

Pulling and Pushing Forces for ICT Use in Initial Teacher Preparation for Secondary Schools

Adula Bekele Hunde, Giuseppe Tacconi
University of Verona, Verona, Italy

The transformative use of ICT (information and communication technology) in the educational setting is demanding continually assessing bottlenecks and conducive conditions with the aim of consolidating the pre-conditions and to dry the drawbacks from their root. As a result, this qualitative research approach employed to explore enablers and barriers of using ICT in initial teacher preparation in the context of JU (Jimma University), Ethiopia. The study employed in-depth interviews with student teachers and teacher educators. Participants' perception of ICT as a vehicle for quality learning and multiple access to ICT use pointed as supportive conditions. Whereas, mismatch of methodologies being used in teacher education and schools, resource constraints, marginalizing teacher education program, unsuccessful experience of learning via ICT, and lack of clear directive and expertise on the use of ICT were some of the major issues forwarded by the participants. Redesigning of the teacher education program in the way of using ICT is clearly indicated, the system that forces and reinforces the use of ICT in place is among the recommendations forwarded.

Keywords: ICT (information and communication technology), teacher educator, student teacher, teacher education, Ethiopia

Introduction

The ubiquitous overflow of knowledge in our time is becoming beyond human mind's understanding. According to UNESCO (United Nations Educational, Scientific, and Cultural Organization) (2002), the world's knowledge base doubles every 2-3 years, about 7,000 scientific and technical papers flourishing everyday and graduates of secondary schools exposed to enormous information than their grandparents have in their life time (pp. 14-15). Therefore, the bloom of knowledge in quantity and form is requiring new skills and a new way of thinking, which is definitely challenge the traditional way of considering teachers and textbooks as an ultimate source of knowledge. Exposing learners with dynamic and ill-structured information while they are at school is one way of preparing them to the huge demands lying in front of them as they grown up as adult. Therefore, schools, which are implementing teaching-learning process that let learners learn by sorting relevant information, organizing, and synthesizing knowledge on their own, are in the position of assisting their learners develop skills to function effectively in the dynamic, information-rich, and ever existing change of environments.

A growing body of literatures shows that such transformation is hastened by using ICT (information and

communication technology), though, it is not the only means (UNESCO, 2002; Angeli & Valanides, 2009; Engida, 2011). ICT can be in the form of hardware, software, and/or networks that primarily meant for facilitating students' learning. In the first case, ICT assists teachers to transform and teach topics which are difficult to be understood by learners or the one they could not represent easily (Angeli & Valanides, 2009). According to Zhang, Tousignant, and Xu (2012), using ICT in education setting assists teachers to expand broadness and depth of their teaching. Besides, ICT facilitates collaborative learning and the redefinition of relationships among students and teachers (UNESCO, 2002). Here, students realize the possibilities of learning independently at their own times and learning in collaboration with their colleagues and relevant experts. Moreover, teachers' use of technology enables students to see simulated environments in a class, get exposure to the same thing from different perspectives that supports them not only to broaden their knowledge, but also to challenge their understanding, which leads them to be remained active learners (Whetten, 2007). Similarly, it allows students to get connected to external experts and relevant classrooms even in other countries, just from their classrooms. In this manner, learning can be initiated in the classrooms, then, students continue with at home or other places where they could get an Internet connection (Tacconi, 2009). By and large, ICT also assists teachers as a tool to continue to learn in the course of improving their teaching repertoire (Jung, 2005). Therefore, using ICT in education has multifaceted wins in letting students get deep understanding of the topic they are learning, to consider and amalgamating ever changing development in their environment and areas of their study.

Cognizant of this fact, countries have already turned their faces to integrating ICT in their educational settings disregarding their socio-economic background, which is witnessed by the numbers of policy papers and publications emerging as per planning, implementation, and assessment of ICT use in the arena of education. Coming to Ethiopia, ICT is already considered as one of the six quality improvement packages that the government is embarking on as an instrument for enhancing the quality of general education (MOE (Ministry of Education), 2010). Nevertheless, the integration of ICT use in educational setting is not an easy task, and it has been a challenge all over the world (Goktas, Yildirim, & Yildirim, 2009). In order to utilize ICT in school settings, teachers need to be equipped with the capacity of integrating ICT in the curricula and their teaching. The prime venue where they could be trained to do so is the teacher education (Koehler, Mishra, & Yahya, 2007; UNESCO, 2002). According to Zhang et al. (2012), the use of technology should be emphasized on teacher education program so that the graduates will have reasonable abilities of using ICT in their teaching. Thus, this ultimately requires the integration of ICT use in teacher education program.

Based on this assumption, we have conducted a qualitative study on the use of ICT in the new secondary school teacher education program (consecutive model), named hereinafter as PGDT (Postgraduate Diploma in Teaching), which is hosted at the Institute of Education and Professional Development Studies at JU ((Jimma University), Ethiopia). Thus, this article is part of the major study that devotes itself to the unavail factors to be strengthened and others that would be ameliorated so as the attempt of equipping would be teachers with ICT competence is realized.

Context of the Study

Initial teachers preparation for secondary schools in Ethiopia has undergone reform as of 2011 with the intention of absorbing high caliber entrants to teaching profession from graduates of a three-year bachelor program in discipline related to secondary school contents (MOE, 2009). Ten universities with sound teacher

education background have been selected to host the program, and JU is one of them. In this manner, the MOE screens potential candidates on the basis of academic achievement and sends them to the hosting universities for the final decision. Thereafter, the hosting universities admit after conducting further screening. However, we have a feeling that this approach may not guarantee the recruitment of “best teachers” to the system in the way that the ministry intended. Experiences from countries with high performing schools, such as Finland (Sahlberg, 2012) and Singapore (Goodwin, 2012), witnessed that a selection of teachers need to go deep into the academic background, achievement on matriculation, and personal passion that the applicants have for teaching. In these countries, teaching is among the top professions that attract best achievers. For instance, only one of the 10 top applicants have the chance to join teacher education in Finland (Sahlberg, 2012). Taking back the issue to the point of our discussion, prospective teachers that we have been discussing are recruited from social sciences, humanities, and natural science disciplines, as these are harboring subjects that can be taught in secondary schools. These disciplines, particularly, programs which have a direct relationship with secondary school subjects are the least field picked by university entrants. As a result, the academically less prepared students forced to join the program, and at the end, relatively best achievers among them are recruited for teaching force.

Coming to the program components and approaches, the same curriculum was used across all teacher education institutes. All program aspects and procedures were designed centrally by the MOE and distributed to teacher education institutes for implementation. For instance, curriculum framework of the teacher education program and detail syllabus for each course developed at the center and dispatched for implementation. The same trend is happening in the government secondary schools. All secondary schools are using the same textbooks, and for many subjects (nine), satellite plasma television has been in operation to transmit the lesson directly from South Africa (MOE, 2012). In plasma-televised lessons, each session has 42 minutes, out of which, 30 minutes covered with plasma, while the live classroom teacher use the remaining minutes for introduction and conclusion. Having said this, we will proceed to the next section, as our aim is not to argue for or against the use of plasma television. However, we would like to recommend the following references for those readers who are interested to know what has been written down about the situation of plasma teaching in Ethiopia (FDRE (The Federal Democratic Republic of Ethiopia), 2004; Bitew, 2008; Dahlström & Lemma, 2008). In a nutshell, this is the context in which the study was conducted.

Research Methodology

As already mentioned, this article is part of the major study conducted to explore the application of ICT in the selected teacher education program from the perspective of student teachers and teacher educators. As a result, we used qualitative research believing that it would enable us to draw practitioners’ experience-based knowledge about the use of ICT. As discussed in Evans, Coon, and Ume (2011), getting into deeper and inner experiences of practitioners is mandatory in the attempt of drawing practitioners’ experience about the use of ICT. Such case is possible through the hearings of testimonies from practitioners (Tacconi, 2011); understanding the phenomena from the viewpoint of participants (Mortari, 2009); and then, systematically constructing evidence grounded knowledge (Strauss & Corbin, 1998). In a nutshell, the study made use of the mix of grounded theory and narrative inquiry on the basis of qualitative research tenets elaborated above.

Having this in mind, we conducted an in-depth interview with 12 teacher educators and 14 student teachers. All interviews were recorded, and then, transcribed verbatim. Then, we used “grounded theory principles”

(Strauss & Corbin, 1998) to generate categories as per factors related to ICT use in the process of teachers' preparation. Accordingly, the analysis was done through reading and re-reading of interview scripts and labelling descriptions into concepts. The two authors did this first independently, then, through joint discussion. The coding was done by considering the major idea brought out by the sentences in relation to ICT use. In doing so, we tried to use terms used by the participants in order to keep the code close to the reality accounted by the participants. In addition, we made explanatory notes during coding for each concept (factors noted: what, how, and when it happens and influences the use of ICT). In the process of coding, we compared descriptions against the code already provided within, as well as across cases so as to maintain consistency across labels. Following similar procedures, we worked together in letting concepts emerged into core categories (see Figure 1). Finally, presentation of categories accompanied by the corresponding narratives produced by the participants. Moreover, conceptual categories in the report appeared in terms of the rate of recurrence taking into consideration narratives from both sources: student teachers and teacher educators. As an evidence, we tried to present extracts from both sources under conceptual categories as long as the page limit allowed us to do so. So as to differentiate the source and the particular place in the interview transcript where a given excerpt has taken, code has been used at the end of each excerpt. In this way, "T" refers to teacher educator's interview while "S" stands for that of student teacher. Then, the next two consecutive numbers represent the order and round of talk in the interview respectively. For example, in "T4/6", "T" is to mean teacher educator's interview, "4" signifies the number of interviewee (order), and "6" refers to round of talk in the interview.

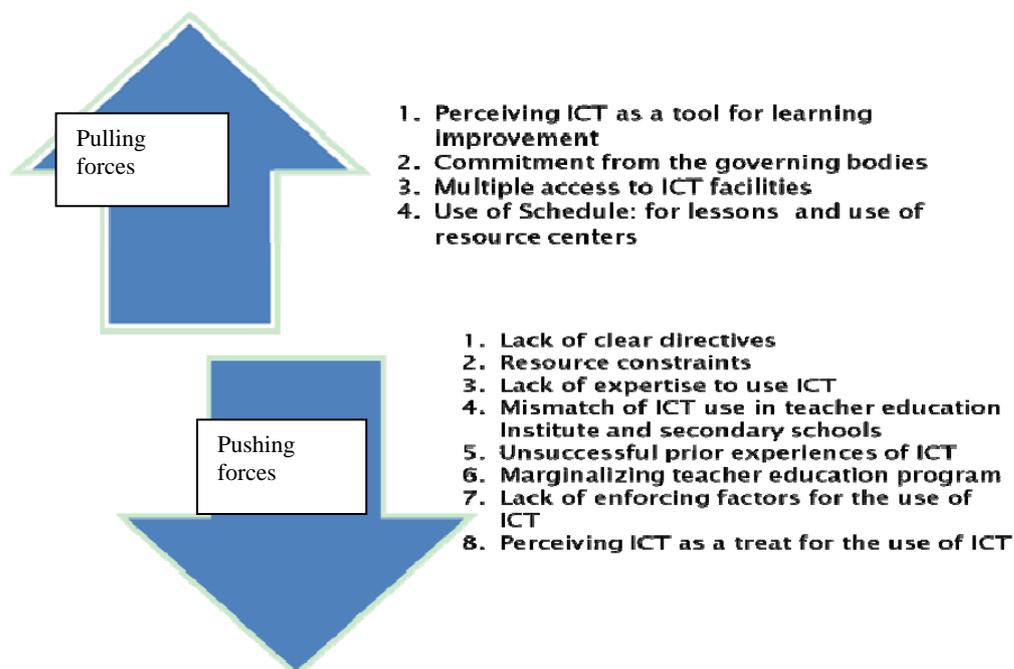


Figure 1. Pulling and pushing factors for ICT use.

In general, all decisions made in the analysis were informed by the critical analysis of testimonies of the participants. For example, the participants' narrations led the study also to the critical analysis of existing guiding documents for secondary school teacher education program, including *Education Sector Development Program IV* (2010/2011-2014/2015 (MOE, 2010)), *Secondary School Teacher Education Curriculum Framework* (MOE, 2009), *Teacher Education Syllabuses*, and *JU's E-learning Policy* (JU, 2011).

Results

Analysis of the participants' interviews reveals the existence of both favorable and hindering conditions in the course of ICT use in the initial teacher preparation. Hence, the following sections will present these factors one after the other.

Pulling Factors

Assuming ICT as a tool for improving teaching and learning process. Both teacher educators and student teachers repeatedly mentioned the value of ICT in enhancing the quality of learning. Among the other, keeping students and teachers updated about the new development in their discipline was emphasized by both groups. Hereunder are some of excerpts taken from their interviews:

... Chemistry is a science, and as you know, science is dynamic. As a result, doing of all projects given need students to refer to online resources. If they depend only on printed texts, all what they are getting and doing may be outdated. (T4/6)

... According to the current global situation, I think ICT use is mandatory. If we do not use ICT, we are putting ourselves out of the domain. As a teacher, if I am not getting updated information on the current issue and also teach my students about current development in the subject I am teaching, I draw back myself and my students from the contemporary world. Later on, at the moment we join others who have been living with updated information and knowledge, we find ourselves at the back of their tail. (S4/2)

Thus, the above excerpts show that student teachers and teacher educators have positive impression on the effectiveness of ICT in equipping teachers with the timely demanded knowledge. As of the respondents, having updated knowledge as a result of ICT use would enable teachers to assist their students to get relevant knowledge and skills. Moreover, the above quotes also have an implication that student teachers learning through ICT would enable them to learn new developments at their own time.

In addition to addressing updated knowledge to learners, the participants of the study considered ICT as a tool for presenting a lesson in effective and efficient manner. The following remarks illustrate this:

There may be animation and the like to be shown to students. For example, there may be some physical activities with video, and we can show to students if these facilities are available in the classroom. Otherwise, drawing on the blackboard is time-taking and boring for students. (T4/4)

I can see the picture of moving objects on text, let say pendulum and teach students pendulum movement is like this and that; it moves with this distance... with that speed and so on. Here, ... when I use a computer, let alone my students, I myself see directly the movement and get a clear understanding of why, to what extent, and how the movement was done. (S12/6)

Therefore, ICT assists teachers to visualize the theoretical concepts they want to teach for the better understanding of learners. Besides, the process assists student teachers to internalize the matter under discussion.

Multiple access to ICT facilities. As we would describe later, teacher educators and student teachers complained that resource constraints did not allow them to use ICT in teaching and learning process. However, as indicated hereunder, some student teachers emphasized that as far as student teachers interested in the use of ICT, access to a computer has no problem, as there are libraries equipped with Internet-connected computers. They added that making teacher education classes in shifts: either in the morning or afternoon has given them adequate time to get access to a computer for a relatively long time.

In JU, access to Internet has no problem. We can get access to a computer and Internet from libraries and computer centers. It is well scheduled for each department and you can use accordingly. ...There is no problem as it is available from different library branches. (S1/8)

... First of all, we do have adequate time as we are learning in shift. If one group attends classes in the morning, the other group will have lessons in the afternoon. This means you are at least free on one shift in a day and that is a good opportunity to use ICT. So, I do not think that there is a barrier as long as you need to use it. (S1/10)

In a resource constraint environment where the demand and supply of ICT facilities do not balance each other, establishing service centers where users are able to get access to at least in shift is one way of allowing equitable access to ICT. Here, an interesting point is users' understanding of such limitations, and at the same time, possibility of getting access service centers under specified situation is promising.

Commitment from government and the university to enhance ICT use. Two of the teacher educators participated in the study were taking part in the management of the institute at different levels and they claimed that there is a clear direction from the government and the university to expand access to ICT. As shown in the following excerpts taken from the interviews, as of the academic year 2013/2014, all teacher education classrooms will be furnished with ICT facilities and the coverage of wireless will be extended to dormitories and other areas where students could get access to Internet easily.

... As of the next year, all classrooms will be furnished with ICT facilities, so that all teachers can use ICT services in class as needed... The expansion of wireless access across all classrooms and dormitories is also another hope for the future. (T7/6)

At the government, university, and institute levels, there is a clear understanding that every teacher should have the skill of using ICT in teaching and learning process. No question on this. (T10/2)

Realization of educational innovation in general appears to be ideal if there is no support from administrators (Fullan, 2007). However, in the context of this study, it seems that university management and government in general has an intention of expanding access to ICT facilities, which is encouraging for the successful integration of ICT use in teacher education.

In a nutshell, it seems that participants perceiving of ICT use as a tool for enhancing student teachers' learning has a pivotal role for gearing student teachers and teacher educators' activities toward the use of ICT in their teaching errands. This is a glimpse of hope for the future as long as what one does fairly depends on the value he/she attached to it. On top of this, the direction towards expanding access to ICT and furnishing classrooms with ICT facilities are hopes for the future success.

Pushing Factors

Lack of clear directive for ICT use. One of the main factors pushing back the application of ICT in teacher education is the absence of clear directive from the course syllabus. Among all teacher educators interviewed in this study, only one teacher educator who witnessed the inclusion of ICT use as a portion in the course was facilitating. Moreover, being asked if there is anything that set to push them to use ICT in their teaching, some reported the recommendation of using some Websites as a resource in the course syllabus, but they did not make use of it, as some of them were meant for commercial purposes while the link provided for some were not functioning. To illustrate:

... The course syllabus should have been in support of ICT use since we are expected to teach according to the syllabus. (T4/4)

... In my course, there is no portion that deals with ICT use. (T4/2)

Specific Websites where you can get some resources included in the syllabus. However, the issue is if users could access to these materials when they go to the Websites. ... I tried to go on some of the Websites provided, and some are already removed and some are requesting for a fee. (T1/8)

I have never tried to use plasma even for myself. I did not know how plasma based contents delivered. I have no such experience. ... I did not see from the syllabus... a part that talks about the use of plasma television. (T3/2)

Thus, it is not difficult to imagine the difficulties in integrating ICT use in teacher education if there is no clear directive from the curriculum guide or if the prescription lacks feasibility in the way indicated above. Moreover, lack of connection between technology use in secondary school and the practice in teacher education vividly shows the gap in application of ICT. The gap is clearly seen if one looks at the course designed to teach the application of ICT in teaching in teacher education program “instructional technology course”. The course syllabus, which was prepared centrally at the MOE, is too broad, and at the same time, it gives undue emphasis to the theoretical knowledge including some aspects which are almost outdated. For example, the use and preparation of overhead projector.

Lack of enforcing factors for the use of ICT. The participants of the study also indicated that the lack of a system that enforce student teachers to use ICT could be one possible hindrance to the successful use of ICT. To put flatly at least what two of the participants have said:

... There is nothing that forces learners to use ICT. I am sure and I have also seen that all of them will use ICT in any way if there is something that force them to do so. (T12/4)

All teachers are giving us an assignment, at that moment, we used our way to get access to the computer even if we are not officially allowed. (S6/6)

... For example, I can go to education library and use for 30 minutes. Even I can use more if there is no person waiting for the service next to me. Besides, I kindly ask computer attendants if the computers are free. In most cases, for example, in the afternoon, many computers are free, hence, it is possible to use as long as I want. (S6/8)

As can be understood from the above excerpts, student teachers could use ICT in the process of teaching and learning had it been there were systems that push them toward such use. In this case, in the context where student teachers perceive the use of ICT as a mandatory, either permanently or for a time being, they were actively devising means of getting access to ICT. This implies that, lack of clear system that enforces student teachers and teacher educators to use ICT in the teacher education program under discussion is one of the factors pulling back the successful application of ICT.

Lack of expertise to use ICT. According to the participants of the study, perceiving ICT as handmaiden for improving quality of learning and making physical resources available for use does not guarantee the use of ICT in teaching and learning. Rather, both parties need to have skills of using such technologies and this has been indicated as a gap in the process of applying ICT in the teacher education program under investigation. The followings are remarks taken from teacher educators’ interviews:

... Our candidates’ skill of using the technology should be areas to be worked on. They are justifying their unsuccessful use of ICT... also from lack of skills for using it. ... I asked if they have taken an ICT course in their undergraduate degree, then, they responded that they had only just learned the theoretical aspects. (T7/6)

... It is not only prospective students, but also we need support and training. For example, you need to be able to use multimedia comfortably in order to use in your teaching, and teach student to use it in their later teaching. (T8/4)

I do not have knowledge about plasma television. Had it been I have some, at least I could have informed them theoretically during my lessons. (T11/6)

As can be understood from the above excerpts, teacher educators were lacking computer skills and that may be the priority areas to be addressed. They also underscored that they themselves need support to use specific instructional technology like plasma television which is being used to deliver secondary school contents in selected disciplines. As this was already discussed, many secondary school subjects have been transmitted via plasma television. However, as teacher educators do not have further training or exposure of mediating plasma instruction, it has been a problem for them at least to touch the theoretical aspects in their course. Moreover, even if the institute has “basic computer skills training package” as one of the components of professional development training for academic staff across the university, teacher educators from the institute are seen speaking for ICT skills related training and support in order to use in their classroom teaching.

Resource constraint. The participants witnessed that ICT related resource limitation is one of the bottlenecks for the successful application of ICT in their programs. Among these, the one which repeatedly raised as shown in the following quotes, is having unfurnished classroom with ICT facilities that even inhibit teacher educators from using of the PPT (PowerPoint) presentation in their teaching. To illustrate:

The classroom I am using for teacher education has no ICT facilities. There is no computer and no Internet connection, so how could I assist them to be good at using technology facilities. (T2/2)

At the beginning, I decided to use ICT in my presentations. Consequently, I tried to carry all materials from my offices. But this is difficult and time-taking, as it needs you to fix everything in front of the students who are waiting for you. For example, plugging in, turning on computers, checking and the like took me at least five minutes. Again, since the class is not meant for the use of PPT, the walls are not clear enough or adequate in size for projecting slide on. As a result, I have tried for the first three or four lessons and then I stopped as it is time-taking and also not legible for students. (T4/4)

One of the participants who is part of the management of the institute confirmed similar feelings with other teacher educators, however, he justified the point mentioning that the teacher education program is new and additional one to the institute, and as a result, the number of classrooms belongs to them is less to accommodate prospective teachers. Hence, it needs the institute to borrow from other colleges through the university’s registrar (an office which is also responsible for monitoring and distributing classroom for colleges and institutes). However, he said that the registrar has a power only to lend unfurnished classroom as others are furnished and locked by the respective colleges.

... This program is conducted during the summer. The number of classes we need during summer is huge. For example, normally, we need four classes for both regular and summer program students. But for this program, we need 20 more classes. Classrooms are normally managed centrally by registrar office. However, furnished classrooms are managed by the respective colleges. The mandate of the registrar is only on the unfurnished classrooms since colleges have already taken the keys of furnished ones and locked them out. Therefore, at the moment, we requested for 20 classrooms for the program, the registrar has offered us only unfurnished classrooms. (T11/6)

However, our concern here is that if colleges are allowed to furnish and keep their own classrooms for their own purposes, it is not clear why did the institute fail to furnish four or half of the classroom they have, so that at least teacher educators facilitating “instructional technology course” could make use of these classes.

Moreover, lack of access to Internet-connected computers on campus is also indicated as one barrier to the application of ICT. These student teachers are living on campus and served on board where the expense is covered by the government. Besides, they are employed and receiving a monthly salary as a starting teacher at secondary school, which is 1,600 Ethiopian birr, while \$1 = 18.37 birr, according to the currency exchange rate on February 12, 2013. Therefore, even if student teachers are getting services on board and receiving salary, it

would be difficult for them like any other Ethiopians with similar income to save from their salary for purchasing personal computers in the context of ever escalating living expenses in the country. Cognizant of this fact, the university has been working aggressively to avail computers at all branch libraries, opening of different computer centers and laboratories at central levels, as well as for a specific program or department. However, as shown in the following script, student teachers are still not getting access to ICT facilities to the level of their need. The mismatch of the number of users and the resource supply is one to mention as a barrier.

... Sometimes, the number of computers we have do not match to the number of students we have. There is a mismatch. Because of this, there is no adequate time to expose prospective teachers to ICT facilities. Otherwise, the intention and the interest are there from staff, students, and government, as ICT is indispensable for everybody, let alone teachers. However, still the gap between the demand and the supply is huge and that is the problem we have (T10/2).

As we already mentioned, student teachers had a feeling that access to ICT was not a problem since there are libraries and computer centers that serve students at least in a scheduled manner. However, teacher educators underlined that the large number of students admitted to the university for different programs, which inhibit individual student teacher to get adequate opportunities of practices with ICT facilities.

Mismatch of ICT use in teacher education program and secondary schools. Mismatch of ICT use in teacher education program and that of secondary school is mentioned as an obstacle for the smooth utilization of ICT in both contexts. In the first case, constraints of resources particularly in remote secondary schools do not allow student teachers to try what they have learned in school context. This could be a source of resistivity for learning the application of ICT, as they might ask themselves the value of learning something that they may not use in their teaching. Conversely, they articulated this as follows:

... Even if they (student teachers) are encouraged here to use ICT, the existing infrastructure in secondary schools may not allow them to use ICT. I know that there is an IT (Information Technology) subject there, but they are teaching only the theoretical part, let alone letting teachers of other subjects use in their teaching. (T1/14)

Students themselves are telling us that even some schools in remote areas do not have plasma televisions. Some student teachers assigned in towns even complained that their school does not have adequate computer facilities. Some are using only for office purpose. As a result, learning about technology for some of them is just knowledge to knowledge as they are not practiced here, as well as at their school. (T8/8)

The other inconsistency mentioned was the fact that schools are using certain instructional technology that teacher education institutes do not know about. It has been more than eight years that secondary schools use televised instruction on six subjects, which mounted to nine in 2013 academic year. However, teacher education program has neither push forward themselves to study the new developments in secondary school and incorporated into their program nor able to receive the content in the course syllabus from the ministry. In this manner, it seems that teacher education and secondary schools are not reading each other in the course of using one another's output. Just for the sake of space limitations, we opted to present narration produced from one educator, which represents directly or indirectly what has been said by others.

In the university, we are training teachers as if ICT is not in secondary school, but secondary school is actually using technology mediated instruction. So, there is a huge mismatch. ... Therefore, I simply can say the pedagogical training has to be remodeled here in PGDT towards the involvement of ICT, there should be space for involvement of plasma television if it keeps going in secondary school. During supervision of student teachers at a practicum site, we observed that classroom teachers have only 10 minutes... While the rest is covered by plasma teacher. So, the classroom teacher has no active role in the class. So, what do they do? And what can we observe for evaluation as our student teacher is a mere

listener, no movement? ... Sometimes, the live and plasma teachers are speaking at the same time. And that is a disturbance. We simply gave some suggestion for example, to write some important concepts and mathematical formula on the blackboard, while plasma teacher is delivering the lesson. However, that is also disturbance, as students may be attracted to the live teacher than the plasma television. Therefore, we have to work out on how approaching plasma television in our program. (T6/2)

As can be understood from the above educator's telling, since they and their students do not have exposure to plasma-based teaching, both get confused regarding what to do and to evaluate during practicum supervision. He is so open even to share his experience that what he recommended his prospective teacher for action went wrong. This would not be happened had it been the government were begun orienting the use of plasma television from teacher education institutions, and push them to include plasma-based instruction in their program. Actually, universities are expected to originate evidence-based technology use, adapt the existing technology, and disseminate to the end-users. However, the issue we observed in the above case is the reverse.

Unsuccessful prior experiences of using ICT. It seems that the manner in which student teachers have learned under professors using PPT presentations in their previous education has shadowed their appetites of learning under similar condition. If a facilitator presents copious of slides, makes slides full of notes, and merely read from slides and rushes through without considering whereabouts of students; students would learn nothing and rather develop phobia towards the use of PPT. Similarly, the fact that student teachers have been learning merely the theory of ICT use, as of secondary school made them incompetent to use ICT. The following two explanations from teacher educators affirm this point:

At the beginning of my class, I heard one student saying "Hoo! This television comes here with us". I immediately recognized that he was saying of the PPT slide that I projected on the screen. Then, after a moment, I brought the issue to the floor. The main reason they hate learning through PPT is that most people are using PPT as a means to go through the lesson than focusing on students' learning. As one of the students mentioned, "It is just like plasma television that runs through to cover the portion and we get tired of it". Thereafter, I tried my best to let them know why and when we need to use PPT. And also, I tried to show them in practice. For example, using the white board to write down some keywords during discussion, and putting only main points on slides. ... I learned that they liked the way I did at the end. (T1/6)

I think they attended some ICT courses during their undergraduate program. But I do not think that they have better skills. It seems that they attended only the theoretical aspects, because I understand now that they have the knowledge, but still, they have a problem regarding technical aspects. (T11/2)

This has an implication for reconsidering the way that teachers of all levels use technology in their classroom teaching. Teachers' misuse of technology appear to have negative impact on students to use or learn through such technology in their subsequent learning.

Marginalizing teacher education program. PGDT is a new program, and trainees participated in the study were the first batch who were on the verge of finishing the program at the moment of the interview. As the program is new, and maybe due to its organizational nature, it has been marginalized, and getting access to ICT facilities was a challenge both at the central and departmental levels. Coming to the central level, service providers, like libraries and computer centers which are providing services across the university, were not informed about the candidates' program, and as a result, they were preventing them from getting access to the resource. The following remarks from respondents are speaking about this observable fact:

... Many of computers centers belong to specific departments or program. PGDT is a combination of disciplines organized under the institute. So, computer centers or branch libraries organized for specific disciplines are not allowing them to get access to, as I heard from students. Even, since their identification named them as "evening students", they said

that they are not getting other library services too. (T12/4)

We are taking an instructional technology course. We are attending the course, but we are yet to get in contact with ICT equipments. For example, no computer lab for practice, even for teachers to demonstrate for us. The social science library, where ample computers with connection are available, do not allow us to use since they scheduled services according to the department. ...When we go there, they requested for our department and if the department is not on their agenda, they will not allow us to get access to the service. For example, PGDT program is new, and at the same time, there is no undergraduate program in civics education. Therefore, whenever we request for the services telling them that we are from either civics department or PGDT program, they are responding that there is no such program in the university. (S6/4)

Marginalizing student teachers are not limited to the central level, but it goes to the home department. Some of the student teachers who participated in the study reported that they were treated differently from other program attendants, such as postgraduate and undergraduate regular students. Accordingly, the department's facility centers are prioritizing other program followers than student teachers.

PGDT students from the other departments, for example, Physics, Biology, and the like are using the departments' computer center. However, we did not get a positive response from our department. They said that the computer lab is meant only for postgraduate students. As a class representative, I spoke with the lab attendant, tried to convince her that we are also postgraduate students, but her response was more of an insult... I do not want to repeat. Then, I spoke with the head of the department, and he responded that there is no space for this year, but they would think over for the forthcoming year. (S5/2)

... The language lab of the department is not functioning during the summer. It seems that they want the lab only for regular students who are on vacation at this time. (S9/2)

Marginalizing teacher education program could be seen as treating the program differently just as something which is an additional job. In this manner, the act could go to the level of lacking access to quality learning. If teacher educators have similar feelings, they may not concentrate on providing quality instruction for these students. Cognizant of this fact may also doomed student teachers' interest in learning, as well as the motive to join the teaching profession.

Perceiving ICT as a treat to quality learning. One of the student teachers utterly argued against the use of ICT in teaching and learning process mentioning that it is a threat to the quality of education than a panacea for educational problems explained here and there.

I have reasonably different feeling towards the use of the ICT, particularly, the Internet. Because the Internet is killing our potential for creativity. It leads students to make copy paste rather than developing ideas from their own readings or thinking. For example, let me tell you one of our assignments in this week on inclusive education. The question was, "How do you treat special need students in your class?". Then, what I did was just putting this sentence on Google, and then, copying something jotted down over there. So, can we say that ICT assist learning in this case? Another problem is with the educators. I am sorry to say that some people are becoming technology dependent. They are copying notes from the Internet and provided us as a handout. You can take one hand out of a student and confirm this just by putting on the Internet site. The other point is using of PPT presentation, some are copying notes from the Internet and put on a PPT slide. Then, they come to class without preparation, because they are to read from the wall. There are teachers who cancelled classes when the power supply is interrupted. (S11/2)

We are doing something that we think as worthwhile, as our feelings affect our actions. In the same way, if student teachers observe the misuse of ICT by themselves, as well as by teacher educators, the extent to which they use ICT in their subsequent learning is very low. In the above excerpt, the respondent presented his own experience of ICT use, from which he concluded that ICT is against enhancing quality learning. Thus, it seems

that he will not use such device in his later career unless he encountered productive experiences that may let him to reconsider his current perception.

Discussion

Successful implementation of educational reform depends on the existence of enabling factors embedded in the given educational institutions (Fullan, 2007). Putting it in another way, in a situation where the hold back factors outweigh its counterpart, it would be difficult to implement educational reform envisaged in the way it is supposed to be. As shown in Figure 1, more inhibiting factors (eight categories) than promising factors did emerge regarding the use of ICT in teacher education program under this study. Though, this is not evaluative research, the target was to reveal the existing situation from the perspectives of student teachers and teacher educators who are in the heart of the system. In this way, the surpassing of pushing factors by half that of pulling factors is an indicator for the level of ICT integration in the teacher education program under investigation. In any ways, we will re-conceptualize these factors beginning from the positive aspects in the following way.

As per the pulling factors, the first and repeatedly raised by the participants was considering ICT as a tool for improving student learning. Belief and vision about technology integration in an educational setting has strong impact on the use of ICT (Goktas, Yildirim, & Yildirim, 2009). Therefore, the participants' perception of ICT as a way of getting relevant and updated knowledge, considering ICT as an effective and efficient way of getting required information, presenting learning tasks in a clear and vivid manner, and letting students learn on their own are driving forces for the use of ICT in teacher education program under investigation. In addition, government policy on expanding ICT, for example, putting ICT use as one of the six quality improvement packages at secondary schools (MOE, 2012) and the aggressive work from JU in expanding access to ICT are promising conditions for the application of ICT. Lastly but not the least, the availability of different centers providing access to Internet-connected computer and provision of services in schedule in the way to accommodate the large number of students are also promising conditions.

Among the factors inhibiting the application, lack of clear directive for ICT use is repeatedly mentioned. As already explained as a promising condition, the government is giving attention to the use of ICT, and as a result, currently embarking on materializing inputs. In a similar way, JU is working hard to realize its vision of letting all course instructors use a blended approach in 2013 (JU, 2011). For example, in 2011/2012 academic years, two subjects from each program selected for providing blended learning. In the same way, the university embarked on expanding wireless Internet access zone, furnishing classroom with ICT facilities, and established e-learning office. However, all these events were forgotten in the teacher education under study. Even learning of operating ICT and its application in the course designed for this purpose did not get emphasis. The course content gave more emphasis on instructional media, where prospective teachers learn the preparation and utilization of locally available instructional materials than focusing on using ICT. Similarly, it is only in one discipline didactic course that teaching of ICT use is indicated, though, some teacher educators were going beyond the syllabus to address the need. At the university level, the program was even more forgotten as ICT facilities facilitated for other programs were not in place. It seems that all these points could be considered as resource constraints, however, we have an impression that the program was not getting the attention it deserved compared to other programs harbored by the university.

Similar to lack of clear directive and resource constraints, lack of expertise to use ICT has been reported as

factors pulling back the application of ICT. It is obvious that teacher educators need to have the skill to facilitate learning via ICT. In the same way, student teachers need to have rudimentary skills of operating ICT if they are to learn successfully through ICT use. However, even if the university has training package on implementing e-learning, as well as on basic ICT for academic staff, the participants did not report of mastery of such technology and they pleaded for tailored training and ongoing support. Moreover, it seems that student teachers were not competent in using ICT in the teacher education program since they did not get the opportunity of practice while they were learning the use of ICT at university or lower levels. Besides, looking at teachers including teacher educators who were abusing the use of PPT and Internet, student teachers' appetite for ICT use for teaching and learning purpose has downgraded.

The mismatch of ICT use in teacher education and secondary schools is also reported as one possible barrier for the use of ICT. For example, government is engaged in reaching all state schools with plasma television, and currently, 71.6% are users of the technology in nine selected subjects (MOE, 2012). The same document showed training has been provided for teachers regarding the operation of plasma television transmission. However, teacher education institutes do not have the program in their curriculum. They were also neither participating in such training organized for school teachers on plasma television operation nor they themselves approach to amalgamate the practice there with their preparation of the would be teachers. On the other hand, prospective teachers were encouraged to use ICT in the teaching and learning process, though, not to the level high. However, as they are newly recruited teachers, they have been placed in remote areas where the getting of ICT facility is difficult. According to a recent report from the MOE, only 26.1% of schools can get access to Internet services (MOE, 2012). It is obvious that schools in urban areas where student teachers placed are without such services, and it is difficult for them to realize the value of learning such skill in their teacher education.

Moreover, lack of factors that enforce teacher educators and student teachers to use ICT and student teachers' perception of ICT even as a threat to the quality learning indicated as a plausible bottleneck for the use of ICT in teaching and learning process.

Implications

The study comes up with the following points as areas for further action in order to ameliorate application of ICT in the preparation of pre-service teacher education.

(1) There is an understanding that reconsidering the planning process of integrating ICT in teacher education program both at the ministry and the university levels is relevant. Developing teacher education curriculum including details of the course syllabus is the mandate of the ministry. Hence, the ministry can lead review of the course on "Instructional Technology" in the way that it emphasizes more ICT aspects. In addition, it has been shown that the application of technology in teaching is effective when teachers are able to amalgamating it with their knowledge of pedagogy, content, and context. One of the areas where such matrix may be exercised in the teacher education program is in the discipline of didactic courses, which is lacking in the current curriculum. Hence, the ministry may reconsider the redesign of the courses from this angle;

(2) As shown in the study, there may be a possibility of realizing learning by using ICT in all teacher education courses had it been there were something that force or reinforce student teachers and teacher educators toward that end. Thus, this is again an area where the institute can embark on, of course, in consultation with other stakeholders;

(3) The institute can also scale up the attempts of teacher educators who have tried their best to integrate the use of ICT in their course. Moreover, organizing ICT skill training and ongoing support for teacher educators, reserving ICT furnished teacher education classroom, and ensuring the accessibility of a resource center are areas deserving immediate attention of the institute;

(4) Learning the operation of ICT in teaching and learning is skill-based, and skill-based learning requires practice, otherwise, what is learned remain to be inert knowledge. Therefore, training students on ICT at different levels needs to be reconsidered. Thinking the way of maximizing the utilization of existing resource is one way of realizing the practical application of the training rather than taking lack of resource as an excuse for practical training.

The program participants have the feeling that the program was marginalized, and as a result, they were not getting services they deserved. As such feeling has strong impact on the impression they may develop, even on the teaching profession, it needs further investigation and actions.

Limitation of the Study

The study is qualitative in nature, and qualitative research is not interested in drawing generalization to the source population. Instead, it intends to present thick and rich description of the participants' account, so that readers will draw their own conclusion. However, we were more selective as page limits did not allow us to present accounts from different participants.

References

- Angeli, C., & Valanides, N. (2009). Epistemological and methodological issues for the conceptualization, development, and assessment of ICT-TPCK (technological pedagogical content knowledge): Advances in TPCK. *Computers and Education*, 52(1), 154-168. doi:10.1016/j.compedu.2008.07.006
- Bitew, G. D. (2008). Using "plasma TV" broadcasts in Ethiopian secondary schools: A brief survey. *Australasian Journal of Educational Technology*, 24(2), 150-167.
- Dahlström, L., & Lemma, B. (2008). Critical perspectives on teacher education in neo-liberal times: Experiences from Ethiopia and Namibia. *A Journal of Comparative Education and History of Education*, 14(1-2), 29-42.
- Engida, T. (2011). *ICT-enhanced model ICT-enhanced*. Addis Ababa, Ethiopia: UNESCO-IICBA.
- Evans, B. C., Coon, D. W., & Ume, E. (2011). Use of theoretical frameworks as a pragmatic guide for mixed methods studies: A methodological necessity? *Journal of Mixed Methods Research*, 5(4), 276-292. doi:10.1177/1558689811412972
- FDRE (The Federal Democratic Republic of Ethiopia). (2004, July). *Report on the development of education in Ethiopia to the UNESCO 47th session of the international conference on education 8-11 September 2004*, Geneva, Switzerland. Retrieved from http://www.ibe.unesco.org/International/ICE47/English/Natreps/reports/ethiopia_scan.pdf
- Fullan, M. (2007). *The new meaning of educational change* (4th ed.). New York, London: Teachers College Press, Columbia University.
- Goktas, Y., Yildirim, S., & Yildirim, Z. (2009). Main barriers and possible enablers of ICTs integration into pre-service teacher education programs. *Educational Technology and Society*, 12(1), 193-204.
- Goodwin, L. (2012). Quality teachers, Singapore style. In L. Darling-Hammond, & A. Lieberman (Eds.), *Teacher education around the world: Changing policies and practices* (pp. 22-43). London: Routledge.
- JU (Jimma University). (2011). *Jimma University's e-learning policy*. Jimma University, Ethiopia.
- Jung, I. (2005). ICT-pedagogy integration in teacher training: Application cases worldwide. *Educational Technology and Society*, 8(2), 94-101.
- Koehler, M. J., Mishra, P., & Yahya, K. (2007). Tracing the development of teacher knowledge in a design seminar: Integrating content, pedagogy, and technology. *Computers and Education*, 49(3), 740-762. doi:10.1016/j.compedu.2005.11.012
- MOE (Ministry of Education). (2009). *Postgraduate diploma for teachers: Secondary teacher education curriculum framework*. Addis Ababa, Ethiopia: EMIS.
- MOE. (2010). *ESDP IV (Education sector development program IV): Program action (2010/2011-2014/2015)*. Addis Ababa,

Ethiopia: EMIS.

MOE. (2012). *Education statistics annual abstract (2011-2012)*. Addis Ababa, Ethiopia: EMIS.

Mortari, L. (2009). *Ricerca e riflettere: La formazione del docente professionista* (Research and reflection: The trainings of professional teachers). Roma: Carocci.

Sahlberg, P. (2012). The most wanted: Teachers and teacher education in Finland. In L. Darling-Hammond, & A. Lieberman (Eds.), *Teacher education around the world: Changing policies and practices* (pp. 1-21). London: Routledge.

Strauss, A., & Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (2nd ed.). London: Sage Publications.

Tacconi, G. (2009). Lavagne interattive multimediali (LIM): spunti per una riflessione didattica (Interactive whiteboards: Some ideas for educators). *Rassegna CNOS*, 26(1), 282-283.

Tacconi, G. (2011). *La didattica al lavoro. Analisi delle pratiche educative nell'Istruzione e formazione professionale* (Didactics at work: The analysis of educational practices in vocational education and training). Milano: FrancoAngeli.

UNESCO (United Nations Educational, Scientific, and Cultural Organization). (2002). *Information and communication technology in teacher education: A planning guide*. Paris: UNESCO-IICBA.

Whetten, D. A. (2007). Principles of effective course design: What I wish I had known about learning-centered teaching 30 years ago. *Journal of Management Education*, 31(3), 339-357. doi:10.1177/1052562906298445

Zhang, Z., Tousignant, W., & Xu, S. (2012). Introducing accessible ICT to teacher candidates: A way to address equity issues. *Journal of Literacy and Technology*, 13(1), 2-18.