin (2016) where inadequate teacher training has resulted in the lack of technology use in the classroom. In addition, the successful use of technology in the class also relies upon the teacher trainees and teachers, in which the acceptance would result in teachers being more willing to implement technology in the classroom. This is supported by Albugarni & Ahmed (2015) who posited the importance of technology acceptance by the teachers. Albugarni & Ahmed's study was conducted amongst Saudi Arabia's secondary and found the teachers' resistance and perceived lack of usefulness towards a certain technology to be a one of the major hurdles in implementing technology in the classroom.

Based upon the above points, the investigation may be conducted from two separate aspects. One aspect being that of the individuals and group that will be the target of the implementation. In the context of the study, this group will be designated as the teacher trainees. The other aspect will include those who are carrying out the implementation.

Literature Review

The effectiveness of an ICT policy is only as effective as its implementation. There have been many reasons that may impede the implementation of an ICT policy. One of these reasons consists of the acceptance of ICT by teachers and administrators. This is supported in a study by Hooker (2017) with regards to the ENLACES ICT policy in Chile. Hooker discussed the lack of acceptance by teachers in Chile as a reason for the poor implementation of the policy. This likely stemmed from the lack of clarity in the policy even when much teacher training and infrastructure support was given.

Chile's ENLACES ICT policy sought to implement a particular ICT policy through training and guidance provided for the teachers involved. Clark, Livingstone and Smaller (2012) stated that teachers are the drivers of change in any program or policy. Therefore, teacher

training should prepare teacher trainees for the implementation of technology in the classroom. This is because how the teacher trainees implement ICT in the classroom upon graduation depends on the teacher training curriculum. If given adequate training and guidance from the curriculum during their teacher training, the teacher trainees will be able to implement ICT well in the classroom, in line with the requirement of the ICT policy.

Similar to the Malaysian context in this study, the ICT policy is implemented by lecturers in higher learning institutions in the form of the teacher-training curriculum. The teacher trainees will be educated on the curriculum, with elements designed around the ICT policy. In the Malaysian context however, many teachers were found to prefer the use of traditional teaching methods per research by Abdullah, Mokhtar, Kiong, Ali, Ibrahim & Surif (2016, May). It is likely that there are many factors associated with apprehension to the idea of implementing ICT in the classroom. However, one likely reason outlined by Mat-jizat, Osman, Yahaya and Samsudin (2016) is inadequate training in the use and application of ICT related tools to encourage E-learning. Both Abdullah, et.al and Mat-jizat, Osman, Yahaya and Samsudin pointed to training as a reason with regards to the teachers being apprehensive in implementing ICT in the classroom.

Aside from teacher training, the lack of infrastructure is at times cited as a cause. A study conducted by Garba, Yusuf & Busthami (2015) within the Malaysian context, indicated that the presence of an ICT infrastructure will not necessarily guarantee that ICT policy will actually be implemented in the classroom. The need for formal and informal teacher training were also mentioned as contributing factors. Training in this case does not only mean knowing how to use the tools, but that the implementation of ICT tools based on pedagogical principles should be ensured.

These studies point to a problem that is related to the implementation of ICT policy in Malaysia. If the ICT policy was implemented well, it is likely that teachers will be accepting and proficient in implementing ICT in the classroom. As such, this study will investigate how the ICT policy was implemented in the form of a curriculum to use ICT in the classroom.

Technology Acceptance Model (TAM)

Gardner & Amoroso utilized a version of the Technology Acceptance Model (TAM). The aforementioned model and survey have also been used in studies by Hsu (2016), Yih (2009), Wolk (2007) and Alsmadi, Jianping, Prybutok & Gadgil (2017). In the aforementioned studies, the Technology Acceptance Model was used to assess aspects of education.

The Technology Acceptance Model (TAM) consists of the following components to assess technology acceptance in a particular context. First, the external variable component consists of the perceived complexity in using technology to teaching. The perceived complexity will be investigated as it may contribute to how the respondents perceived the technology's usefulness. This is seen in a study by Hassan (2007) where perceived complexity was found to affect how the respondents of the study perceived technology implementation. If it were

perceived that a particular technology was too complex to be implemented, it would affect the respondents' perceived usefulness and attitude towards using technology. This could hinder technology implementation in the classroom.

The second component is the perceived usefulness (PU). The perceived usefulness section in TAM investigates the extent of how useful a technology is, as perceived by the respondents in the study. The third component is perceived ease of use, which investigates how complex a technology is perceived to be when implemented by the respondents of a study. The fourth component is attitude towards using technology to teach. Questions in this component investigate the respondents' attitude in implementing technology in the classroom. Attitude is perceived by Hu, et.al (1999) as a means to predict the respondents' intention to use technology in the classroom. The fifth component is behavioural intention to use. Gardner & Amoroso (2004) indicated that behavioural intention to use technology in teaching is a measure of how one is willing to use technology in the classroom. The willingness to use technology can be a good predictor of actual system use, which is the sixth component of the TAM model.

TAM has been divided into version 1 and version 2, with some studies proposing a third version. However, this study will be using the first version (TAM1) due to its simplicity and explanatory power. This is reflected in a study by Venter, Rensburg and Davis (2012) where it was concluded that many of the added components are contextual as assessing technology acceptance can be a complex process, and certain added components of TAM version 2 (TAM2) may not be applicable to the context of this study. As such, the study will interview the respondents to gain a better, contextualized understanding of technology acceptance and use in their teaching. This model and interview questions have been adapted from Gardner & Amoroso (2004). The model is displayed in Figure 1 below:

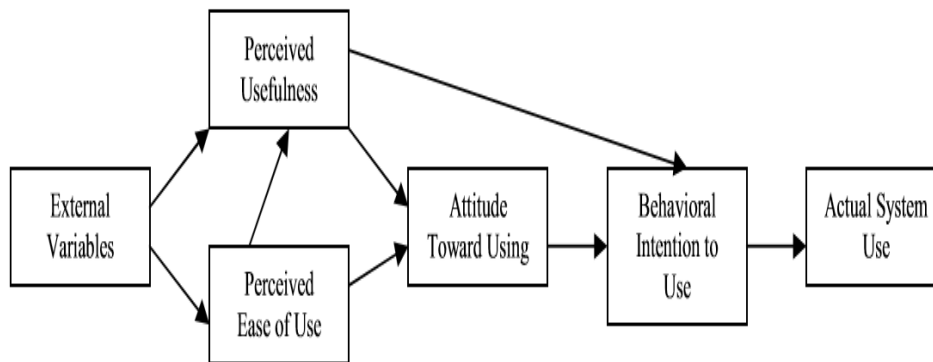


Figure 1. *Technology Acceptance Model*

TAM was used in this study because elements in TAM such as perceived usefulness were found to be determiners of technology uptake (Rienties, Giesbers, Lygo-Baker, Ma and Rees, 2016). Akcaoglu, Gumus, Bellibas & Boyer (2015) indicated the lack of technology acceptance by teachers may result in an ICT policy failing, as the teachers are not willing to implement the technology in the classroom, despite the objectives of the policy requiring them to do so.

The Implementation Staircase

The implementation staircase, coined by Reynolds & Saunders (1987) was used to ascertain how each stakeholder at different levels of a policy process would interpret and implement a particular policy. An adapted version of the implementation staircase is displayed in Figure 2 below:

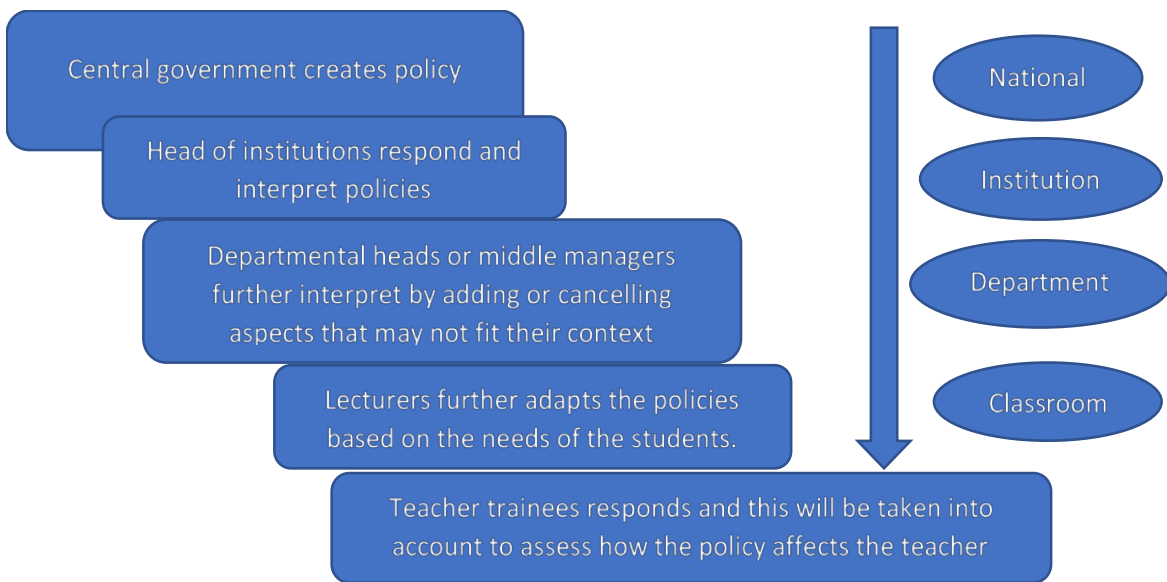


Figure 2. *Implementation staircase Adapted from Reynolds & Saunders (1987)*

The use of the implementation staircase is to create and sustain how a certain policy in an organization can be achieved through investigating how a policy is being implemented at different levels of an organization. The implementation staircase was used by Varga-Atkins (2016) in a case study in a United Kingdom University to create a uniform template for policy implementation. Through the use of the implementation staircase as a guide, Varga-Atkins was able to pinpoint the gaps in E-learning implementation and construct solutions to mitigate it. Varga-Atkins did so by introducing a group to streamline the policy implementation process between the upper administrators and academic staff. This was done to avoid any reinterpretation in how a particular policy should be carried out.

In addition, an article by Saunders & Sin (2015) indicated that the use of the implementation staircase helped researchers ascertain the different views and experiences of different stakeholders from different levels of an institution. The study by Saunders & Sin investigated how a framework was carried out in a higher learning institution. The study investigated the complications faced by the middle managers who dealt with different views from upper management and the academic staff.

The implementation staircase was chosen for this study due to the similarities in this study's objective as well as the objectives seen in other studies. For example, Saunders & Sin's (2015) article focuses on the middle managers in an institution, namely the head of department. Saunders and Sin posits that the middle managers are critical in steering policy change in an institution. This study does the same whereby the focus is on the manager of ICT of Maju University, which is a similar position to a middle manager.

Significance of study

This study is significant because it investigates the implementation of policy at the level of a teacher's training. Understanding how policy is implemented in a teacher-training curriculum could assist in informing the implementation of policy in the future.

Sa'don, Dahlan, Ibrahim and Fadzleen (2014) endorse the importance of implementation factors other than just infrastructure to bring about successful E-learning implementation. This study should help future curriculum writers, policymakers and teacher trainers to prepare teacher trainees more thoroughly for the implementation of classroom E-learning. Hence the emphasis on examining to the way that E-learning is implemented as part of teacher training. Other studies (Zainal, 2016; Lloyd, Downes & Romeo, 2016) also echoed the importance of teacher training in encouraging the implementation of classroom E-learning.

Moreover, the results of the study can serve as a form of assessment of the curriculum created from the policy. These findings can provide more insight into how future ICT policies can be formulated, while taking the difficulties and issues faced by policy implementers into account.

Research Questions

The research questions of this study are as follows:

- i) How do the teacher trainees and administrators view the implementation of E-learning in the classroom?
- ii) How is technology acceptance important in ICT policy implementation?
- iii) How has policy been implemented in the teacher training curriculum?

Method

The following sections discuss the participants involved in this study and explain the different data collection and analysis methods.

Participants

The participants of this study consisted of fifteen respondents (N = 15) who had just completed their teacher training degree at a higher learning institution in Kota Kinabalu, Sabah. The pseudonym of this higher learning institution will be dubbed Maju University. The teacher trainees' hands-on teaching experience enabled the researcher to assess the level of E-learning implementation present in the curriculum taught in the participants' tertiary education.

These teacher trainees were selected due to their internship experience before graduating. The internship experience, which would require the teacher trainees to teach at school for three months, would enable the researcher to understand how the teacher-training curriculum has helped in implementing ICT in their classrooms. Compared to teacher trainees who have not taught in any classrooms, these teacher trainees' views on ICT implementation are likely to have been based on what they learned in their studies as opposed to its practical application in the real world.

The study also included the head of E-learning of the institution. These different viewpoints assisted in providing data which is more reliable. The differing views will support or otherwise contrast with each other and that is ultimately beneficial to obtaining more realistic results.

Assessments and Measures

The teacher trainees in this study are referred to as 'teacher trainees' throughout the rest of this paper. The head of E-learning is referred to as 'the administrator'. Two data collection methods were used to measure the respondents' viewpoints given in their answers to the research questions. The data collection methods used were a dichotomous survey and focus group interviews.

The respondents were given a survey via Google forms. The use of Google forms was adapted from a study by Gardner & Amoroso (2004). The survey was dichotomous in that the teacher trainee was required to answer yes or no to each question. The answers provided the study with only an overall perception of technology use in the classroom by the respondents. As such, the researcher conducted an interview to further probe the thoughts of the respondents with respect to the research questions.

Two interview sources were used in this study. The first interview source was derived from the Technology Acceptance Model, in the form of a semi-structured interview. The data from the interview was used to support the data that had already been obtained from the survey. The interview enabled further questions to be added that would supplement the data obtained from the survey. Respondents were questioned in a focus interview. The focus group interview enabled respondents to discuss the topics freely and build upon other group members' answers.

The second interview was derived from the implementation staircase. The interview was in the form of a semi-structured interview. The questions used were modified from Mofarreh & Ibrahim's (2016) study which was conducted in the kingdom of Saudi Arabia. The study investigated how technology was implemented at various levels from the upper administration down to the teachers. The aim by Mofarreh & Ibrahim is similar to this study, which is to ascertain how stakeholders from each level would implement ICT.

Both interviews were conducted in English. The interview derived from the Technology Acceptance Model was conducted for 45 minutes. The interview derived from the implementation staircase was conducted for 40 minutes. In addition, the language used for both interviews was in English.

The interview was analysed using thematic coding; the transcript of the interview was analysed for themes that could be used to answer the research questions. The interviews were adapted from Gardner & Amoroso (2004) and the questions were amended so that they would supplement the data obtained from the surveys.

The administrator in charge of E-learning was also interviewed to ascertain how technology had been implemented in the higher learning institution. Through investigating how technology was implemented in the higher learning institution, this study will be able to gain a better understanding of what may be hindering the acceptance of the teacher trainees. This is because implementation, especially in the form of the teacher-training curriculum, could affect the teacher trainees' acceptance of applying technology in the classroom.

Results

The results for this study have been organised with attention to the different sections of the surveys and interviews. The results that will be mentioned first consists of the survey and interview results derived from the Technology Acceptance Model. The survey addressed the perception of the teacher trainees followed by an interview that obtained further support for the survey answers.

This is followed by the interview conducted with the administrator. The results have been displayed in order of the questions in the implementation staircase.

Perceived usefulness

In general, most of the respondents were in agreement that technology was useful in teaching. The response for each question in the survey has been attached marked Appendix 1.

While the survey data indicated a generally positive attitude from the respondents, the interviews delved further into this. The questions were as follows:

- i) Did you learn how useful technology was in classroom teaching from your courses in Maju University? What courses?
“...helpful courses were the multimedia education courses and the teaching methods course...” (R1Q1)
“...Some helpful courses were the ones given by the library, technology was introduced...” (R1Q1)
- ii) How were you taught that you found these tools useful?
“...Lecturer helped us with the tools...” (R3Q2)
“...Help from the lecturer do it step by step...” (R1Q2)
- iii) Was guidance given?
“...Lecturers help us to use the programs in a way...(R3Q3)”
“...Most learning is done by the students’ initiative...(R5Q3)”

Based on the first category in TAM, the answers illustrate that in terms of perceived usefulness, a majority of the respondents believed that technology can help in various aspects, particularly in completing their tasks quickly, improving their teaching, and becoming more efficient. The institution was cited as a place where useful technology can be learnt. In addition, the participants pointed out that some guidance was given. Some respondents, however, found guidance to be insufficient, thus necessitating the teacher trainees in the class to search for further information and guides through the Internet. These negative responses did not reflect so well on the course content.

Perceived ease of use

A large majority of the respondents agreed that learning technology made it easier for them to teach. Thus, indicating that their perceived ease of use was positive. Furthermore, these respondents agreed that finding information from the Internet was made easier through the use of technology. A majority of these respondents agreed that the flexibility of technology made it easier for them to teach in the classroom. Furthermore, these respondents also found that using technology was not an issue due to the courses offered at the university. The relevant questions are attached in Appendix 1.

In the interviews, the respondents provided a different perspective. With regards to the ease of technology use due to the respondents’ exposure to technology at the university, they provided some rather mixed opinions.

- iv) Was technology easy to use for you due to your exposure of it here in university?
"...was easy to use because of the assignments...(R3Q4)"
"...the assignments helped... (R4Q4)"
- v) Was it easy because you were guided on how to use it?
"...even if we were guided, there are not enough facilities in school or in university, so in the end, guidance is not enough on how to handle it...(R6Q5)"
"...it was easy, especially with guidance and also with phones and computers, information can be found on how to use the right tools...(R7Q5)"
"...having difficulties when it came to classroom management issues, was not guided on how to overcome that...(R8Q5)"

The interviews confirmed the results of the surveys to some extent. The respondents generally appeared to confirm that the use of technology had been made easier due to their exposure to it at their university. This could most likely be attributed to assignments that had spurred the teacher trainees to more actively use technology in their teaching. Furthermore, some respondents attributed the ‘ease of use’ to their course at the university and stated that the course helped by teaching them the steps to using certain educational programs.

However, when probed further, the respondents had differing viewpoints regarding ‘ease of use’. Some respondents conflated the lack of ease of use with the lack of facilities in both the teaching environment and the university. These facilities included a lack of infrastructure such as internet, as well as hardware such as computers. The deficiencies in facilities, according to some of the respondents, meant that the guidance was also not very helpful. Another possible reason for the opinions expressed could be due to the difference in guidance as to how to use a particular program and guidance as to how to apply it in a classroom setting.

Attitude towards using technology to teach

The large majority of the respondents stated that they enjoyed using technology in the classroom. However, 70% of the respondents who participated perceived that the use of technology to teach was particularly troublesome. In addition, the opinions of the respondents were divided as to how difficult it was when using technology to teach in the classroom. The questions and results for each question are listed in Appendix 1.

During their interview, the respondents were questioned further as to whether they enjoyed the use of technology as a result of their exposure to it at university. The first question was with regards to the teacher trainees’ enjoyment of courses related to technology at the university. The answers indicated a lack of enjoyment when exposed to technology on the courses at the university.

- vi) Did you enjoy using technology because of the courses I was exposed to in university?
"No (all respondents Q6)"

“...Especially due to lack of infrastructure...(R4Q6)”

A follow-up question was used to ascertain further if the respondents were taught to overcome the difficulties that they faced when using technology in the classroom. The answers indicated that they had a preference for traditional methods of teaching and that they had not been taught how to overcome the challenges they faced in their attempts to implement technology in the classroom.

- vii) If technology was difficult to use, were you taught on how to overcome it in your courses at university?

*“Not exactly, we were taught how to use the program only. (R3Q7)
“...were never taught, so had to buy our own equipment such as LCD projectors...(R4Q7)”*

Behavioral intention to use technology in teaching

This section investigated whether respondents had the intention to use technology in teaching. The results indicated that they were divided as to whether they would use technology whenever they engaged in teaching. Sixty per cent (60%) responded positively, and the remaining 40% of the respondents responded negatively. However, a majority of the respondents agreed that they had at least attempted to use technology in the classroom and would do so in the future. The questions and results for each question are listed in Appendix 1.

In the interview, the respondents were asked if they were encouraged to use technology to solve teaching problems. The answers obtained were that there were a few programs that are not technology related. These include programs on pedagogy where the lecturer used some programs such as Kahoot to enhance the learning experience of the students. Their responses centered around the delivery of content and how it motivated the students.

- viii) Were you encouraged to use technology to solve your problems in teaching? How?

“Yes, especially if we want to use technology to define and explain certain abstract concepts.

“... The use of PowerPoint slides help the students summarize and present the ideas better. (R8Q8)”

“...use Kahoot to help in learning...(R9Q8)”

The respondents were also questioned if the university had encouraged the use of technology for teaching in schools. The response was generally positive, indicating that they were encouraged or at times required to use technology to teach in their school, by the university.

- ix) Were you encouraged to use technology for teaching in school?

“Yes! (All, Q9)”

“We are ‘strongly encouraged’ to...(R7Q9)”

Perceived complexity in using technology in teaching

This section investigated the perceived complexity in using technology in teaching. The overall response was mixed. Some respondents indicated that the use of technology in the classroom was time consuming and difficult. Many respondents, however, indicated that there was a lack of infrastructure and equipment, which led to difficulties in technology implementation. The questions and results for each question are listed in Appendix 1.

An interview was also conducted in order to ascertain what forms of complexities can be found from the survey. The teacher trainees indicated that their courses were mainly focused on the pedagogical and content aspect of teaching. In general, training on how to integrate technology to support pedagogy and content in the classroom was limited. Training was also lacking when the teacher trainees were completing their internship at school.

- x) How were you told to overcome the complexities in integrating technology in your classroom teaching?
“Lecturers focused on the pedagogy, teaching us how to attract their attention and how it can be matched with content. (R3Q10)”
- xi) Were there any guidelines given?
“No, not at all.” (R1Q11)”
“No, there were none. (R4Q11)”
- xii) Were there any courses that assisted you in this?
“Yes, but we could not participate(R3Q12)”
“Sometimes, some teachers in school will share how to use certain programs with us (R2Q12)”

Actual system use

This section investigated the actual system use by the teacher trainees. The teacher trainees indicated that technology was implemented into classroom practice and this mainly consisted of the use of PowerPoint presentations. The interviews attempted to ascertain if that type of use was a result of the way the courses had been implemented. Most of the respondents said there was a lack of guidelines. However, the respondents indicated that strategies were obtained through programs that were additional to the courses provided at the university. The teacher trainees also stated that they used other tools than just Microsoft word and PowerPoint slides.

The interviews showed that no guidance had been given regarding the implementation of classroom technology. The teacher trainees pointed out that the use of technology in class was learnt through modelling from the lecturers. The teacher trainees, in general, attributed their knowledge of technology use in the classroom to courses that were not part of the university's curriculum.

- xiii) Were you given any guidelines and strategies on using technology in the classroom?

“Yes, but through courses, more through the lecturers showing or modelling the use of certain programs in the class. (R11Q13)”

“I learnt mine through being a research assistant and get exposed to certain tools used in research. (R3Q13)”

A follow-up question was asked as to whether any extra courses had been given to assist the teacher trainees in integrating technology in the classroom. The teacher trainees replied that such courses were seen in their placement schools. However, the courses were not made available for the teacher trainees because they were not full-time staff.

- xiv) Were there courses given for you to help in integrating technology in the classroom?

“There were in school, but we were not allowed to join because we were too junior (R3Q14)”

The teacher trainees were also asked if they were given any encouragement by their supervisors.

- xv) Were you encouraged by your supervisor? Were you taught practical courses to use technology in the classroom during your practicum?

“The course is not holistic enough (R11Q15)”

“most things learnt I already know... I have learnt nothing new” (R6Q15)”

“I believe that as long as we get exposed to it, we can use critical thinking to find out ourselves. However, to implement, one issue is the lack of infrastructure, which makes it difficult so we need new ideas and equipment to complement not just the teaching and also as long as there is a need, people will find out (R13 Q15)”

Implementation of ICT curriculum in the higher learning institution

This section focuses on how ICT has been implemented in a higher learning institution from the administrator’s viewpoint. The lecturer in charge of E-learning was interviewed to support the responses obtained from the teacher trainees. The first question addressed the policy as prescribed by the ministry and how the policy was being implemented by the university.

- i) When you look at DEPAN, do you think it is being implemented in Maju University?

Now in Malaysia we don't really have the policy except for DEPAN but it's a draft and it's not implemented and it's the only guideline to follow.

The administrator was asked if there was any form of the policy's implementation in the university. Their response indicated that the policy (DEPAN) had not been fully implemented in the university. It was also noted that there had been a lack of implementation at the university's administrative level.

- ii) Do you think it is being seen in anywhere in Maju University? Perhaps in the curriculum or do you think it's just a 'by the way' kind of thing.

*People can't agree on DEPAN. Other people don't really know about it, sometimes they choose...
...You need to have a governance level, something that force people to change...*

The next question probed the reasons behind the administrator's lack of enthusiasm for policy implementation. The reply showed that there appeared to be a lack of enforcement and no central body to take the lead on the implementation.

- iii) It is interesting that you talk about the governance level, at the top level the draft is done, but none is done. So why do you think it is so?

*...no institution to carry the policy,
....no one is enforcing it...*

- iv) Are you saying there is no mechanism where DEPAN can be implemented?

Yes ... between us, we adopt certain aspects of e-learning and DEPAN to use in MAJU UNIVERSITY

- v) With that in mind, what other mechanisms are being used to gauge ICT use?

...If you want to achieve blended learning, if you want the lecturer to adopt the approach, workshop and roadshows are not effective. You still need the policy and some top down to move the agenda forward. In most universities, it moves slow because you can do 100 training, but at the end you can't really gauge whether it's been done or not.

The following question examined whether there were any methods for evaluating ICT use in the teacher trainees' classes or in the university. Overall, the response indicated that there was a lack of encouragement and no methods for such an evaluation. Examples are shown below:

- vi) Is there no way to evaluate if ICT is being used in the teacher trainees' classes or university?

*Not yet, but we will be doing that soon.
...workshops will be held and we will never know when it will happen...
... online platforms' use will be encouraged to have an idea where we are
now and what are the usage of ICT.*

Since the administrator had raised the question of future programs, the interviewer proceeded to ask the lecturer about the possibility of a future plan by the university. The response indicated that a way forward is still at the planning stage.

- vii) Is there a plan or a roadmap for ICT implementation in the classroom?

*I will first collect the data, analyze it from workshops...
...data will be used to develop a strategy to move forward in terms of E-
learning...*

- viii) What is the main reason it should be implemented? What is the vision that you have for the future in E-learning?

*...many courses overlap and it is a waste of resources. If everything is on the
server, it can be done anywhere, a form of open concept...
...It's like Grabcar and the future is going to be like that...*

The reply from the administrator showed that there is a lot of potential to implementing ICT in order to spur E-learning in a higher learning institution. However, there is no 'road map' in spite of this potential. The administrator was then questioned on policy from a teaching and learning perspective.

- ix) Can you comment on the aspect of teaching and learning?

*...I use different approaches of blended learning to deliver the content...
The delivery is changed, with videos and online activities incorporated to
increase engagement.*

- x) Does it help in their understanding?
*It does, to a certain extent. Maybe understanding is the same but engagement is
definitely there...
...students need to find the lesson enjoyable and to dictate their own learning...*

In general, the administrator concluded that the use of ICT in the classroom has been beneficial for the teacher trainees and students from a teaching and learning perspective. The administrator was asked about the support and culture of using E-learning in the classroom.

- xi) Are the other university staff supportive of the initiative?

...after they see what I do, even if I don't force them, they like it and they are motivated...

- xii) Is there any incentive, monetary or otherwise involved in using technology in the classroom?

No, the government has to do something, for example, you can have a yearend Award of Excellence to appreciate and should be one of the criteria...

- xiii) Is there a culture in the institution that encourages the use of technology in the classroom to promote E-learning?

So far, we have not had a culture of this.

- xiv) Do the lecturers fear the use of technology in the classroom?

Maybe there is a lack of incentive.

- xv) Since there are so many different aspects of E-learning, what do you think is the most important thing to make the implementation of technology a success?

*...Policy and support from top management...
...so, we need to carry out a culture where there is a sense of need, if not, if you do a once a year event, they will think it's a one-off event and not something important to change the whole teaching and learning scene...*

The responses indicated a lack of incentive, support and encouragement from the leaders or top management of the higher learning institution. There appears to be no culture for the implementation of ICT in the classroom.

Discussion

This section discusses the findings of the data collected based on the results of the study.

i) How do the teacher trainees and administrator view the implementation of E-learning in the classroom?

The majority of the respondents appeared to have a level of acceptance of the use of technology in teaching when compared to the technology acceptance model. The teacher trainees felt that the use of technology was good and that it helped them in their teaching throughout their time at practicum.

While the teacher trainees felt that the technology could be easily implemented into their teaching, there was an issue over the lack of infrastructure. The lack of

infrastructure was one of the main obstacles to the implementation of technology in the classroom. Other issues that were highlighted in technology implementation were the lack of guidelines, courses and guidance in implementing ICT in the classroom.

However, teacher trainees still seem to have managed to use technology to encourage E-learning in their classroom practice. This is achieved through the use of the internet and modelling the tools other lecturers used during lectures. This was also supported by the administrator of E-learning in the higher learning institution, who stated that the teacher trainees would endeavour to incorporate ICT in the classroom.

The administrator highlighted that there was a lack of implementation of technology by most lecturers. The administrator reported that even though increasing numbers of lecturers had tried implementing technology in their teaching and learning process, there was still a general lack of acceptance. The administrator attributed this to the lack of directives or motivation from other administrators in the higher learning institution.

ii) **How is technology acceptance important in ICT policy implementation?**

Wong (2015) indicated that technology acceptance would lead to its implementation in the classroom. This is because the teacher trainees need to see the benefits of technology demonstrated and modelled before understanding and accepting it. The same conclusion can be applied to the teacher trainees of this study. Many of the teacher trainees attributed their implementation of technology in the classroom to the demonstrations carried out by their lecturers. Furthermore, the administrator of E-learning observed that since there are no incentives in implementing technology in the classroom, the only reason that lecturers would use technology in the classroom is because they had witnessed its effectiveness in workshops or programs. The lecturers having seen it for themselves can then create a chain effect whereby the lecturers then demonstrate the use of technology, either directly or indirectly, for the teacher trainees.

This is supported with the study by Sørebo, Halvari, Gulli, & Kristiansen (2009) which asserts that demonstrations were crucial in gaining technology acceptance by teachers and in the context of the study, the lecturers teaching the subjects. Rienties, Giesbers, Lygo-Baker, Ma & Rees (2016) echo this point in their study, citing the need for training, and demonstrations of how it can be used to ensure that the lecturers do use technology in the classroom.

iii) **How has the policy been implemented in the teacher training curriculum?**

The curriculum was assessed through the head of E-learning and the teacher trainees. The head of E-learning said that policy was implemented in the institution mainly through the initiative of the lecturers as there are no requirements nor incentives to do so.

Furthermore, the lack of incorporation of technology into the curriculum is an issue. The curriculum for teacher trainees did not specifically require the use nor implementation of ICT in the classroom during the internship period. In addition, it was reported that there has been a lack of motivation from the leaders of the institution or any central agency of the government to encourage its implementation. Thus, it can be concluded that the implementation of the policy has been mainly carried out on the initiative of the lecturers or teacher trainees.

As a result of the findings above, the teacher trainees did not associate the ability to implement ICT in the classroom to the teacher-training curriculum. The teacher trainees claim that they gained this knowledge by modelling the way that lecturers had implemented certain ICT tools in the classroom. In addition, the teacher trainees also attributed their willingness to use ICT to other experiences such as working as a research assistant. The types of experiences that were mentioned were all not part of the curriculum.

It can be concluded that the ICT policy was not implemented well in the teacher-training curriculum. Elements of the ICT policy were carried out based on the interest and self-motivation of the lecturer and teacher trainees. As such, many teacher trainees prefer the traditional method of teaching due to the lack of incentive, directive from the administrator as well as the curriculum that is written based on the objectives of the ICT policy.

Conclusion

The study has found that there is a willingness both in the administrator and the teacher trainees to use ICT in general in the classroom, and a genuine desire to do so. The fact that this willingness exists can be taken as one form of success with regard to the implementation of ICT in this HEI. This success, however, can be diminished by the lack of support from the relevant authorities. Support could be given in the form of directives, promotion opportunities or programs that advocate the use of ICT in the classroom. In summary, while the DEPAN policy provided some direction in terms of how ICT should be implemented, a lack of incentive and support have been found to stifle the drive of the policy

Furthermore, the acceptance level of both the administrator and teacher trainees in general already exists. Therefore, the leaders and authorities governing the implementation of the policy should ensure that assessments of the courses, curriculum and teaching staff also incorporate an assessment of technology implementation. Through the incorporation of assessment, some rewards for the lecturers and teacher trainees can be incorporated at the university level. This is likely to increase the chances of success for the implementation of the National E-Learning policy at Maju University.

The findings of this study are only limited to the context of Maju University. The findings should not be generalized to the context outside of Maju University.

References

- Abdullah, A. H., Mokhtar, M., Kiong, J. C. C., Ali, M., Ibrahim, N. H., & Surif, J. (2016, May). Factors preventing Malaysian teachers from using Information and Communication Technology (ICT) in teaching mathematics. In *Information and Communication Technology (ICoICT), 2016 4th International Conference on* (pp. 1-6). IEEE.
- Akcaoglu, M., Gumus, S., Bellibas, M. S., & Boyer, D. M. (2015). Policy, practice, and reality: exploring a nation-wide technology implementation in Turkish schools. *Technology, Pedagogy and Education, 24*(4), 477-491.
- Albugarni, S., & Ahmed, V. (2015). Success factors for ICT implementation in Saudi secondary schools: From the perspective of ICT directors, head teachers, teachers and students. *International Journal of Education and Development using Information and Communication Technology, 11*(1), 36.
- Alsmadi, D., Jianping, C., Prybutok, V., & Gadgil, G. (2017). E-Learning in Jordanian Higher Education: Cultural Perspectives and Institutional Readiness. *Journal of Information & Knowledge Management, 17*50035.
- Clark, R., Livingstone, D. W., & Smaller, H. (Eds.). (2012). *Teacher learning and power in the knowledge society* (Vol. 5). Springer Science & Business Media.
- Cullen, R., & Hassall, G. (2016). e-Government in the Pacific Island states: ICT policy and implementation in small island developing states: Cook Islands Country Report.
- Fathema, N., Shannon, D., & Ross, M. (2015). Expanding The Technology Acceptance Model (TAM) to Examine Faculty Use of Learning Management Systems (LMSs) In Higher Education Institutions. *Journal of Online Learning & Teaching, 11*(2).
- Garba, S. A., Yusuf, B., & Busthami, A. H. (2015). Toward the Use of Technology and 21st Century Teaching-learning Approaches: The Trend of Development in Malaysian Schools within the Context of Asia Pacific. *International Journal of Emerging Technologies in Learning (iJET), 10*(4), 72-79.
- Gardner, C., & Amoroso, D. L. (2004, January). Development of an instrument to measure the acceptance of internet technology by consumers. In *System Sciences, 2004. Proceedings of the 37th Annual Hawaii International Conference on* (pp. 10-pp). IEEE.
- Hooker, M. (2016). Cultivating synergies in enhancing ICT Competencies: A partnership approach (GeSCI). In *Diverse Approaches to Developing and Implementing Competency-based ICT Training for Teachers: A Case Study* (Vol. 1, pp. 87-118). UNESCO Bangkok.
- Hooker, M. (2017). *A Study on the Implementation of the Strengthening Innovation and Practice in Secondary Education Initiative for the preparation of Science, Technology, English and Mathematics (STEM) Teachers in Kenya to integrate Information and Communication Technology (ICT) in Teaching and Learning* (Doctoral dissertation) Queen's University, Belfast.

- Hsu, L. (2016). An empirical examination of EFL learners' perceptual learning styles and acceptance of ASR-based computer-assisted pronunciation training. *Computer Assisted Language Learning*, 29(5), 881-900.
- Lloyd, M., Downes, T., & Romeo, G. (2016). Positioning ICT in Teachers' Career Path: ICT Competency as an Integral Part of Teacher Standards (Australia). In *Diverse Approaches to Developing and Implementing Competency-based ICT Training for Teachers: A Case Study* (Vol. 1, pp. 21-44). UNESCO Bangkok.
- Mat-jizat, J. E., Osman, J., Yahaya, R., & Samsudin, N. (2016). The use of augmented reality (AR) among tertiary level students: Perception and experience. *Australian Journal of Sustainable Business and Society*, 2(1).
- Ministry of Higher Education. (2011). Dasar e-Pembelajaran Negara Institusi Pengajian Tinggi. Malaysia: Asia e-University.
- Mofarreh, A., & Ibrahim, Y. (2016). *Implementation of ICT policy in secondary schools in Saudi Arabia*. (Thesis). University of Wollongong. Retrieved from <http://ro.uow.edu.au/cgi/viewcontent.cgi?article=5731&context=theses>
- Pesonen, H., Itkonen, T., Jahnukainen, M., Kontu, E., Kokko, T., Ojala, T., & Pirttimaa, R. (2015). The implementation of new special education legislation in Finland. *Educational Policy*, 29(1), 162-178.
- Reynolds, J., & Saunders, M. (1987). Teacher responses to curriculum policy: beyond the 'delivery' metaphor. *Exploring teachers' thinking*, 195-214.
- Rienties, B., Giesbers, B., Lygo-Baker, S., Ma, H. W. S., & Rees, R. (2016). Why some teachers easily learn to use a new virtual learning environment: a technology acceptance perspective. *Interactive Learning Environments*, 24(3), 539-552.
- Sa'don, N. F., Dahlan, H. M., Ibrahim, A., & Fadzleen, N. (2014). Usage of mobile learning in Malaysian secondary education: Stakeholders' View. *Journal of Information Systems Research and Innovation, JISRI*, 6, 42-50.
- Saunders, M., & Sin, C. (2015). Middle managers' experience of policy implementation and mediation in the context of the Scottish quality enhancement framework. *Assessment & Evaluation in Higher Education*, 40(1), 135-150.
- Sørebø, Ø., Halvari, H., Gulli, V. F., & Kristiansen, R. (2009). The role of self-determination theory in explaining teachers' motivation to continue to use e-learning technology. *Computers & Education*, 53(4), 1177-1187. doi: 10.1016/j.compedu.2009.06.001
- Tobin, M., Lietz, P., Nugroho, D., Vivekanandan, R., & Nyamkhuu, T. (2015). Using large-scale assessments of students' learning to inform education policy: Insights from the Asia-Pacific region.
- Varga-Atkins, T. (2016). A study of the role of a technology-enhanced learning implementation group in mediating an institutional VLE minimum standards policy. *Research in Learning Technology*, 24(1), 32815.
- Venter, P., van Rensburg, M. J., & Davis, A. (2012). Drivers of learning management system use in a South African open and distance learning institution. *Australasian Journal of Educational Technology*, 28(2).

- Wolk, R. M. (2007). Using the technology acceptance model for outcomes assessment in higher education. In *Proceedings of the Information Systems Education Conference* (pp. 1-16).
- Wong, G. K. (2015). Understanding technology acceptance in pre-service teachers of primary mathematics in Hong Kong. *Australasian Journal of Educational Technology*, 31(6).
- Yih, M. B. (2009, April). An investigation on students' acceptance of writing Web logs: A test of Technology Acceptance Model. In *Education Technology and Computer, 2009. ICETC'09. International Conference on* (pp. 181-185). IEEE.
- Zainal, N. F. (2016). TPACK Development in Teacher Education Programs: Malaysian Context. *International Journal of Academic Research in Business and Social Sciences 2016*, 6(12), 237-244.

Appendix 1

PERCEIVED USEFULNESS

No.	Question	Percentage of respondents who are in agreement.
1.	Using technology (powerpoint/youtube/blendspace/schoology/any web2.0 tools) helps me finish my teaching tasks quickly.	92%
2.	Using technology (powerpoint/youtube/blendspace/schoology/any web 2.0 tools) helps improve my teaching.	100 %
3.	Using technology (powerpoint/youtube/blendspace/schoology/any web 2.0 tools) helps me to be more efficient (finish more tasks).	92 %
4.	I find technology (powerpoint/youtube/blendspace/schoology/any web 2.0 tools) useful in my teaching.	100%

PERCEIVED EASE OF USE

No.	Question	Percentage of respondents who are in agreement.
1.	Learning to use technology to teach is easy for me.	77 %
2.	I find it easy to find teaching materials from the internet.	92 %
3.	I find technology easy and flexible to use in my classroom teaching.	77 %
4.	I find technology easy to use because of the courses obtained from my University.	84 %

ATTITUDE TOWARDS USING TECHNOLOGY TO TEACH

No.	Question	Percentage of respondents who are in agreement.
1.	I enjoy using technology to teach my class.	92 %
2.	Using technology to teach my class is troublesome.	69 %
3.	It is difficult to use technology to teach in my class.	46 %

BEHAVIORAL INTENTION TO USE TECHNOLOGY IN TEACHING

No.	Question	Percentage of respondents who are in agreement.
1.	I always use technology whenever it has a feature to help in my teaching practice.	61 %
2.	I try to use technology as much as i can in my teaching practice.	84 %
3.	I want to try using technology as much as I can in my teaching practice in my future classes.	100 %

PERCEIVED COMPLEXITY IN USING TECHNOLOGY IN TEACHING

No.	Question	Percentage of respondents who are in agreement.
1.	Using technology in my teaching practice takes up a lot of my time when completing tasks.	53 %
2.	I find using technology in my work is more troublesome than just using pen and paper.	23 %
3.	I find it difficult to use technology because there is no internet in school.	23 %
4.	I find it difficult to use technology because the equipment is not provided.	77%

ACTUAL SYSTEM USE

No.	Question	Percentage of respondents who are in agreement.
1.	I have used technology in class often in my classroom practice.	58 %
2.	I use more than just Microsoft word and PowerPoint in my classroom practice.	91%