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Pre-service training and ICT implementation in the classroom: ELT teachers' perceptions

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ABSTRACT

This paper aims to explore practicing teachers' perceptions of the approach adopted in their pre-service training programs with regard to educational technology. The paper also investigates the extent to which the teachers employ technology to accomplish pedagogical goals as well as the instructional methodology they embrace when they use ICT in the classroom. The thrust of the argument in the current study is that the way practicing teachers use educational technology is reflective of the inadequacy of the pre-service training programsthat still insist on disentangling ICT from pedagogy and content. Informed by TPACK, a four-section, five-point Likert scale questionnaire was administered to 56 ELT practitioners in middle and secondary education in the province of El-Jadida. It was found that the integration of technology, pedagogy and content was left to the discretion of the teachers. This approach resulted in limited ICT implementation for instructional purposes and inconsistent interpretations of how ICT can best be used in the classroom. Although the teachers reported that they embraced a student-centered methodology while using ICT, they also fell back on teacher-centered instructional principles. On the basis of the results obtained, a number of implications will be offered for an effective ICT-oriented ELT teacher education.

Keywords: *ELT; TPACK; Pre-service teacher education; ICT; Middle and secondary education.*

INTRODUCTION

Since the turn of the 21st century, the academic debate on the effectiveness of ICT in education has continued unabated worldwide. In particular, all stakeholders in Moroccan education including researchers, educators, teacher trainers, and ELT practitioners have joined efforts to reach an in-depth, research-based understanding of the added value of ICT in classroom practices (Erguig 2006). Just as there is a general consensus on the necessity to boost teaching practices by educational technology, the academia has long recognized that the effective use of technology for instructional purposes transcends the mere provision of the appropriate infrastructure, training in computer literacy and enhancing teachers' ICT-related attitudes and beliefs. As stipulated in the National Charter of Education and Training (1999), government funding has gone into a series of initiatives aimed at providing schools with multi-media rooms and training in computer literacy for teachers. The effects of such initiatives have been perceived in a number of studies reporting on the positive attitudes teachers embrace towards ICT (Zyad 2016; Erguig 2006). Pre-service and in-service training programs have been shaped and driven by the evidence-based realization that teacher self-efficacy and attitude towards educational technology are tightly intertwined.

However, changing attitudes to and beliefs about the capability of technology to transform instructionfor the better is necessary but not enough (Venkatesh & Davis 2000). In addition to thiscrucial prerequisite, a special body of knowledge is required for teachers to be able to construct an instructional environment conducive to greater amounts of learning than can be achieved in traditional classroom instruction. This unique body of knowledge has been named as TPACK and is conceived of as incorporating three sets of knowledge; namely, technology,

pedagogy and content (Mishra & Koehler 2006; Koehler & Mishra 2009). TPACK is not to be viewed as the unrelated combination of thesethree concepts. In fact, this framework includes but qualitatively transforms the aforementioned types of knowledge into a vivid understanding of how best to implement ICT in the classroom under different circumstances and changing contexts.

With this background in mind, the present paper argues that the approach adopted in pre-service teacher training programs in Morocco is not attuned to the latest developments in ICT integration in education. It aims to demonstrate that the failure to effectively integrate ICT in mainstream classroom practices in middle and high schoolsis a corollary result of the approach tothe teaching of the ICT component in pre-service teacher education in Morocco. The paper sets out to answer the following research questions:

1. How do middle and high school teachers perceive their pre-service training programs with regard to educational technologies?
2. To what extent do the teachers agree that they use educational technologies in their teaching practices?
3. What do they perceive the ways in which they use these technologies to achieve instructional goals?

In the following sections, a discussion of the theoretical framework within which the study is situated and a review of the literature on the relationship between teachers' beliefs and classroom practices will be offered. Subsequently, the methods and materials employed in the study will be presented. After the results are displayed, they will be discussed and interpreted in accord with previous related research. The study will conclude with a number of implications for an effective implementation of ICT in ELT teacher education.

REVIEW OF THE LITERATURE

Theoretical framework: TPACK

Well back in 1986, Shulman argued against the conceptualization of teachers' knowledge as comprising either content or pedagogy. He observed that teacher education and training programs of the time disentangled subject matter from the strategies and techniques through which it could be taught and learnt. According to Shulman, this disentanglement led to deficient teaching practices that did not positively affect students' learning. On this understanding, he called for a special type of knowledge lying at the intersection of knowledge of content and pedagogy, which he termed as pedagogical content knowledge (PCK).

Since then, researchers, educators and teachers' understanding of PCK has palpably improved. However, the introduction of technology into the educational arena has somewhat blurred the picture and complicated an already complex domain. All stakeholders in education have had strong confidence in the capacity of technology to facilitate the learning process and increase students' uptake. This confidence has been premised on the assumption that technology alone can qualitatively transform classroom practices irrespective of how it is used. It has not taken so long before the realization emerged that such an assumption was flawed and that more needs to be done for an effective integration of educational technology. Just as content was detached from pedagogy before Shulman (1986) introduced PCK, knowledge of technology has so far been dissociated from content and pedagogy. This conceptualization of the role and position of technology in education has done very little by way of ameliorating instructional routines.

Acknowledging that other researchers have also alluded to the necessity of viewing technology as it dynamically interacts with other context-specific and fluid variables including content and

pedagogy, Mishra and Koehler (2006) proposed a framework that can serve as a yardstick to characterize teacher knowledge. They labeled this conceptual model as technological pedagogical content knowledge (TPCK) and clarified that it incorporates two other pairings of the concepts of technology, pedagogy and content in addition to a new triad. Figure 1 visually illustrates this framework:

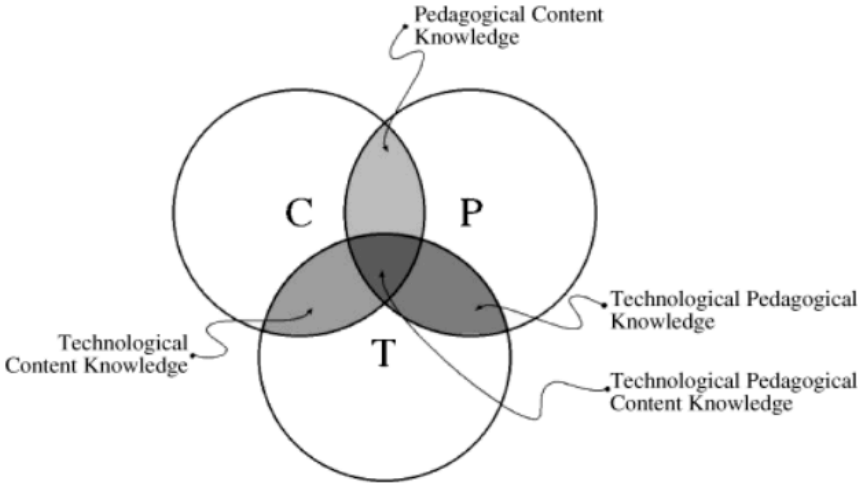

Figure 1: *Technological pedagogical content knowledge (Mishra & Koehler 2006: 1025)*

By technological content knowledge (TCK), Mishra and Koehler referred to the complex ways in which technology and content intersect and influence one another. Technology enables content to be represented in newer and more efficient ways but the eccentric nature of specific content constrains the amount of choice as to what technology to utilize. This requires teachers to know not only the subject matter but also how it can be displayed to the students by means of diverse technologies. Moreover, technological pedagogical knowledge (TPK) stands for the transformative power of technology in the educational setting and how instructional practices can be changed by the use of pedagogically oriented technology. Koehler and Mishra (2009) argued that since technological tools were not originally meant to serve students' learning, teachers are supposed to leverage them to achieve desirable instructional goals. While TPACK is inclusive of all the other pairings of technology, pedagogy and content, it designates a unique body of knowledge unequal to any one of them considered individually. TPACK empowers teachers with a profound understanding of how best technological affordances can be harnessed and especially tailored to cater to the needs and demands of changing contexts and specific circumstances.

TPACK has attracted researchers' scholarly attention, leading to a number of studies attempting to evaluate its validity. To illustrate, Angeli and Valanides (2008) investigated the nature of the technological pedagogical content knowledge (TPCK) by asking whether it is a unique body of knowledge or the result of the integration of teachers' multiple knowledge bases. Drawing from previous research, the researchers modified TPCK and labeled it as ICT-TPCK. In its current form, ICT-TPCK includes subject matter knowledge, pedagogical knowledge, technology, knowledge of students and knowledge of the context wherein learning takes place. After the model of ICT-TPCK was formulated, an empirical study was conducted to evaluate its validity. As the intervention came to an end, the participants' competence in designing and implementing ICT-based lessons improved significantly. Besides, the study concluded that ICT-TPCK

constitutes a unique body of knowledge qualitatively different from the individual and disconnected aggregation of its parts.

Informed by the conceptual framework of TPACK, Khan (2014) departs from the premise that teachers use ICT only for personal purposes including keeping notes, searching for information, and keeping records for administrative ends. Khan argued that such basic ends to which ICT is put do not account for the full potential of technology to transform students' learning. For this reason, a model based on TPACK is suggested to improve ICT integration in Bangladesh. This model rests on the assumption that successful and effective ICT use in the classroom goes beyond providing teachers with the technical know-how to include concern with how computer literacy can be harnessed in the service of pedagogy and content. To capture the full spectrum of teacher professional development, the model is conceived of in three successive phases, spanning pre-service, in-service and ongoing training programs.

ICT implementation and teachers' beliefs

Wong and Hsu (2008) explored the interplay of pedagogical and technological innovations and how they brought about major transformations in teaching practices. In particular, the study aimed to address the impact of ICT on classroom practices and the emergent ICT implementation strategies that resulted thereof. It was reported that ICT caused a positive impact on the participants' modes of teaching and learning.That is, teachers started to move away from a teacher-centered approach to a more student-centered approach due to educational technology regardless of the region, school level or type of school. Of importance, too, was the relationship established between the implementation of a student-centered approach and teachers with a mindset that favors inquiry and collaborative learning. It was also recognized that only schools that managed to create a balanced amalgamation between technology and pedagogy were successful in producing a more innovative, constructivist learning environment. In other words, technological innovations cannot positively transform classroom practices without a school climate that encourages innovation and experimentation at the level of pedagogy.

In the same vein, Chen (2008) found inconsistencies between teachers' pedagogical beliefs and their teaching practices. These inconsistencies begged the question of why the teachers did not put to practice the beliefs they claimed to embrace. Three interconnected factors were found to explain this phenomenon; namely, the influence of external factors, teachers' limited or improper theoretical understanding and teachers' other conflicting beliefs. Of the external factors mentioned, reference was made to the lack of access to computers and software, insufficient time to plan instruction, inadequate technical and administrative support and large class size. By improper theoretical understanding, Chen meant teachers' inability to translate constructivist theories into practical implementation due to the lack of pedagogical support. Besides, the incongruitybetween beliefs and classroom practicewas traced back tothe disparity between teacher' core beliefs and peripheral beliefs. A number of teachers clarified that the reason why theycould not use technology for teaching was their concern with conformity to the official guidelines demanding content coverage within a preset time frame. Chen argued that if this concern was situated in the province of core beliefs, it would override the intention to include educational technology in the lesson plan.

Levin and Wadmany (2006) explored the evolution of teachers' beliefs with regard to learning, teaching, technology and instructional practices through a longitudinal study. The study found that due to their exposure to multi-year experiences in ICT-based classrooms, teachers' educational beliefs and instructional practices changed quite substantially. At the level of beliefs, the participants initially held behaviorist and transmissionist views on learning and teaching, which began to change toward the end of the intervention. It was observed that such a change was accompanied by dissimilar, sometimes conflicting, pedagogical beliefs without the teachers being

aware of them. For example, a participant stated that she still viewed learning as a process of language acquisition but at the same time she considered the student as an active learner. All the teachers now believed that the focus in the classroom should be on students' understanding rather than on the concern with content coverage. Concerning the changes that occurred in teachers' beliefs about technology, one teacher shifted away from viewing technology as a supplementary tool for traditional instruction to viewing it as a communicative tool for broadening the conceptual world of teachers and students alike.

The concern with the current situation of ICT integration in education has led several researchers to probe the motivating factors that encourage teachers to use technology to accomplish pedagogical goals. As a case in point, Cubukcuoglu (2013) found that it was necessary to eliminate a number of barriers in order to successfully drive teachers to use ICT in the classroom. Among the factors alluded to was a positive attitude towards the potential of ICT to improve classroom practices. However, the study indicated that to foster such positive attitude in teachers, they need to be equipped with the necessary skills of computer literacy. It was also reported that the explicit knowledge of the benefits of technology could also help in increasing ICT implementation in education.

Furthermore, Gennip and Rens (2009) investigated the question of whether teachers use teacher-centered methods of instructional delivery or engage in learner-centered classroom practices. The results revealed that the majority of the teachers believed that students should have access to many information resources, should work together cooperatively and should develop their teaching material themselves. Most of them also expressed the view that students should reflect on the growth of their competences, should be given the chance to use multimedia and should be enabled to experiment. A major conclusion that emerged from such results was that most of the activities stated in the questionnaire were not part of the teachers' plans for instruction. However, when ICT was used, there was more focus on the collaborative construction of knowledge.

Pre-service training and TPACK

On another plane, several studies have examined the relationship between educational technology, the development of TPACK competencies and a range of variables related to teacher trainees. A case in point is Karaca (2015), who investigated the relationship between teacher trainees' TPACK and a variety of variables such as age, gender, type of school, grade level and possession of different technologies. This study rests on the understanding that knowledge of teacher-trainees' characteristics that influence the development of TPACK competencies can help create appropriate activities specifically tailored to the needs of the trainees. The study found that the pre-service teachers had a middle level of TPACK competencies despite their graduation from Computer Education and Instructional Technologies Department. This finding corroborates previous research that knowledge of technology alone does not guarantee effective ICT implementation in the classroom. This empirical investigation also reported that a significant correlation existed between TPACK development and variables such as gender, the reasons for choosing the profession, the perceptions of the value of school experience courses and the possession of tablet computers.

Likewise, Cetin-Berber and Erdem (2015) studied the relationship between TPACK and variables such as gender, age, educational program, year of study, kind of instruction and field experience. This study also aimed to identify which type of knowledge included in TPACK is most influential in effectively developing pre-service teachers' TPACK. The results indicated that significant differences existed with regard to pre-service teachers' perceptions of TPACK when examined across gender, program, year of study and field of experience. It was also reported that CK and

PK palpably contribute to teacher trainees' TPACK development. However, TK was found to play a less prominent role in helping pre-service trainees acquire TPACK competencies.

Other studies pursuing the same line of research have attempted to draw attention to the importance of field experience in supporting pre-service teachers' understanding of TPACK and the potential use of educational technology in the classroom. For instance, Nordin, Davis and Ariffin (2013) explored pre-service teachers' mastery levels of TPACK before and after field experience. The study found significant increases in all TPACK domains except for CK. This was attributed to the fact that the participants rated their knowledge of content as the highest before the field experience. Another important finding in this study was the statistically significant correlation between TPACK development and field experience. However, it was observed that the participants' use of ICT during the field experience was limited. This suggests that teacher education programs are required to include training in TPACK during the practicum to give more opportunities for teacher trainees to experiment with technology in the classroom.

In the same vein, Merç (2015) researched the frequency of pre-service teacher trainees' actual use of ICT for pedagogical goals and the conditions in the institutions where they had their practicum. In addition, the study explored the effectiveness of the ways in which these teacher trainees utilized ICT. In line with previous research studies, the participants reported that they had a positive attitude towards ICT integration in educational practices. It was nonetheless observed that the schools where they had their classroom training were not adequately equipped with the necessary infrastructure for an effective and sustainable implementation of ICT. This lack of equipment had a negative impact on the frequency of ICT use in the classroom. Such conditions are hardly conducive to developing teacher trainees' TPACK competencies and the eventual inclusion of technology in instructional agendas.

METHODS AND MATERIALS

Setting and participants

This exploratory study was conducted in middle and high schools based in El-Jadida province. The schools were geographically situated in urban and rural areas for more representativeness. According to the Moroccan educational system, students begin to study English in their final year in middle school and over the three years in high school. The schools were randomly selected for participation in the study, including 11 middle schools and 9 high schools. Of the 20 schools, 12 were located in urban areas while 8 schools were in rural areas.

As can be seen from table 1, 56 ELT practitioners participated in the study, excluding those working for the private sector. Of the 56 teachers whose age ranged from 20 to 49 years, 23 were male and 33 were female. Additionally, 23 were sampled from middle schools and 33 from high schools. As for teaching experience, the threshold was set at 15 years because the reform that introduced the ICT component in middle and secondary teacher education was launched in 2000. It therefore was necessary to set a maximum of 15 years to include all the teachers who benefitted from ICT-based courses in their pre-service training program.

Table 1:*Demographics of the participants*

Variable	Category	Frequency	Percent (%)
Gender	Male	23	41.07
	Female	33	58.92
Age	20-29	36	63.28
	30-49	20	35.71
Teaching experience	1-5	29	51.78
	6-10	16	28.57
	10-15	11	19.64
Educational stage	Middle school	23	41.07
	High school	33	58.92

Data collection and analysis

The main instrument for data collection was a questionnaire that was constructed on the basis previous research studies (Venkatesh & Davis 2000; Al-Barakat & Bateineh 2008; Zyad 2016). The questionnaire included four sections using a five-point Likert scale design. A code from 1 to 5 was assigned to respondents' level of agreement with the statements suggested; namely, strongly disagree, disagree, neutral, agree and strongly agree respectively. The first section was designed to collect information on the participants' demographicsincluding gender, age, teaching experience and educational stage. By contrast, sections two, three and four were aligned with the three research questions that the study set out to answer. The second section was aimed at practicing teachers' perceptions of the ICT-based training they received in their pre-service education. It included 14 items and covered areas such as quality of instructional materials, equipment, computer skills dealt with, and other related issues.

The third section gathered data on the instructional activities that the teachers' utilized by means of some form of technology. This part of the questionnaire comprised 6 items related to collaboration, feedback, assessment, communication, organization and instructions. The respondents were required to specify the frequency with which they used ICT-based activities on a scale including never, occasionally, frequently and almost always.

The fourth section was primarily designed to collect data on the instructional philosophy that informed the participants' classroom practices when they used technology. It was composed of 15 items, some of which were predicated on transmissionist pedagogy while others were rooted in progressive, student-centered methodology. To alleviate response bias, it was deemed appropriate to mix the items and to use reverse coding. After the questionnaire was constructed, it was dispatched to a panel of expert researchers in the field to evaluate its layout, readability, clarity and relevance. In light of the feedback obtained, the questionnaire was revised and piloted among a sample of 11 teachers for internal consistency using Cronbach's Alpha. Table 2 presents the results of Cronbach's Alpha for each scale.

***Table 2**:Cronbach's Alpha values for each scale in the questionnaire*

Questionnaire scales	Cronbach's Alpha	Number of items
Scale 1	.72	14
Scale 2	.81	6
Scale 3	.82	15

The table shows that the questionnaire had good internal consistency whose acceptable threshold is set at .70 or higher in social science research (Hilton 2004).In consonance with the exploratory nature of the study, data analysis and organization was carried out on the basis of descriptive statistics. In addition to frequencies and percentages, the study used means as a measure of central tendency and standard deviations as an index of dispersion.

RESULTS

Educational technology in pre-service training: teachers' perceptions

Overall, table 3 below reveals that both male and female teachers agreed that the pre-service training program was satisfactory in terms of the quality of instructional materials (male: μ = 2.3; Female: μ = 2.9) and equipment (male: μ = 4.5. female: μ = 4.1) as demonstrated by means closer to average or well beyond it. Approximately, the same level of agreement went to the program covering an adequate range of computer skills (male: μ = 3.4; female: μ = 4.1) as well as to teachers' acquiring several literacy skills (male: μ = 3.9; female: μ = 3.8).

However, the respondents were not equally satisfied with the pre-service training program when the pedagogical dimension was introduced in the questionnaire. 95.65% male and 87.87% female teachers reported that the blend between pedagogy and technology was lacking (male: μ = 4.6; female: μ = 4.5). With regard to modeling, the greatest majority indicated that they were not shown how to use ICT to achieve pedagogical goals in the classroom. Almost all the participants reported that the supervising teacher did not give demo lessons involving the use of ICT over the practicum period nor did they give one themselves. Although the teachers were assessed on the computer skills they acquired in the training, they indicated that no such assessment was directed at how they could use such skills for instructional purposes.

Table 3: *Teachers' perceptions of ICT-related pre-service training programs*

Items	Male teachers (N = 23)			Female teachers (N = 33)		
	SA & A			SA & A		
	N	Mean	Std. D	N	Mean	Std. D
The quality of the pre-service technology program was satisfactory	19	2.3	.14	29	2.9	.16
The quality of instructional materials is satisfactory.	17	2.7	.23	31	3.3	.35
The quality of the equipment was satisfactory.	22	4.5	.19	32	4.1	.17
I was satisfied with the quality oftechnology integration	19	3.2	.32	25	3.8	.25
Coverage of computer skills was adequate	17	3.4	.42	32	4.1	.16
I acquired several computer literacy skills	22	3.9	.23	24	3.8	.23
The program was removed from the blend between pedagogy and technology	22	4.6	.16	29	4.5	.12
There was enough modeling of how to use ICTs in the classroom	19	1.6	.21	32	0.9	.20
The modeling focused on student-centered use of technology	20	.7	.25	21	1.6	.27
The supervising teacher in the practicum used ICT in his/her classroom	22	.3	.12	32	1.2	.15
I implemented some of the ICT-related skills in the practicum	21	2.4	.34	27	3.2	.17
I was encouraged to implement educational technology in the practicum	17	3.1	.45	29	3.8	.25
Assessment of computer literacy was done on a range skills	19	3.5	.23	29	4.2	.32
My assessment included demo lesson of how I could use technology in the classroom	21	1.3	.13	32	2.2	.18

ICT-based instructional activities

Figure 1 presents the results on the frequency with which the respondents implemented ICT-based instructional activities in the classroom. The blue bars show the percentage of the teachers who never use ICT in the classroom. The instructional activities that were reported to be

occasionally implemented by the teachers were communicating with the students (33.5%), organizing classroom discussions, demonstrations and presentations(34.2%) in addition to giving classroom instructions (28.8%).

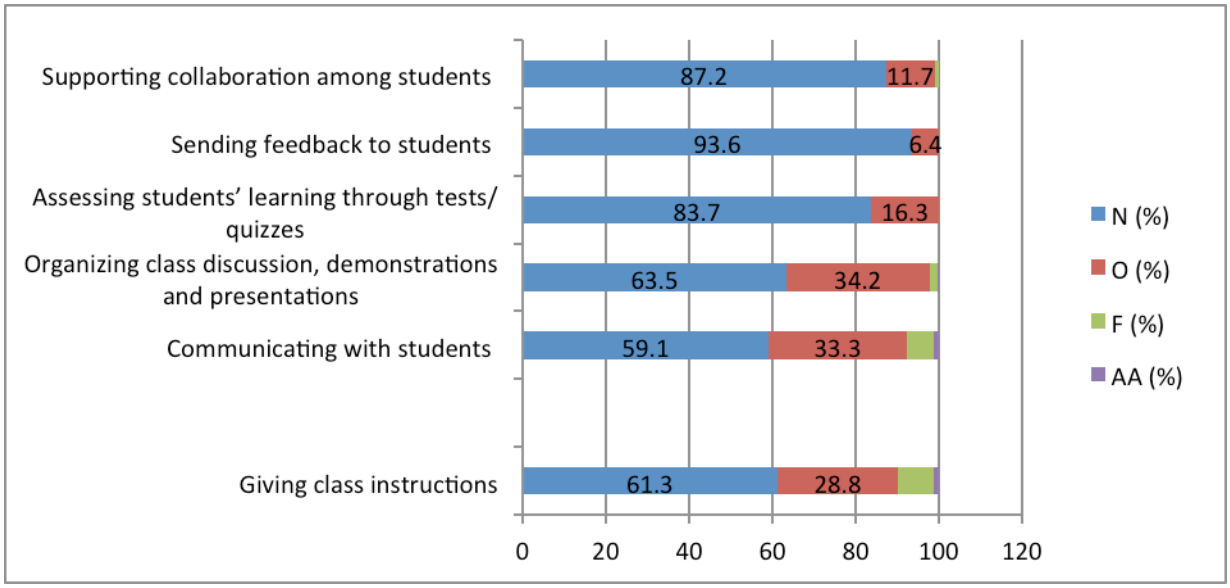

Figure 2: *The frequency of ICT-based instructional activities*

The instructional approach to ICT in the classroom

The third research question is concerned with how the teachers implemented ICT in the classroom. More specifically, it attempts to ascertain whether they employed ICT on the basis of a teacher-centered or student-centered methodology. As can be observed from table 4,the participants reported that they observed student-centered teaching methodology when they used ICT in the classroom. Most of the means did not go well beyond the average (except for wait time and group work), which indicates that their teaching was moderately informed by the constructivist framework.

Despite rejecting a teaching environment where the students passively receive information from the instructor (male: μ = .4; female: μ = .7),the means for other practices aligned with transmissionist teaching styles were above average. For instance, although the respondents noticeably disagreed with high teacher talking time, they appeared to contradict this by reporting that they explained the lesson most of the time to help students understand. They also pointed out that they emphasized the transfer of content to their students (male: μ = 3.7; female: μ = 2.7) and they preferred lecture-based teaching to student-based knowledge construction (male: μ = 2.6; female: μ = 3.9).

***Table 4**: Student-centered instructional principles*

Items	Male teachers			Female teachers		
	SA & A			SA & A		
	N (%)	Mean	Std. D	N (%)	Mean	Std. D
I emphasize students' autonomy and initiative	69.56	2.1	1.32	87.87	1.4	.79
I emphasize the use of varied instructional strategies and content according to students'needs	86.95	3.7	.27	93.93	3.5	.45
I emphasize teacher-student and student-student dialogue	56.52	3.2	.92	96.96	3.7	.36
I emphasize that students should ask thoughtful, open-ended questions	91.30	3.4	.43	81.81	3.1	.54
I emphasize students' engagement in experiences contradicting their initialhypotheses and encourage discussion	26.08	1.3	.21	57.57	2.3	.76
I emphasize wait time for students' responses	95.65	4.4	.26	90.90	4.7	.32
I emphasize the use conceptual terminology such as analyze, compare, contrast, and interpret	95.65	1.5	.23	96.96	0.7	.12
I emphasize group and individualized learning	95.65	4.3	.34	81.81	4.2	.33
I emphasize project-based and task-based learning	73.91	2.5	.89	87.87	3.2	.78

Table 5:*Teacher-centered instructional principles*

Items	Male teachers			Female teachers		
	SA & A			SA & A		
	N (%)	Mean	Std. D	N (%)	Mean	Std. D
I emphasize students' role as passive recipients of knowledge	23	.4	.27	33	.7	.49
I emphasize the acquisition of knowledge without the need for context	21	1.3	55	32	2.4	.23
I emphasize that mistakes are intolerable in classroom participation	18	1.5	1.8	27	2.3	.37
I emphasize explaining the lesson most of the time to help students understand	22	4.5	.78	30	4.3	.89
I emphasize the transfer of content to students	21	3.7	1.1	32	2.7	.65
I prefer lecture-based teaching to student-based knowledge construction	22	2.6	1.78	32	3.9	.97

DISCUSSION

The present study aims to evaluate practicing teachers' perceptions of the approach to ICT teaching that they were exposed to in their pre-service training programs. Another objective that the study set out to address was the types of ICT-based activities they employed in their classrooms together with the teaching methodology that informed their ICT-based practices.

Concerning research question one, it was found that the pre-service training program that the teachers (both males and females) had was primarily focused on helping the teacher trainees to acquire several ICT-related skills to make them computer literate. That is, the overall program dealt with technology and pedagogy as exclusively disconnected aspects of the teacher trainees' professional development. It appears that this approach is based on the understanding that by acquiring a package of computer skills and becoming conversant with the latest pedagogical developments, the teachers would be able to transform these two disconnected knowledge bases into an effective implementation of ICT in the classroom. Normally, the objective of such training programs is to prepare teachers for the needs and demands of 21st century digital natives. However, such objective simply fails to materialize. As was indicated by the teachers themselves, the skills acquired during the training are doomed to be forgotten or used for personal purposes such as networking with friends or surfing the Internet. In the case of the teachers who do use ICT in areas related to their teaching, technology serves as no more than a mere facilitating tool for preparing the lesson plan or keeping a database of teaching materials, students assignments and grades. Important though these uses may be, they still do not actually respond to educators' and researchers' vision of the potential of technology to transform teaching and learning practices.

The pedagogical framework upon which pre-service training programs similar to the one described above rests is certainly removed from the complex characterization of the prerequisite knowledge sets portrayed by TPACK (Mishra & Koehler 2009). According to TPACK, the effective

use of ICT in educational contexts lies at the interface of a sophisticated network of relationships between and among technology, pedagogy and content. Leaving the construction of such multi-faceted knowledge to teachers as they grow increasingly professional over the years does not guarantee that the ultimate result would be effective ICT-mediated classroom activities. Other studies in the relevant literature support the fact that training in computer literacy does not necessarily lead to effective ICT-based classroom practices (Karaca, 2015). This is also corroborated by evidence from the present study that teachers use ICT for low-level purposes such as giving a PowerPoint presentation or keeping a record of assignments and grades. If this is all that is to be expected of technology in education, then it is legitimate to ask how this is different from traditional tools of instruction.

It needs to be remembered that the respondents indicated that the supervising teacher did not give any demo lesson by way of showcasing how technology can be used in the real world of the classroom to attain certain pedagogical goals. It was also reported that they did not, and were not required to, teach by means of technology during the practicum. The supervising teacher may not have employed ICT for a number of reasons that lie outside the purview of the present study. It nonetheless seems likely that the effect this might have had on the trainees is counter to the objectives of the pre-service training program. In this respect, research-based evidence has illuminated the impact of field experience on the potential development of teacher-trainees' TPACK competencies (Nordin, Davis &Ariffin, 2013). It is questionable whether they would integrate ICT in their future lesson plans if they felt that the school culture did not promote the implementation of technology in classroom practices. Theoretical support for this finding comes from Venkatesh and Davis (2000), whoreported on the significance of subjective norm, by which they meant the influence important others may have on the likelihood of technology being used in a given context. Said differently, if neither the practicing teacher nor the school culture wherein the new teacher would be nominatedused ICT, it would not be much of a surprise if the newly appointed teacher did likewise. This calls to mind an important distinction made in the literature between core and peripheral beliefs (Chen 2008). It may be safe to assert that an environment that does not encourage the use of technology would result in relegating it to teacher's peripheral belief system (Merç, 2015). That is, teachers would perceive technology as a low priority and therefore decide not to utilize it.

As concerns research question three, the present study found that the respondents employed ICT within a methodology that includes both student-centered and teacher-centered instruction.This is inconsistent with Wong and Hsu (2008), who found that the use of ICT caused a positive impact on the modes of teaching and learning by bringing about transformations away from a teacher-centered approach to a more student-centered approach regardless of the region, school level or type of school. This claim is tantamount to saying that technology alone can be regarded as a change agent irrespective of otherattendant factors. Similarly, the teaching practices of the participants in the current study were not radically transformed in favor of exclusively student-centered instruction even though they occasionally employed ICT in the classroom. This can be interpreted as an effect of the pre-service training program that separated technology from pedagogy and content. The amalgamation of these three knowledge sets has been left to the discretion of the teachers. This has led to multiple interpretations of how best to use educational technology. Most of the time, such interpretations failed to meet the characterization of 21st century teacher knowledge that is framed by TPACK (Mishra & Koehler 2009).

CONCLUSION AND IMPLICATIONS

This paper was an attempt to evaluate practicing teachers' perceptions of their pre-service training programs with regard to how the ICT component was approached. It also aimed to illuminate the ICT-based instructional activities they employed alongside the teaching

methodology that informed their technology-mediated classroom practices. It was found that pedagogy and content were dealt with in isolation from technology. The ICT-based course was chiefly designed to provide the trainees with the technical skills and competencies to become computer literate. In addition, the teacher trainees were not exposed to models of how to effectively implement ICT for pedagogical ends in the practicum. After they became practicing teachers, the participants only occasionally included ICT in their lesson plans. When they did actually use ICT, it was reported that their practices were informed by disparate methodological frameworks. Such variety was not construed as reflecting teachers' concern with students' needs, demands and learning styles so much as it pointed to teacher's personal interpretations of how best to implement technology in the learning environment.

The above stated results have a number of implications for an effective integration of ICT for educational purposes. Computer literacy is a necessary, but insufficient, precondition to empowering teachers to make ICT a daily event in their teaching routines. TPACK offers a guiding framework that highlights the need for a research-based approach to incorporating ICT in teachers' pre-service training programs. This implies that teacher educators' are required to design and implement programs wherein the complex relationships between and among technology, pedagogy and content are clearly articulated. A fundamental feature of such programs is the use of modeling at all stages of teacher trainees' education.The selection the supervising teachers' in whose classrooms the trainees are supposed to spend a given time span needs to be based on a meticulous profiling process. The objective of such process is to select only those teachers who are reputed among their colleagues to frequently use ICT in their teaching. In this way, the prospective teachers will not only begin to appreciate the importance of technology in the educational scene but will also recognize that they will not be alone in utilizing ICT. If teacher trainees are exposed to educational technology at every stage in their education, their end-of-program assessmentalso needs to incorporate demo lessons in which they demonstrate their readiness to employ ICT in their classrooms.

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