

COMPETENCIES REQUIRED BY EDUCATORS TO USE LEARNING TECHNOLOGIES

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ABSTRACT

Living in a world that is constantly changing, forces teachers to adopt the use of technology and to integrate it in their teaching practices. Teachers are facing a new generation of learners who are continuously occupied enjoying learning with technology tools. Dealing with these net generation learners is not an easy task if teachers are not equipped with the necessary technology skills. Nowadays learners prefer to learn using online methods such as forums. This can be an obstacle for some teachers if they are not technology literate. It can be a threat to the popularity of the teaching profession and cease the smoothness of the learning process. To avoid these fears teachers need to develop certain technology competencies to deal with the 21st century learners. These competencies should be enhanced through professional development opportunities that are provided by the organization or the individual himself. These technology training courses should be done according to a systematic plan where collaboration of schools and individuals is required for the success of the process.

INTRODUCTION

In a complex and rapidly changing globalize world it is critically important that teachers and teacher educators engage in debate, decision making, new knowledge creation and action for change (Ashton & Newman, 2006). Teachers with their traditional methods of teaching failed to capture the attention of the new generation of learners. They are in danger of loosing the status of their profession if they do not integrate it with the technology to meet everyday work challenges. They need technology to communicate knowledge and skills to their learners and to contribute to their motivation and activity inside the classrooms. They need to use and adapt Information and Communication Technology in their daily work life and seek knowledge in and by this emerging educational tool.

This cannot happen unless teachers possess certain special competencies that enable them to make effective use of computers and other technology tools that can assist them to play the important role as change agents in their communities effectively. Gaining these competencies is not an easy task to accomplish. This is where professional development and teacher education programs of both experienced and novice teachers play an essential role.

Teachers need to share responsibility with their administrators to train themselves in using technology in their daily life. Teachers should learn how to be lifelong learners for sustaining teacher moral and career advancement.

In this paper, a clear picture of the required ICT competencies needed to develop teachers will be discussed. The role of professional development in fostering these competencies is going to be discussed with the provision of some practical implications. Recommendations and further research are suggested at the end of the chapter.

LITERATURE REVIEW

In this changing world driven by globalization, educators and specifically teachers have no choice but to integrate Information Communication Technology in their teaching to cope with the needs of the learners of the 21st century. Today's learners are found to be confident in using technology tools in their daily life. For example, they are messaging, logging, and using video games easily. They also can form groups of friends from different countries using the internet and they can chat with each other at the same time. The teacher of such students needs to be competent in using technology and in investing their time to learn to improve and facilitate the learning process. The teacher needs to be well equipped with the demanding knowledge and skills.

As ubiquitous communications and immediate access to information have become more common, learners recognize that learning can be an anytime and anywhere experience (Davis & Roblyer, 2005). These learners are described as self-regulated learners who can construct their own learning using technology tools easily. They also learn using different technology tools at anytime they wish. This demonstrates the type of teacher this new generation of learners demand and the new role the teacher should perform in this changing society inhabited by such competent learners.

The teacher's no more the only source of information and the master of knowledge as it used to be in the old days. This is because the new technology such as the internet is providing this service easily. A wise teacher is then the one who uses this technology device and others to improve his teaching and to advance his knowledge and skills. The 21st century teacher should act as a facilitator of students' learning and as a guide on the side but not a sage on the stage.

The surrounding world is changing and the knowledge is advancing because of the impact of technology. Teachers do not live in isolation. In the contrary, they are surrounded with technology interfering in every aspects of their life. For example, the world is experiencing at the moment the emergence of e-governments where every element in the surrounding system is operated with the use of technology tools. People nowadays use e-banking where they use a card to buy stuff from different parts of the world. They also can shop online by just entering their account number to pay for what they buy.

Digital technologies can play a role as tools which afford learners the potential to engage with activities (Fisher, Higgins & Loveless, 2006). Teachers can benefit from these digital tools in enhancing and improving their learners' abilities and creativity in dealing with the given tasks differently. For example, using the computer as a tool for delivering a story in a reading class can inspire some students to use the drawing and painting tools in a concept mapping software to turn the story into interactive colorful scenes or create a totally different version of the story.

Loveless, DeVooged and Bohlin (2001) draw attention to how digital technologies can provoke shifts in understanding of knowledge itself as presented in the school curriculum. Traditional presentation of knowledge or content of the curriculum cannot motivate the learner to sense that knowledge and understand its power in shaping understanding whereas, using technology to present the same content can influence understanding effectively. For example, presenting some contents of grade one English materials dealing with concepts such as colors, shapes or numbers using animation programs in the computer can help the students

to understand these three concepts in an enjoyable way and by relating them to the pictures and animations they see in the program. Another example is teaching English literature using concept maps where students can divide the given story into different parts of literary devices.

Introducing online teaching and learning in educational systems is considered as a step forward in improving methods and practices of the two processes in the global era. For example, online teaching requires teachers to be skillful in using technology tools. It also needs extra time and efforts in preparing, organizing and uploading the intended materials. According to Sammons and Ruth (2007) communication, interactivity and feedback are additional challenges in online teaching. This emphasizes that teachers need to be careful when they design their online courses. For example they should provide variety of communicative activities that involve learners to interact with each other such as online chats and forums. This also encourages both teachers and learners to be innovative. For instance, they can create communicative learning environments that help both parties to benefit from the interaction between them and from providing constructive feedback that can contribute in improving the learning and teaching process.

Although faculty support has been identified as a critical factor in the success of educational technology programs, many people involved in such efforts underestimate the complexities of integrating technology into teaching (Moser, 2007). For example, to implement this integration, colleges and universities have to specify sufficient budget for this purpose. They also need to setup a systematic plan for training faculty members in using different technology tools. In addition they need to convince faculty especially the experienced ones in the expected benefits of using technology in teaching and learning.

Effective and productive use of technology in teaching cannot be achieved and accomplished unless teachers possess certain special competencies and skills that are considered prerequisites for effective teaching in the digital age.

What ICT competencies teachers are required to develop?

The next generation teachers must be technology literate to teach the new generation of students. Smith (2005) identifies over fifty unique competencies needed by online instructors. This ensures that becoming skillful in using IT tools is not an easy task and it needs time, collaborative efforts and commitment. According to the research findings of the Teacher Technology Competency Committee (1997) these competencies are set of technology standards that define teacher proficiency in using computer technology in the classroom. These computer-related skills are grouped into four related domains. They are basic technology operations, personal and professional use of technology tools, social, ethical and human issues and application of technology in instruction.

Each domain contains specific competencies teachers need to master in order to enjoy the benefits of technology and to understand its potential in improving their teaching practices and students learning experiences.

The First Domain

The first domain is related to basic technology operations where teachers need to learn how to deal with the operating systems of the computer. For example, they should master certain skills such as opening/closing applications, file management, printer setup/selection, changing desktop settings, install/uninstall software, keyboard shortcuts, using online help and identify technical support. In addition to computers, teachers should be able to use other

devices available to them. For instance, they can use available hardware tools such as video camera, projection devices, digital camera, printer and VCR. They also need to know how to integrate these tools into multimedia presentations.

The Second Domain

The second domain is concerned with personal /professional use of technology tools related to seven topics: word processing, graphics, database, spreadsheets, multimedia applications, telecomputing and administrative/teacher applications.

Using the word processor enables for example, teachers to identify and use available menus, toolbars and palettes, entering text, formatting /editing text, saving/retrieving documents, using spell checkers, using templates/stationary, using headers and footers, inserting graphics and importing/exporting documents.

Graphics enhance the communication of concepts, relationships, interaction and structures (Teacher Technology Competency Committee, 1997). Teachers should be able to use available menus, clipart or libraries. Moreover, they should demonstrate good use of graphic tools for creating objects and images and manipulating them such as arranging object, copying and pasting images and locking objects. They should be able to enhance documents with graphics, for example spreadsheets, databases and multimedia.

It is very important for teachers to know how to construct an electronic database. It is an effective way of creating, organizing, storing and retrieving information. Teachers should be able to identify and use available menus and toolbars, use database manipulation such as data entry, search strategies, moving among files, find a record and match records and create and modify a database.

Spreadsheets can be used as gradesbooks where teachers can keep and organize their students' grades or scores. They can be also used to run statistical analysis and other mathematical applications. Teachers need to be aware of the use of different toolbars and available menus. They also need to be aware of spreadsheet terminology that will enable them to use this tool effectively. They should be able to create and modify a spreadsheet. For example, they should know how to enter data, add functions and formulas, add/delete rows/columns, format cells and sort information.

Multimedia applications combine both hypermedia and presentation software. This program offers both learners and teachers to be involved in a non- traditional learning environment where they can experience a variety of communication methods. In order to benefit from this program, teachers need to understand some design considerations such as fonts, backgrounds, storyboard and audience. They also need to understand and use hypermedia such as basic concepts, paints tools, buttons, create a simple stacks and present it. They need to use presentation applications such as outlining, how to create a presentation and how to modify it. It is also important to know how to integrate tools into multimedia presentations.

Telecomputing refers to how to use computers in accessing information and in communicating with others. For instance, through emails teachers can communicate with different teachers, students or other professionals from different parts of the world and not only from their countries. To make good use of this facility, teachers have to know how to use email to communicate with others. They should know all the skills related to this issue such as composing email, sending/receiving emails, attaching files and creating address book or lists. Teachers also need to know how to subscribe to newsgroups, use the WEB browser

and understand instructional issues related to the use of WWW such as evaluation and use of information, how to monitor students' use of the internet and how to track links.

Using technology tools in administrative /teacher applications such as keeping daily attendance, recording students' grades and creating students portfolios is very essential for teachers to acquire. In order to fulfill these aim teachers need to be good at using available classroom management and productivity tools such as attendance, students' record and portfolios.

The Third Domain

It is concerned with social, ethical and human issues where district guidelines play an important role. Using technology should be connected with clear awareness of the responsibility a person should carry regarding the use of electronic information and the regulations governing the access of this information. As far as teachers are concerned they should also be aware of the social and human issues related to the use of technology. For example, they need to consider the privacy of others' emails, portfolios or electronic journals. They need to understand and accept the regulations of the use of electronic systems such as asking for permission before accessing someone's email or using any copyrighted electronic information.

The Fourth Domain

This domain is concerned with the application of technology in instruction. It is divided into two parts: district vision and technology integration. For the district vision, teachers as well as other staff members in the district are expected to be able to articulate the district's purpose of spending a lot of money in implementing technology in its educational system. This assumes that teachers should understand the district instructional vision and its technology plan. The second part deals with integrating technology in instruction inside the classroom. In this respect teachers need to demonstrate familiarity with current research on technology use in education and understand the various roles it plays in education such as curriculum support and personal and professional productivity. They also need to demonstrate the use of technology as an integral element of instruction and to show their ability to select and evaluate instructional software.

The National Research Council concluded that fluency with information technology is imperative today (The National Research Council, 1999). This emphasizes the important role that technology plays in our lives and how important it is for people and specifically educators to command the technology skills. Fluency in information technology requires educators to master three kinds of knowledge.

Contemporary Skills. They refer to the ability to use today's computer applications, enabling people to apply information technology immediately. These skills provide a store of practical experience on which to build new competence.

Foundational Concepts. They refer to the basic principles and ideas of computers, networks, and information that underpin the technology. Concepts explain the how and why of information technology and they give insight into its opportunities and limitations

Intellectual Capabilities. They are concerned with the ability to apply information technology (IT) in complex situations, encapsulating higher-level thinking in the context of IT. These capabilities empower people to manipulate the medium to their advantage and to handle unintended and unexpected problems when they arise.

It is worth to mention that the above discussed competencies are not fixed but changeable because the field of education is always progressing and the technology devices are changing

and advancing. Therefore, teachers are in need to seek new knowledge in educational technology and to sign up for any appropriate professional development or training courses in technology which suits their governments' educational technology plan and can enhance their students' learning.

In many cases, however, educators are not well-trained to use information technology tools to enhance their instruction and thus student learning (Zhang, 2000). For this reason training teachers in using technology tools should be proposed during the pre-service teacher training. Teacher education programs provide productive learning experiences for pre-service teachers if they are properly planned. This also suggests that professors and faculty members should be well informed in the use of technology in designing and teaching university courses.

Practical Implications

Since the adoption of any given technology will be influenced by how it disrupts existing practices, it is important to understand how technology changes teaching roles and practices in order to ensure that we make *wise* use of technology (Lea, 2001). This suggests that teachers, administrators and even governments should have clear vision of the impact of technology on teaching and learning and should be aware of the rationale behind introducing technology in their systems. This also emphasizes the fact that the role of the teacher has changed completely in the digital age. The teacher is a facilitator of knowledge and a change agent in the educational field and the community.

Having competent teachers and educators in ICT is an essential goal governments in the Arab world should aim for if they are willing to compete with other developed countries in the digital age. This aim cannot be fulfilled unless teachers undergo special professional development programs that can support them in acquiring the needed ICT skills. This training should be based on informed technology policies that reflect the best methods and the rationale of integrating technology into teaching practices.

One of the critical issues identified by the North Central Regional Education Laboratory as stated by (Cook and Fine 1997) is that the "ultimate worth of professional development for teachers is the essential role it plays in the improvement of student learning". This means that the most important aim of professional growth programs directed to teachers is the effect they have on students learning achievement. It also requires that these professional development programs should be well planned and should encourage teachers to update their knowledge and skills by researching their teaching field on a regular basis for the sake of upgrading the standards of their learners.

Professional development training in technology use for teachers should be implemented in two formal phases and should be intended for both novice and experienced teachers. There are other available training opportunities for teachers that should be also recommended to raise teachers' awareness of the possible methods of professional development in IT.

The First Phase: Teacher Education Programs

Colleges and universities have answered the professional development call by redesigning their beginning and practicing teacher programs (Lieberman and Wilkins, 2006). Professional development for teachers in integrating ICT in teaching and learning should start during the teacher education programs. Professors and faculty members must train future teachers in using technology tools to communicate knowledge and skills and to design their teaching

materials. For example, during their study in the university student teachers use forums, chats, and other online programs to learn collaboratively with and from each other. They use the World Wide Web to search for information about certain topic they need to know about. They also gained the skills of creating their instructional materials using different softwares such as inspiration, flash and front page. Moreover, student teachers practice and develop ICT competencies while learning through technology. For example, they learn how to operate computer systems while presenting certain topics to their class using special programs such as PowerPoint or flash. They also learn how to create projects using different computer programs. For example, they learn how to create and deliver simple online courses using interactive programs such as moodle or webct.

The Second Phase: In-service Professional Development Programs

The in-service professional development programs play an essential role to enhance teachers' competency in using technology in education. Governments, school administrators and teachers themselves are responsible of making these training programs productive and useful. For example, governments hold responsibility of producing strategic plan for implementing technology in the schools within the time limit they identify in their plan and according to the research or need analysis they carried about these schools. It should reflect the steps that the project will go through, the challenges it will face and actions to be taken to solve these obstacles. The plan also should reflect the budgets specified for the project that should be sufficient for sponsoring such an important project. Governments' policies should reflect the role and the rationale for applying technology in the system of education and what they expect teachers to gain and be capable of doing after receiving this training.

School administrators should have a clear vision of the impact technology will have on the teaching and learning processes. Their aim of implementing technology tools in their system should enhance both their staff development and students learning achievement. Their role will be very crucial in supporting their teachers' technology training and in implementing the government plan. For example, they need to arrange the suitable place for training and to schedule teachers' enrolment in these courses so that they are not pressured with hectic timetables. They are also responsible for providing the training tools such as computers or needed softwares.

Teachers should seek any available opportunity for professional development. The teacher does not have to wait for the school to provide that chance for development, but should be independent learner and enroll in the appropriate training courses. They are also not advised to stop at a single professional development opportunity, but they should be lifelong learners who are ready to learn anywhere and at anytime of his life.

Other professional development opportunities

Teachers need to be acquainted with the different types of professional development technology training other than the face to face method. Supervisors need to introduce them to different online training where they can experience innovative methods and materials.

Web-based learning has been proposed as a convenient way to provide professional development experiences (Lebec & Luft, 2007). There are many certified training websites where teachers can download or purchase their materials. They also can gain membership and participate in discussions and forums whenever they like.

Teachers can also download free materials or even purchase whole training packages where they can use them to train themselves in certain easy programs such as presentation programs or word processing programs.

In addition, they can join other teachers or professionals from different parts of the world to form groups of trainees where they can benefit from each other's experiences.

Using E-Learning in university programs such as postgraduate program can help concerned educators to develop their technology competencies. For example, online learning is used in Sultan Qaboos University in the MA programs such as educational management program and curriculum and teaching methods program. Some of the courses in these two programs are taught using e-learning methods such as moodle and webct where the professors design their courses using web-based methods. Students are taught how to use different tools to submit their assignment and to paste their presentations and contributions online. This type of teaching and learning method can help students to develop technology skills they never have before and they are also introduced to new electronic methods that can enhance their work in the educational field in the future. However, students need more training in how to deal with these tools effectively. For example, concerning the use of technical support teachers need to be made aware of how to use this support tool whenever they face problems.

RECOMMENDATIONS

Adhering to a framework for developing technology competencies might be a good idea for school districts to adapt. This will help their teachers to improve and renew their technology skills bearing in mind the changes appear in the world of teaching and the world of technology. It is important to note that the framework tries to reflect the best practice that will be required of teachers, not just today, but over the next few years. For this reason, it should be an evolving framework that should be updated to reflect the progress made in technological opportunities and professional practice.

Providing curriculum-focused professional development to teachers where technology is involved in enhancing students' skills in a particular subject or area of the subject such as the English grammar will help the classroom teachers better see the connection between technology and the curriculum. For example, teachers can be introduced to the use of concept mapping program in presenting some concepts related to science. In this regard they can observe the difference between introducing the same concepts using traditional methods in their classrooms. Students can learn better when they can structure concepts systematically.

Curriculum developers and writers should create appropriate opportunities for teachers to integrate curriculum with technology through project-based tasks. These types of tasks motivate the teachers to use technology tools such as the computer and its various programs to explain and demonstrate the tasks for their learners. For example, they can recommend the use interactive softwares in teaching reading (LRC) to young learners where teachers can make good use of Learning Resource Centers they have in their schools for fulfilling this aim. This also emphasizes the point that teachers need to be oriented in their training courses about how to involve the LRC in their teaching. For example, how to utilize the audio and video tools provided in these centers for benefiting their students and for reforming their teaching.

Pairing novices with experienced classroom teachers and involving them in a professional development course can help both parties to learn from each other. This process where the two types of teachers are engaged in the same learning experience can result in good exchange of expertise and in producing innovative methods of investing technology in education. These teachers can easily form group of learners and can exchange materials and ideas that will enhance their teaching practice. According to Barton & Haydn (2006) working in groups in taught sessions was also felt to be generally helpful in terms of being a time-efficient, congenial and stress-free way of making progress in ICT. The experience of working in group encourages the participants to invest the time they have for training in exploring the ways they can improve their teaching using creative ideas where IT is the facilitating tools for implementing these ideas. Group work environments are often non-threatening and they motivate trainees to enjoy what they learn.

Special attention should be given to in-service professional development programs implemented in the Arab countries. These programs mainly focus in the face to face training where an IT trainer deliver simple training sessions concentrating on how to use basic computer operations or programs such as word processing and presentation programs. Teachers are rarely trained on how to design their courses using technology tools. Moreover, there is hardly any follow up for the impact of that training in the educational field. Professional development is treated mainly as a curing dose given to the teachers whenever there is an urgent need and not according to a well organized plan.

A strong, comprehensive professional development program cannot be left to chance. Since the aim is to create competent teachers, who are proficient in using technology for professional purposes and in integrating it into all curriculum areas, professional development must have a defined structure and a systematic plan that guarantee a well organized and productive training. It should also aim for continued staff development that emphasizes that learning is an ongoing process.

As mentioned earlier pre-service education programs play an important role in training teachers to use technology tools and to acquire the necessary skills. Some of these courses that still use the traditional face to face lecturing as the only medium of conveying knowledge to students need to be restructured. For example, professors need to redesign their courses to enable the learners to enjoy learning through different technology tools. Their courses should focus in equipping teachers with technology competencies that can benefit them in their future teaching.

Schools should willingly carry their responsibility in providing effective in-service training for teachers in facilitating their teaching using technology. Their responsibility is not concerned with providing isolated training sessions but it takes the shape of preparing productive professional programs according to a well established plan. Schools should also provide incentives to motivate teachers to get enrolled in these courses. For example, they can offer extra courses for the teachers who are interested in experimenting teaching through other technology tools such as mobile devices.

Schools are also responsible of preparing their teachers and to educate them to act effectively in the 21st century. For example, they should encourage teachers to research new teaching methods where technology tools facilitate the learning process. They should offer extrinsic and intrinsic incentives to encourage teachers to carry classroom research continuously. Schools administrators should act with open minds toward innovative ideas and they should

not discourage teachers from experimenting and implementing new ideas in their classrooms. These ideas if based on research can benefit the school in improving the standards of the students.

As highlighted above individual teachers should be also responsible of educating themselves in technology use. They should not wait for the organization (school) to educate them technologically. For example, they can attend different professional development courses available online or practical sessions done on site. There are also whole packages of tutoring guidelines available as paper documents or softwares that teachers can buy or purchase from certified websites.

Governments in the Arab world need to encourage collaborative teacher associations where teachers share experiences and ideas about the use of technology in teaching and learning. These associations can be also contribute to teachers' professional development by running or arranging courses for teachers by expert teachers in technology. Government should support these associations by funding them or providing experts to train teachers in using technology tools in their daily work life.

Governments in the Arab world should give the schools the freedom to implement creative, research- proven methods and not to restrict them to follow the same traditional methods. For example, if some schools tried online learning and it benefited their students and teachers , schools can be allowed to implement it with higher grades (11 & 12) where learners are in need to be oriented about this type of learning as they will practice it in the college level. They should also provide the internet service in the different secondary schools to encourage and to direct the students to use this tool in searching for information which they will need at the university level.

Governments in the Arab world need to raise the awareness of the community organizations of the importance of supporting governments' efforts in implementing learning through IT in schools. This can be done through involving them in implementing the country technology plan. For example, many companies can voluntarily provide schools with computers or sponsor the training of some teachers.

CONCLUSION AND FUTURE TRENDS

Teachers need to cope with this changing world where everything surrounding them is nowadays operated by technology. In order to do so they need to develop certain technology competencies that enables them to benefit from technology in their educational field. These competencies are more related to computer basic skills where they need to reflect competency in manipulating them.

Recently teachers deliver different courses online especially at university level. They are required to familiarize their students with the different available technology tools. This is because today's learners will be tomorrow's teachers who need to acquire the appropriate technology skills to survive in this digital era.

Teachers should not stop their at acquiring the needed technology competencies and consider it as their final step in professional development. They should always search for what is new in the field of technology and can support the development of their profession. They also

need to reflect regularly on their performance and their mastery of technology skills and try to renew and upgrade them.

In the near future teachers like other people who inhabit this globalizing world will be learning through their mobiles. Mobile learning can be considered as a future trend in technology learning where everyone including teachers can learn anywhere and at anytime under certain conditions related to provision of tools (mobiles) and wireless network. The mobility enabled by wireless communication is leading us to new instructional patterns. However, more research is required the use of mobile technology in teacher ICT professional development and the mobile learning skills required by teachers.

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