

Difficulties Faced by Teachers in Using ICT in Teaching-Learning at Technical and Higher Educational Institutions of Uganda

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Abstract

A study aimed at finding out the difficulties faced by teachers in using Information and Communication Technology (ICT) in classroom teaching-learning in technical and higher educational institutions in Uganda. The use of ICT in the classroom is very important in providing opportunities for students to learn to operate in an information age. Studying the obstacles to the use of ICT in educational institutions may assist educators to overcome these barriers and become successful technology adopters in the future. 55% of a sample of 150 teachers and 57% of a sample of administrators participated in the study. Chi square test and weighted average using Statistical Package for Social Science (SPSS) software were used to analyze and interpret the data. The findings of this study reveal that teachers had a strong desire to integrate ICT into teaching-learning process even though with difficulties. The major barriers were lack of genuine software, inadequate computer in the classroom, low speed internet, lack of motivation from both teacher and student side to use ICT, lack of proper training skills, unavailability of latest ICT equipment, lack of expert technical staff, poor administrative support, poor course curriculum etc. Suggested are made for ongoing professional development of teachers to model new pedagogies and tools for learning with the aim of enhancing the teaching-learning process. It is important for teacher trainers and policy makers to understand the barriers and cost-effectiveness of different approaches to ICT use in teacher training so that training strategies can be appropriately explored to make such changes viable to all.

Key Words: *ICT, Teaching-Learning, Difficulties, Uganda*

1. Introduction

As Uganda adopts Information and Communication Technology (ICT) in education, it faces the same

challenges like most developing countries where unstable economy, poorly developed ICT infrastructure, high bandwidth costs, unreliable supply of electricity, general lack of resources etc, were found to be the central issues to meet a broad spectrum needs of the country. Like other factors improper use of ICT in the classroom teaching-learning is a very important factor to be considered in the educational context of Uganda. ICT provides opportunities for teachers and students to operate, store, manipulate, and retrieve information, encourage independent and active learning, and self-responsibility for learning, motivate teachers and students to continue learning even outside school hours, plan and prepare lessons, design materials and facilitate sharing of resources, expertise and advice.

ICT as a versatile instrument has the capability not only of engaging students in instructional activities to increase their learning, but of helping them to solve complex problems to enhance their cognitive skills [1]. Generally, three objectives are distinguished for the use of ICT in education:-a) the use of ICT as object of study; refers to learning about ICT, which enables students to use ICT in their daily lives; b) the use of ICT as aspect of discipline or profession; refers to the development of ICT skills for professional or vocational purposes; c) the use of ICT as medium for teaching and learning; focuses on the use of ICT for the enhancement of the teaching and learning process [2]. It is a fact that teachers are at the center of curriculum change and they control the teaching and learning process. Therefore, they must be able to prepare young people for the knowledge society in which the competency of using ICT to acquire and process information is very important [3]. ICT plays various roles in learning and teaching processes. According to Bransford et al [4], several studies have reviewed literature on ICT and learning and have concluded that it has great potential to enhance student achievement and teacher learning. Wong et al., [5] point out that technology can play a part in supporting face-to-face

teaching and learning in the classroom. According to Flanagan and Jacobsen [6], technology integration is meant to be cross-curricular rather than become a separate course or topic in itself. Technology should be used as a tool to support educational objectives such as skills for searching and assessing information, cooperation, communication and problem solving which are important for preparation of students for the knowledge society [2].

In fact, innovative use of ICT can facilitate student centered learning [7]. Hence, every classroom teacher should use learning technologies to enhance their student learning in every subject because it can engage the thinking, decision making, problem solving and reasoning behaviors of students [8]. These are cognitive behaviors that students need to learn in an information age. Although ICT may facilitate independent self-paced learning, the potential of ICT may not be optimized if there is no shift in the learning and teaching paradigm [9]. In fact, teachers play an important role in the teaching-learning paradigm shift. They must understand the potential role of technology in education. Also, they should become effective agents to be able to make use of technology in the classroom.

Due to ICT's importance in society and possibly for the future of education, identifying the possible obstacles to the use of ICT in educational institutions would be an important step in improving the quality of teaching and learning in the education system of Uganda. Balanskat, Blamire, and Kefala[10] argue that although educators appear to acknowledge the value of ICT in institutions, difficulties continue to exist during the processes of adopting these technologies. This study therefore aimed to bring together the findings and the key points from a review of a significant part of the available literature associated with difficulties that teachers are facing in using ICT in teaching-learning process. Identifying the fundamental problems may assist teachers and educators to overcome these problems and become successful technology adopters. Moreover, this paper aims to investigate the difficulties of integrating technology and the nature of problems faced by teachers in teaching-learning process in technical and higher educational institutions in Uganda. It also investigates the reasons behind various problems faced by teachers in using ICT in the teaching-learning environment. In fact, understanding the pedagogical, psychological and cognitive barriers to the successful use of ICT is a vital precondition for improving the utilization of computers and other technological aids in the educational institutions [11]. Also, the detection of these barriers provides information that is helpful in

supplementing existing in-service training programs. Identifying the fundamental barriers may assist teachers and educators to overcome these barriers and become successful technology adopters [12]. Based on this; the paper provides some recommendations on improving ICT integration in classrooms.

2. Importance of ICT in Educational Institutions

Several studies argue that the use of new technologies in the classroom is essential for providing opportunities for students to learn to operate in an information age. It is evident, as Yelland[13] argued that traditional educational environments do not seem to be suitable for preparing learners to function or be productive in the workplaces of today's society. She claimed that organizations that do not incorporate the use of new technologies in institutions cannot seriously claim to prepare their students for life in the twenty-first century. This argument is supported by Grimus[14], who pointed out that *"by teaching ICT skills in educational institution the students are prepared to face future developments based on proper understanding"* (p. 362). Similarly, Bransford et al. [4] reported that *"what is now known about learning provides important guidelines for uses of technology that can help students and teachers develop the competencies needed for the twenty-first century"* (p. 206).

ICT plays various roles in learning and teaching processes. According to Bransford et al. [4], several studies have reviewed literature on ICT and learning and have concluded that it has great potential to enhance student achievement and teacher learning. Wong et al. [5] point out that technology can play a part in supporting face-to-face teaching and learning in the classroom. Many researchers and theorists assert that the use of computers can help students to become knowledgeable, reduce the amount of direct instruction given to them, and give teachers an opportunity to help those students with particular needs. It can help the teachers enhance their pedagogical practice and equip them with the knowledge and skills to use different computer technologies to access, analyze, interpret process and disseminate information to learners. It can also help the educational institutions to provide ICT capacity (resources) to ensure that all teachers and students have immediate access to all software that are required to support the curriculum and adequate support to implement its use in classroom teaching-learning process without any difficulties. Furthermore, it can also help to enhance the quality of education by increasing learner motivation and engagement,

facilitating the acquisition of basic skills and enhancing teacher training and promote the shift to a learner-centered environment.

3. Difficulties to Integrate ICT into Educational Institution

The act of integrating the use of ICT into teaching and learning is a complex process and one may encounter a number of difficulties. Different categories have been used by researchers and educators to classify the problems in use of ICT in educational institutions and several studies have divided the problems into extrinsic and intrinsic categories. Ertmer[15] referred to extrinsic problems as first-order and cited access, time, support, resources and training and intrinsic problems as second-order and cited attitude, beliefs, practices and resistance. Whereas, Hendren[cited in 12] saw extrinsic problems to institutions rather than individuals and intrinsic problems pertains to teachers, administrators and individuals.

Another perspective presents the obstacles in the use of ICT in educational institutions as pertaining to material and non-material conditions [16]. The material conditions may be the insufficient number of computers and copies of software. The non-material obstacles include teachers' insufficient ICT knowledge and skills, the difficulty of integrating the use of ICT in instruction, and insufficient teacher time. However, since the purpose of the paper is to find the present and future problems in use of ICT, this study focuses on the teacher-level and institution-level problems.

4. Methodology

The study was a descriptive method with quantitative analysis. The sample of the study was selected from 150 teachers and 75 administrators from the five selected technical and higher educational institutions of Uganda. Stratified random sampling technique was used for data collection. Out of the response rate of 150 teachers and 75 administrators, 55 percent of the teachers and 57 percent of the administrators were allocated in Eastern part of Uganda Mbale; 24 percent of the teachers and 25 percent of the administrators in West Nile Arua; 21 percent of the teachers and 18 percent of the administrators in Central Kampala.

A questionnaire was designed and divided into two parts. The first part contained direct answers yes/no and multiple choice answers and sometimes it required teachers' and administrators' opinions for qualitative analysis. The second part contained the questions regarding different aspects of ICT use in the institutions based on Likert-type five point scales. The validity of

the questionnaires was confirmed through expert's opinions after certain modifications. The analysis was carried out at the institutional level. Chi square test and weighted average were used to analyze and interpret the data. Interpretation of chi square test was done through SPSS (Statistical Package for Social Science) software. Chi square test was used in finding out whether the opinions of the respondents were statistically significant or not. The significant value was compared with the critical value at 0.05 levels.

5. Analysis Based On Likert Type Scale

Table 1 shows that, around 48.7 % of the teachers think that they can use the ICT very well in the teaching-learning process with sound confident and 51.3% of the teachers said that they are skilled enough to use the ICT in teaching-learning process. That's why the weighted average of the teachers shows high confidence of 4.49 about the use of ICT in teaching-learning process which is neither uncertain nor poor. Also the chi square value of 0.744 which is greater than critical value 0.05 means null hypothesis is accepted and teacher's opinions were rejected which is statistically insignificant.

Table 1: Present condition of the institution in terms of ICT service

Questions	Opinion	WA	χ^2 Test (Sig. value)
How well do you think that ICT system will be managed by your institution if it is introduced?	Teachers	4.49	.744
	Administrators	3.93	.000
Overall opinion of the quality of ICT service that your institution receives up to now.	Teachers	3.49	.000
	Administrators	3.47	.564

The weighted average of the administrators show moderate value of 3.93 which means their confidence depends upon the teachers regarding ICT skills to manage their institution and the chi square value shows 0.00 which is less than the critical value of 0.05 meaning null hypothesis is rejected and the administrators' opinions are accepted which are statistically significant.

Over 50% of the teachers and the administrators were in view that the quality of ICT service they receive in

their institution is somehow average because of the many factors that were discussed earlier about the difficulty in the use of ICT in teaching-learning process. The weighted average is moderate about the quality of the ICT service received in the institution while the chi square value of the teachers shows 0.00 which is less than critical value of 0.05 meaning the null hypothesis is rejected and the teacher's opinions are accepted about the average level of the quality of service received in the institution which is statistically significant. On the other hand the chi square value of the administrator's shows 0.564 which is greater than critical value of 0.05 which means the null hypothesis is accepted and the administrator's opinions are rejected which is statistically insignificant.

Table 2: ICT existence in teaching-learning process (Teachers Opinion)

Questions	WA	χ^2 Test (Sig. value)
Do you think the existing audio visual aids are properly used for teaching-learning purpose?	3.35	.000
ICT tools are technically too complicated to use	2.51	.000

Table 2 presents that 55.3% of the teachers agreed they used the existing audio visual aids properly in teaching-learning. The weighted average shows moderate value of 3.35 while the chi square value shows 0.00 which is less than critical value of 0.05 meaning that teachers opinions regarding proper use of the audio visual aids in the teaching-learning process is accepted which is statistically significant and the null hypothesis is rejected.

Table 2 depicts that 38% of the teachers disagreed with the statement that ICT tools are complicated to be used in teaching-learning process. The weighted average value of 2.51 indicates low opinions of the teachers regarding ICT tool complication while the chi square value of 0.00 which is less than the critical value of 0.05 meaning that the null hypothesis is rejected and the teachers opinions about the dissatisfaction is accepted and statistically significant.

6. Results and Discussion of the Findings

With respect to barriers to computer and ICT usage, figure 1 reveals that no factor has the supreme majority for limiting the use of ICT in teaching-learning process in technical and higher educational institutions in Uganda. This means all factors depicted below greatly limit the use of ICT in educational institutions in Uganda.

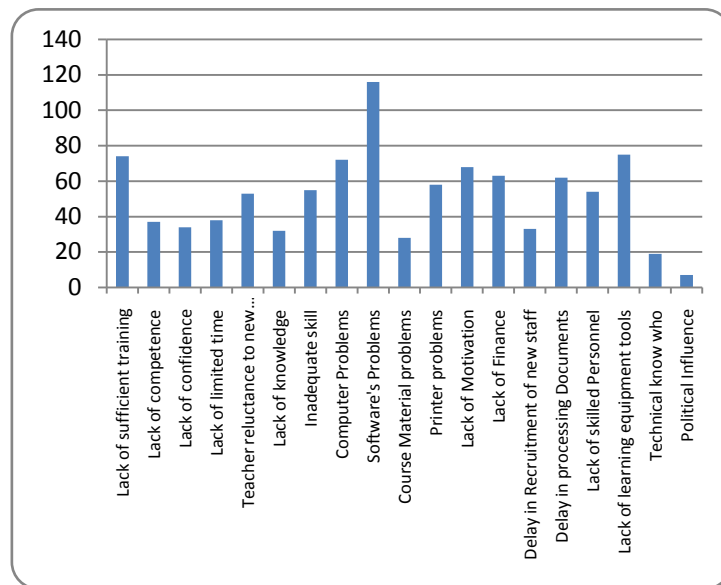


Figure 1: Factors that limit the use of ICT in teaching-Learning process

However, according to figure 1 the problems are categorized into three levels-a) top level, b) middle level and the c) lower level which are analyzed below-

a) In the top level problems lack of software, lack of sufficient training, lack of learning equipment and computer problems were identified.

6.1 Lack of software problem

This was one of the major factors that made difficulties in use of ICT. There were unreliable and pirated software that had been frequently changed in the computer labs which were difficult to use properly in teaching-learning process. In majority of the cases it had been found that the ICT facilities were limited for both the teachers and students and they had to share with other teachers. According to Becta[17], the inaccessibility of ICT resources is not always merely due to the non-availability of the hardware and software or other ICT materials within the institution. It may be the result of one of a number of factors such as poor organization of resources, poor quality hardware, inappropriate software, or lack of personal access for teachers [17]. According to Osborne and Hennessy [18], the limitations on access to hardware and software resources influenced teachers' motivation to use ICT in the classroom.

6.2 Lack of sufficient training

Most of the teachers lack the skill to use the ICT in teaching-learning process because they did not get

enough training opportunities. Teachers were rarely seen using ICT in a classroom environment because most of the teachers were reluctant to use new technology. New technologies need to be integrated in the classroom and teachers have to be trained in the use of these ICT in particular. In this regard some initial training is needed for teachers to develop appropriate skills, knowledge, and attitudes regarding the effective use of computers to support learning. According to Beggs[19], one of the top three problems to teachers' use of ICT in teaching was the lack of training. According to Becta[17], the issue of training is certainly complex because it is important to consider several components to ensure the effectiveness of the training. These were time for training, pedagogical training, skills training, and ICT use in initial teacher training. Providing pedagogical training for teachers, rather than simply training them to use ICT tools, is an important issue [17].

6.3 Lack of learning equipment tools and resources

It was found that most of the institutions had computers. But the computers were very few and most of the time they were being used by students who were offering computers science and information technology (IT) leaving the rest of the students and teachers in dilemma. Various research studies indicated several reasons for the lack of access to technologies. In Sicilia's study [20], teachers complained about how difficult it was to always have access to computers. The author gave reasons like "*Computers had to be booked in advance and the teachers would forget to do so, or they could not book them for several periods in a row when they wanted to work on several projects with the students*" (p. 50). In other words, a teacher would have no access to ICT materials because most of these were shared with other teachers. Teachers identified lack of insufficient numbers of computers, insufficient peripherals, and insufficient numbers of copies of software, and insufficient simultaneous internet access as the main obstacles to the implementation of ICT in educational institutions. According to Balanskatet al. [10], the accessibility of ICT resources does not guarantee its successful implementation in teaching, and this is not merely because of the lack of ICT infrastructure but also because of other problems such as lack of high quality hardware, suitable educational software, and access to ICT resources. Newhouse [21] asserts that poor choices of hardware and software and lack of consideration of what is suitable for classroom teaching are problems facing many teachers. Similarly, Cox et al. [22] found that majority of teachers agreed that insufficient ICT resources in the institution and

insufficient time to review software prevent teachers using ICT.

- b) It was identified that teachers reluctant to use new technology, lack of motivation, lack of finance, delay in processing documents, lack of skilled personnel and of limited time were the mid-level problems.

6.4 Teachers' reluctance to new technology

One of the problems in the implementation of computers in teaching-learning was teachers' acceptance, which is in turn was influenced by their attitudes towards these media. Teachers' attitudes have been found to be the major predictors of the use of new technologies in instructional settings; the successful use of new technology in the classroom depends largely on the teachers' attitudes toward these tools. In fact, teachers' attitudes towards computers affect their use of computers in the classroom and the likelihood of their benefiting from training. Many researches into the problems of integrating ICT in education found that teachers' reluctant to new technology was a significant problem. Watson, [23] argued that integrating the new technologies into educational settings requires change and different teachers will handle this change differently. According to him considering different teachers' attitudes to change is important because teachers' beliefs influence what they do in classrooms. Becta[17] claims that one key area of teachers' attitudes towards the use of technologies is their understanding of how these technologies will benefit their teaching and their students' learning. Schoepp, [24] found that, although teachers felt there was more than enough technology available, they did not believe that they were being supported, guided, or rewarded in the integration of technology into their teaching.

6.5 Lack of skilled personnel

It has been observed that the teachers were lacking in the knowledge and skills; and they were reluctant about the changes and incorporation of extra learning associated with computers into their teaching practices. Hence there is a problem of teachers' acceptance and adoption of ICT. Accordingly, teachers who do not use computers in classrooms claim that "lack of skills" is a constraining factor preventing them from using ICT. It was also found that teachers' lack of knowledge and skills in teaching was a serious obstacle of using ICT in technical and higher educational institutions. Newhouse [21] found that many teachers lacked the knowledge and skills to use computers and were not eager about the changes and integration of supplementary learning

associated with bringing computers into their teaching practices.

6.6 Time limitation

The study reveals that many teachers have skills in using computers in the classroom, but they still make little use of technologies because they did not have enough time. A significant number of teachers identified time limitations as one of the difficulties in scheduling enough computer time for classes as a problem in their use of ICT in their teaching-learning. According to Becta[17] the problem of lack of time exists for teachers in many aspects of their work as it affects their ability to complete tasks. Some of the teachers who participated specifically mentioned that they need time to locate internet information, prepare lessons, explore and practice using the technology, deal with technical problems, and receive adequate training. Recent studies show that lack of time is an important factor affecting the application of new technologies in ICT education [12].

- c) The research findings identified lack of confidence, lack of knowledge; course material and political influence were the lower level problems.

6.7 Lack of confidence

One of the problems that prevent teachers from using ICT in their teaching is lack of confidence. The study investigated the reasons for teachers' lack of confidence with the use of ICT and found that due to 'fear of failure' many teachers do not consider themselves to be well skilled in using ICT and feel anxious about using ICT in front of a class. According to Balanskat et al. [10] limitations in teachers' ICT knowledge makes them feel anxious about using ICT in the classroom and thus do not have confidence in using it in their teaching.

6.8 Lack of knowledge

Another problem, which is directly related to teacher confidence is- teachers' lack of knowledge in integrating ICT into pedagogical practice. In Syria, for example, teachers' lack of technological competence has been cited as the main problem of using ICT in teaching-learning [25]. Likewise, in Saudi Arabia, lack of ICT skills is a serious obstacle to the integration of technologies into classroom teaching and learning [12, 26]. Another worldwide survey conducted by Pelgrum[16], of nationally representative samples of institutions from 26 countries, found that teachers' lack of knowledge and skills is a serious obstacle to using ICT in educational institutions.

7. Constraints of Using ICT in Educational Institutions

The respondents expressed their opinions in some open ended questionnaires, where many factors that limit the use of ICT in the educational institutions, seem to be noteworthy to a meaningful conclusion for this study. It has been found that there are many barriers related to teachers and administrators.

Constraints related to the teachers: Many teachers who wanted to use computers for teaching-learning purpose said that there were inadequate computers in the classroom. However the content of the programmes were appropriate but resource material required to teach the courses both in soft and in hard form needs to be available to assist the students. More computers and more Labs need to be established so that the students should utilize the computers. It is found that though the numbers of computers at the institution are less even though, some teachers used their own initiative in using their own personal laptops for the better teaching-learning. Many teachers claim that if facilities are available then they can use those facilities and some are really ready to do so. Low speed internet, lack of computers skills, virus threat, lack of proper training, lack of skilled personnel, software problems, power problems, lack of motivation to encourage the use of ICT from the administration side, shortage of training, shortage of proper equipment and delay to purchase equipment are the remarkable causes that makes it difficult to use ICT in the teaching-learning process.

More practical courses need to be given to students than theory. Availability of resources e.g., projectors, white boards and many others need to be put in all lecture rooms. Lecturers need to be provided with computers for planning their lessons in order to make the best use of the ICT in teaching-learning process. Some software is very complicated to use by some of the teachers/lecturers who have limited skills of ICT usages. Hence appropriate training should occur frequently. Lack of motivation on students is also a significant factor that limits the use of ICT. Students are reluctant to use online resources to help them in the academic process. Some students are weak and do not want to practice in using computers. Extreme course load was given on teachers due to the shortage of teachers. It was found from the structured question that most of the teachers had heavy class loads approximately over 30 hours per week which put extremely pressure on them. Though some of the teachers were interested in the use of ICT for preparing their teaching-learning materials, due to the heavy load they did not get enough time to do so. Due to heavy

class loads, teachers became panic and depressed about the use of ICT.

The other important reason behind teacher's failure to use modern technology for effective teaching-learning process is job dissatisfaction. Their initiative, creativity, inventiveness became indolence because of job satisfaction. Many teachers of the institutions remained in the same status and in an unhappy salary position for a long period of time as they do not get any promotion due to wrong policies in the educational institutions and due to personal wrath of some administrators. As the teachers are very upset about their job career, they are not boosted to do any new changes for the institution.

Factors related to administrators: Institutions in Uganda are lacking in ICT materials and professional instructors who are literally conversant with the interest in ICT techniques. Poor network providers, unreliable and slow internet connectivity make it difficulties to use ICT and hence affect the teaching-learning process. For example- handling programmes like CISCO learning which needs constant network stability. Unreliable power supply and too much of power fluctuation also interrupts teaching and it is worse to the students especially when it comes to practical lessons. It was found that the lack of proper knowledge about the importance of using ICT by administrators was one of other factors that limit the use of ICT.

Regarding the ICT integration into teaching-learning process the respondents gave several opinions. The following table summarizes their opinions for possible implications to integrate ICT with teaching-learning process.

Table 3: Possible implications of ICT Integration

Difficulties	Administrators	Teachers
Lack of genuine software	Purchase of more genuine software	Updating software's at a regular interval
Lack of technical support	Providing continued technical support	Properly utilize those available support
Unstable and unreliable internet	Purchase high bandwidth with high internet speed	Frequent accessibility to internet
Resistance to change	Provide training in new pedagogical approaches	Being open minded towards new ways of teaching and

		adapt with that
Lack of ICT equipment	Providing ICT resources	Taking advantage of those resources
Lack of available time	Reducing the administrative loads and course loads	Acquiring skills of self-organization and time managements
Lack of training expertise in ICT	Providing training courses in dealing with the new devices, modern technologies, and new pedagogical approaches	Taking up opportunities of the training and knowing how to access to the resources

Other remarkable constraints: In general, several other barriers have been identified by the respondents. Among them a range of the following factors are teachers' attitudes towards computers, poor funding, lack of teacher confidence, poor administrative support, lack of computer skills, poor course curriculum, lack of incentives, scheduling difficulties, lack of training opportunities, and lack of skills in how to integrate ICT in education.

8. Conclusion

The aim of this research was to provide information of finding on the difficulties that teachers faced in using ICT in their teaching-learning process. The findings of this study indicate that teachers have a strong desire for the integration of ICT into education but they encountered many barriers to it. These findings therefore have implications for training the teachers to become regular users of ICT focusing on acquiring basic IT skills. Since confidence, competence and accessibility have been found to be critical components for technology integration in institutions, ICT resources including software and hardware, effective professional development, sufficient time, proper training and technical support need to be provided to teachers. No component in itself is sufficient to produce good teaching. However, the presence of all components increases the probability of excellent integration of ICT in teaching-learning process. Therefore the training of teachers in the pedagogical issues should increase if teachers are to be convinced of the value of using ICT in their teaching-learning process.

Teachers need to take advantage of ICT resources offered at institutions. They need to be prepared before joining the teaching profession. Where training is absent, teachers can prepare themselves by enrolling in private sessions or by self-training. They should open minded towards new approaches of teaching. Where support is lacking, they need to find ways to be able to solve problems involving their use of ICT in Institutions. Finally, teachers should acquire skills of self-organization which will help them a great deal in conducting their classes when using ICT.

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