Teacher Educators'Pedagogical Beliefs and Practices towards ICT in Teaching and Learning

[a]Mei Lick CHEOK, [b]Su Luan WONG, [c]Ahmad Fauzi MOHD AYUB, & [d]Rosnaini MAHMUD
[a]*Teacher Training Institute, Malaysia*
[b]*Faculty of Educational Studies , University Putra Malaysia, Malaysia*
[c]*Faculty of Educational Studies , University Putra Malaysia, Malaysia*
[d]*Faculty of Educational Studies , University Putra Malaysia, Malaysia*
* wsuluan@gmail.com

Abstract: This study investigates uses of ICT as reflected in teacher educators' beliefs and practices. The research is situated in Malaysia where ICT in education has still not reached the desired expectation. Based on the argument that teacher educators' limited use of technology in teaching and learning can be explained by the lack of beliefs towards ICT, understanding their rationales and behaviours is important for a successful implementation of an ICT initiative. Interviews were used to solicit information from nine teacher educators from a teacher training institute. Four foci emerged across the findings in terms of beliefs that guided their practices. Analysis of the findings resulted in a development of a typology explaining the relationship between beliefs and practices among the teacher educators.

Keywords: ICT, beliefs, practices, teacher educators

1. Introduction

It is interesting that Hooper and Rieber (1995) mentioned in their article that doctors or dentists from 50 years ago will not be able to handle the equipment in today's hospital but a teacher from the same era would immediately feel at home in today's classrooms. Despite the current trend worldwide where there are more ready access to technology, increased opportunity for more technology training, and more supportive policy, teachers use of technology is still surprisingly low (Ertmer, 2005). There are a multitude of factors for this phenomenon but this paper will focus on teachers' pedagogical beliefs in their classroom instruction.

One's beliefs can be inferred from what one's speech, intention and action. When all three aspects are examined then we can fairly say that we have an accurate representation of one's beliefs (Rokeach, 1968). Pedagogical beliefs is defined as whether or not we think technology can help us achieve our instructional goals which we perceive to be most important (Watson, 2006). Teachers make value judgments about whether the technology is relevant to their goals in addressing their important teaching and learning needs. The more they value it to be important, the more likely they are to use it. As learning and adopting any new tool will take up a substantial amount of their time, energy and resources, they will only be willing to do that for tools that would be instructionally worthwhile. Continuous professional development trainings need to promote and sell the idea that the new tool alligns with their pedagogical beliefs. If inconsistencies exist between their beliefs and practices, there may be contextual factors that are preventing teachers from applying their beliefs at work. Issues like assessment, facilities, management, availability of support and the community at workplace, to a large extent influence beliefs from manifesting into practices. In a study by Fang (1996), the author stresses that due to the complexities of a teachers' job, inconsistency between what they believe and what they actually do, happens. To a large extent, teachers' beliefs are context specific.

This study sought to examine why and how teacher educators (TEs) use technology in order to understand their pedagogical beliefs in relation to technology use. By understanding this, relevant and effective professional development and training needs could be planned and aligned accordingly. If these trainings are delivered based on their beliefs, they will be more

likely to be transferred into the classrooms. Implications for professional development and suggestions on how teachers' pedagogical beliefs can be influenced to change are discussed.
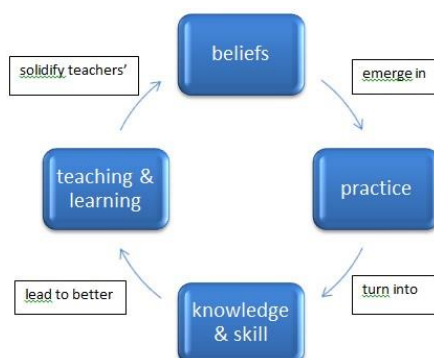

Figure 1: Framework on the progression wheels of teachers'
pedagogical beliefs (adapted from Ertmer, 2005)

Figure 1 suggests, as TEs' pedagogical beliefs influence or is congruent with their teaching and learning, professional development programmes should then focus on using the technology to fulfill their immediate needs in the classrooms. Over time, with more usage and as their teaching and learning skills and knowledge steadily increase, so will their students' learning. As their students' learning outcome improved, their pedagogical beliefs towards the technology will also be renewed and strengthened. Based on this reasoning, continuous professional development programmes have to be alligned to the teacher educators' beliefs in order for them to be effective and relevant.

2. Methodology

2.1 Research Design

This is a qualitative study designed to study TEs' experiences in real unpredictable real-life situations. Participants responded to a structured interview carried out in their Teacher Training Institute. Data were collected about two weeks after the start of a new semester.

2.2 Context and participants

Convenient purposeful sampling was used in recruiting **sample** for the study. TEs who are recognised for their technology integration in the classrooms were approached for the study. Table 1 shows demographic information of the participants. There were nine TEs whom were interviewed in the study. Two are PhD holders while the other seven have their Masters degree. Three are males while the other six are females. Four of them have more than ten years of teaching experience.

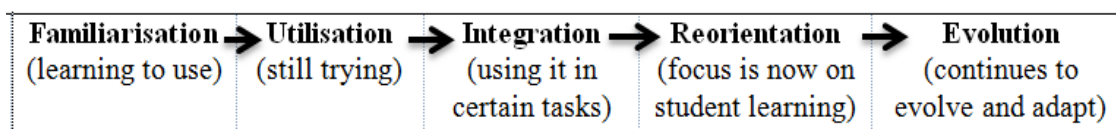Table 1: Demographic information of participants

Code name	Department	Age	Years of teaching	Highest qualification
R1	Technology	59	25	Masters
R2	Language	58	13	Masters
R3	Social Studies	58	28	Masters
R4	Social Studies	55	25	PhD
R5	Language	53	8	Masters
R6	Language	50	8	Masters
R7	Language	46	6	Masters
R8	Language	43	8	PhD
R9	Language	42	2	Masters

2.3 Procedures and data collection

Data were collected from an interview carried out involving nine TEs from a teacher training institute in Malaysia. Each TE responded to four questions asked during the structured interview. These questions were meant to capture their beliefs through their opinion of the value**s** and use of technology in their teaching. Questions that were asked, "What is effective teaching and learning to you?, How do you view the role of technology in achieving an effective teaching and learning process?, How do you use the technology in your teaching and learning? and How do you encourage teachers to use more technology in their teaching and learning?"

2.4 Data Analysis

Table 2: Teacher educators' patterns of educational technology adoption (adapted from Hooper & Rieber, 1995)

Familiarisation (learning to use)	Utilisation (still trying)	Integration (using it in certain tasks)	Reorientation (focus is now on student learning)	Evolution (continues to evolve and adapt)

Data were coded using a priori coding scheme based on the three broad dimensions; perception towards ICT in teaching and learning, beliefs about the role of ICT in teaching and learning. These dimensions are found to be important in the literature on teachers' beliefs and technology usage. Each TE's data was studied for emerging themes before it was then compared to the other samples. Upon completion of the coding, decisions were compared and discrepancies discussed and reconciled before further analysing the data. Codes were then grouped to identify themes, patterns and tentative categories regarding the various issues and aspects. Hooper and Rieber's (1995) five phases of technology use were adopted in order to explain the trainers' usage of ICT (refer Table 2). This is a model which explains patterns of adoption after they are first introduced to educational technology. These five phases include familiarisation, utilisation, integration, reorientation and evolution.The cross-case analysis between the nine respondents yielded a typology concerning their pedagogical beliefs towards technology in fulfilling their teaching needs.

3.0 Findings

Data on respondents' pedagogical beliefs were obtained from the interpretations made from their responses during their interviews. The following section presents how the themes cut across all the respondents. The sole criterion for this qualitative grouping is based on their level of technology usage in their teaching and learning; three groups were formed.

3.1 Perception towards ICT in teaching and learning

All nine educators clearly valued technology's role towards improving their teaching and learning. What differentiates them in their technology integration is their ICT knowledge and skills. Two of the educators were classified in the evolution stage as they are constantly on the lookout for better tools and ways to improve their lessons. Placement of the TEs adoption stage (refer Table 3) was based on their statements made captured during the interviews. Three are placed in the reorientation stage as they seemed to have reached the stage of reconceptualising the purpose and function of the classroom. Their concern is more on providing an environment where students feel supported and are facilitated in their learning. The other four are in the integration stage where only certain tasks will utilise technology. This is the stage where change in teachers' practices start.

Table 3: Classification of teacher educators' adoption stage

Adoption Stage	Indicators	Sample qualifying statements
Evolution	• classroom learning environment should constantly change to meet the challenge and potential provided by new understandings of how people learn	"… create a Yahoo Group … uploaded my lectures, the course proforma, references or websites … communicate through chat group … upload videos … design coursework … use digital tools like mix text, sound, video, and images, to create original materials (R9)" "It is a mean, not an end (R2)."
Reorientation	• provides learning environment that supports students' construction of knowledge	"… create, search, share and provide learning resources … more attractive, interesting, user friendly and accessible to students (R4)."
Integration	• designate certain tasks and responsibilities to the technology	"… present the content…(R3)." "When I think its necessary and suitable… (R8)."

3.2 Beliefs about the role of ICT in teaching and learning

Teach and assess more effectively: All the TEs use technology to help them either to gain new knowledge by reading up on new materials and resources or to disseminate information to their students. Unlike in traditional setting, technology made it possible for the teachers and students to take the lessons "…further than planned … (R2)." Besides, as the internet offers so much flexibility and varieties, teaching and learning are more captivating and efficient. One of them, however, mentioned that, "… technology is only another medium to enhance transmission of knowledge but be it effective or not, it still depends on the teachers' abilities in delivering and students to construct meaning upon receiving those input … (R5)".

Help to create, search, share and provide better learning resources: Only two of the TEs are using authoring tools to design their own learning packages, "… use any LMS to set up your teaching and learning web site for your students. Example: Schoology, Edmodo. Currently, I am using the institute's platform, el@IPGKPM, created using Moodle(R2).". Training for building own online courses had started more than ten years ago in the teacher training institute. However, the uptake is minimal as some felt the training were not sufficient for them to create their own courses online, "… had some sort of technology-related professional development in the past years but the instruction … in technology integration, whether online or face-to-face, is still too focused on learning how to use the software versus integrating it into the teaching and learning process (R7)."

Transform and enhance teaching through wider range of resources: Information to be learned need not only be transmitted by the teachers as they are no longer the fount of knowledge. Students through well constructed technological pedagogical strategies will be able to construct knowledge and problem solve either by looking up for new information or consulting experts and peers from any parts of the world. By browsing for information, students learning becomes more meaningful as they will need to generate webs of semantically and logically related information which makes sense to them personally. Technology enables them to see the interrelatedness of content and subjects which in itself leads to deep and meaningful processing of learning.

Increases comprehension and engagement: Human use of computing is vast and growing. The potential for learning online has become greater, along with the complexity of identifying the most viable and desirable ways. All echoed the sentiment that technology makes their teaching easier with the ready accessibility to vast choices of resources. The exposure from varying perspectives and modalities enable students to understand concepts at a deeper processing level and not superficially. According to the TEs, when lessons using technology are designed with robust instructional principles, students are more likely to stay engaged and committed, "… teachers who know their subject matter thoroughly can be more effective and efficient at organizing the subject matter, connecting the subject with the students' previous knowledge, finding useful analogies and examples, presenting current thinking on the subject, and establishing appropriate emphases (R9)." Inert knowledge that are the the result of traditional learning approach will be replaced with knowledge that are applicable in the real world. This leads to the emergence of new learning scenario where, "... see the world from a different perspective and gained more satisfaction utilizing their own material for teaching and learning. They are able to relate content to the real-world… (R2)."

Table 4 presents the typology of pedagogical beliefs among the teacher educators which summarised the essence of the findings.

Table 4: Typology of teacher educators' pedagogical beliefs towards technology integration in teaching and learning

Level of technology use	Classroom Usage	Perception towards ICT in teaching and learning	Beliefs about the role of ICT in teaching	Beliefs about the role of ICT in learning
Evolution [2 teacher educators]	Continues to evolve and adapt	Facilitation tools	Teach and assess more effectively	Increases comprehension and engagement
Reorientation [3 teacher educators]	Focus on students' needs and learning.	Fulfill teaching needs and increase productivity.	Helps to create, search, share and provide better learning resources	Emergence of new learning opportunities
Integration [4 teacher educators]	Use technology in some tasks	Teaching tool that is dependent on teachers' skill and knowledge.	Transform and enhance teaching through wider range of resources	Transformation of students as they become more engaged and responsible

4.   Discussion

TEs in this study reflect varying pedagogical beliefs towards technology in their teaching and learning. This is due to their self-efficacy level in handling technology. The more confident they feel, the more risks they are willing to take. On the other hand, even if they have high pedagogical beliefs towards technology, but their self-efficacy towards technology is low, chances are they will not have much technology integration in their classrooms. On a more positive note, this latter group of teachers would also be equally ready to embrace new technology provided they are given sufficient training. As teachers are faced with a variety of implicit and explicit mandates that will define and limit their instructional options, their pedagogical beliefs will only be relevant to a certain extent. Their practices will be largely situational, as mentioned by a respondent "… most of the schools do have a computer lab but it is hardly used or the computers are outdated and not functioning properly (R9)." She further adds, "… limited computers mean grouping, making it harder for teachers to control the class … and unruly students … (R9)."

Various strategies have been proposed in order for teachers to change their belief. These include obeservation, practice, reflection and social cultural support (Ertmer, 2005). By observing others, it may spark teachers to reflect on their ways of teaching and make necessary changes in the ways they integrate technology in their lessons. It would also trigger them to think and re-evaluate their roles and responsibilities in preparing students to survive in the 21st century workforce. Rather than working alone behind the closed doors of their classrooms, in collaborative classrooms, teachers can witness successful outcomes of innovative uses of technology. According to De Liddo (2014), for new knowledge and new beliefs to be constructed, reflections and annotations need to be shared within community in a social interactive environment, where together they examine their existing beliefs, filtering prior beliefs, and alligning conflicting beliefs. However, a one-time off effort to change teachers' belief systems may not be effective. Fundamental changes need time to take place. This is where on-going continuous experiences of change, growth and professional development, is the key for a sustained change and growth. When new experiences and knowledge formed, their beliefs, will also be reshaped.

Any Continuous Professional Development (CPD) programmes and trainings should only be conducted after teachers' assessment needs are conducted (refer Figure 1). Only then can the process of designing, developing and implementing CPD trainings be carried out. The starting point of teachers' in any CPD trainings is important. Information like how proficient and comfortable they are with technology and the subject they are teaching is of utmost important consideration. As mentioned by a respondent, "…the instruction they receive is still too focused on learning how to use the software … (R9)". She adds, "… the focus should not be on the technology itself, but on how computers can improve performance in these core areas of the teacher's job (R9)." Trainings must be able to convey the message that whatever new technology training introduced, the sole purpose is to make teachers' job easier and more effective within the context of their subject matter.

Leadership aspect must not be overlooked where school leaders are the connecting medium between what their teachers need and the appropriate CPD trainings to be taken place. Schools where technology integration thrives, they have leaders that provide strong support and advocacy for technology integration. Leadership is one core area that will make an impact on teachers' newer beliefs. However, without the empowerment to act, school leaders will not be able to influence and induce much change. Give them the voice and choice to act.

5.0 Implications of the study

Various stakeholders can reflect upon findings from this study and use them to design relevant CPD courses for TEs specifically. These courses need to explicitly target teachers' pedagogical beliefs as asserted by Buehl and Fives (2011) the importance of teachers' beliefs to practices in the classrooms. Teachers need to see the potential impact of technology on their students and how these have also been used and applied in other actual classrooms before they can be convinced to try it out themselves. Whatever new novel ideas have to be based in teachers' situated contexts and only then it will have better chance of survival among the teaching community. As stressed by one respondent, "… teachers … have the power to decide whether they want to introduce technology into their classrooms (R9)."

6.1 Conclusion

Though data were merely based on respondents' self-reports and perceptions, the interrelationships between teachers' beliefs and their technology integration practices cannot be denied. In order to expedite teachers' technological practices in class, we need to understand the pedagogical beliefs that are guiding them. By influencing their beliefs, we can influence their behaviours. The existence of other equally dominant factors in determining one's technological practices besides pedagogical beliefs have been shown to exist. Varying levels of psychological, social and environmental realities of teachers at their respective schools will either constrain or allow their beliefs to manifest in their practices. If teachers' strong faith in the role of technology are not reflected in their practices, this requires scrutinisation of other contextual factors which are beyond the scope of this paper. In order to capitalise on the potential of technology in blended approach, it is hoped that findings from this study will lead to improved understanding of the complex and interrelated processes of experiences, beliefs and practices.

References

De Liddo, A. (2014). Enhancing Discussion Forums with Combined Argument and Social Network Analytics. In *Knowledge Cartography* (pp. 333-359). Springer London.

Ertmer, P. A. (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration?. *Educational technology research and development*,*53*(4), 25-39.

Fang, Z. (1996). A review of research on teacher beliefs and practices.*Educational research*, *38*(1), 47-65.

Hooper, S., & Rieber, L. P. (1995). Teaching with technology. In A. C. Ornstein (Ed.), Teaching: Theory into practice, (pp. 154-170). Needham Heights, MA: Allyn and Bacon.

Watson, D. (2006). Understanding the relationship between ICT and education means exploring innovation and change. *Education and Information Technologies*, *11*(3-4), 199-216.

Zheng, H. (2013). Teachers' beliefs and practices: a dynamic and complex relationship. *Asia-Pacific Journal of Teacher Education*, *41*(3), 331-343.