



CONDITIONS THAT CONTRIBUTING THE UTILIZATION AND IMPLEMENTATION OF EDUCATIONAL INNOVATIONS AT HIGHER EDUCATION: A REVIEW OF THE LITERATURE

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Abstract

Nowadays, use of ICT in higher education is one of the main consideration in educational improvements. Integrating ICT into the training procedures is extensively apparent as a critical assert in educational reforms. In spite of remarkable improvement higher education in many countries, integration of ICT into universities to be astonishingly low. The purpose of current paper is based on a review of 68 refereed article and dissertation that focused on introducing Ely's (1990) eight conditions that simplify implementation of an invention. Also identify which conditions more affected on successful implementation an innovation in higher education. The results shown that although there were important efforts and positive approaches toward the use of ICT in higher education, but the procedure of ICT integration at the university challenged factors that have effect on utilization of ICT by faculty members in universities. The review finding revealed that effective implementation of an innovation in higher education was dependent on the four significant factors included availability of resources, existence of knowledge and skills, availability of time, and leadership.

Keywords: Innovation, Ely's conditions, faculty members, implementation, ICT integration

Introduction

Nowadays, students hope for the existence information communication and technology (ICT) and use of it in their schools (Roberts, 2008; Prensky, 2005). AS stated by investigators, as students' expectations growth, teachers are hearten by those prospect, and their managements to integrate ICT in their training (Roberts, 2008; Surry, Ensminger & Haab, 2005; Ensminger & Surry, 2002). Research shown faculty members in universities incessantly attempt to find methods to increase students' learning achievements ,and continually seek implementing ICT, think carefully about possible advantage use of ICT into universities' classrooms (Montalvo, 2006; Becker, 2000; Sahin & Thompson, 2007). Undoubtedly, ICT can increase the quality of education and also help make teaching and learning more effective. If ICT is utilized properly in teaching and learning, it can be valuable (Strampel & Oliver, 2007). Thus, the use of ICT in education

also has many advantages for teachers and students. Technologies facilitated activities can change the traditional role of teacher which is the main source of information into a facilitator of learning (Barak, 2006). According to Tinio (2003) "ICT supported learning encourages interaction and cooperation among students, teachers and experts regardless of where they are". ICT also provide opportunities for learner to work with other people around the world from different cultures which can help them to increase their communication skills (Tinio, 2003). Governments and educational agencies have invested in the integration of technology in curricula to increase the effectiveness of instructions. Despite more than 20 years of research in this area many of these issues remain and technology developments may still be hampered by management, cultural, financial and staff development issues (Marshall, 2010).

Research Problem

Nevertheless several universities faculty members have determined to integrate ICT into their training, some faculty make the purposeful selection not to do so. Universities faculty members also educators have stated several causes over the years for not utilizing ICT into their training. Many schools and universities pointed to not be using educational technology in the early 1990's which was described to be at to a limited extent because of lack of adequate ICT tools (Gill, & Dalgarno, 2008). Although the increasing emphasis from the nation at huge and from schools and universities 'principals, the integration of ICT into universities and schools continues to be astonishingly low (Ertmer, 2005; Franklin, 2007; Hew & Brush, 2007). Educators indicated the main obstacles of using ICT to be inadequate hardware and software, lack of technological skills, lack of adequate training, and the lack of enough time (Slaouti, & Barton, 2007; Ertmer, 2005). This study addressed this question, What elements effect on higher education faculty members to use and implement ICT in their training proces



Aims

The aims of this literature review is to identify research related to investigate universities faculty members as regards their exercise and insights of the reasons and facilitative and or conditions that allow them to use ICT into their classrooms. Besides, the purpose of current research is to decide whether there are universal barriers that prevent universities faculty members' integration of ICT in to their classrooms.

Implementation of Innovation

Successful implementation of any program or project requires planning .Without some type of strategy for implantation; human, financial, and time resources could be wasted (Gulbahar, 2007). Poor planning or poorly executed plans could also result in the failure of or negative reactions toward a program. These types of outcomes and reactions could make it impossible to establish a similar type program in the future. Many researcher investigated on why inventions unsuccessful and established that many are failed for the reason that of inadequate implementation plans and not because of poor of the invention (Ensminger & Surry, 2008; Roberts, 2008). According to Fullan(2005)this problem is not related to technology users in the procedure of ICT implementation, he believe that focus on invention important than users . Certainty the diffusion of an invention is immediately link to its positive implementation. Therefore, implementation an innovation should not only be informed of factors that accelerate implementation of innovation. Thus, essential for defining which factors are more significant to their arrangement a specific invention? To recognize the essential for distinguish factors, we should become used to with several of the key models and approaches connected to change in education. Based on research into the implementation of educational invention, Ely (1990, 1999) suggested to ensure the successful implementation of inventions, such as the ICT, there are eight conditions that must exist in the environment in which the innovation is to be implemented. Ely suggested a set of conditions that simplify the utilization of ICT inventions in a variety of education.

Association between Ely's Conditions and Barriers to ICT Utilization

In Ely's pioneering study (1976) of revolution in education, he uses eight conditions for replace to mention to a set of elements he uses to define the situations. Ely's approach recognizes the characteristics of the invention are not the only reasons prompting ICT acceptance. Ely (1999, 1990a) characterize eight conditions that simplify the implementation of inventions or ICT (Figure 1). "The presence of eight conditions is necessary to implement change once an innovation has been introduced and adopted. The presence of all the eight conditions would indicated high probability of sustained implementation. Reduction of the conditions would lessen the probability of continuation" (Ely, 1990b, p75). The procedure of ICT integration is the procedure that includes the implementation of an inventions. It is important to understand that few change agents will have direct control over all the environmental variables, so it may not be possible to expect that improved knowledge of participants in the change effort to make more effective decisions. These conditions are: 1) dissatisfaction with the status quo, 2) adequate resources, 3) skills and knowledge, 4) adequate time, 5) rewards and incentives, 6) participation, 7) leadership, and 8) commitment (Ely, 1990, 1999). Since Ely's (1990) several dissertations have considered the significance of Ely's conditions in implementing a technology. Ely have discovered the role these conditions play in employing an invention, program inventions and procedures inventions. Brief description of these conditions and studies follow: Figure 1: Eight conditions of implementation – adapted from Ely (1990, 1999).

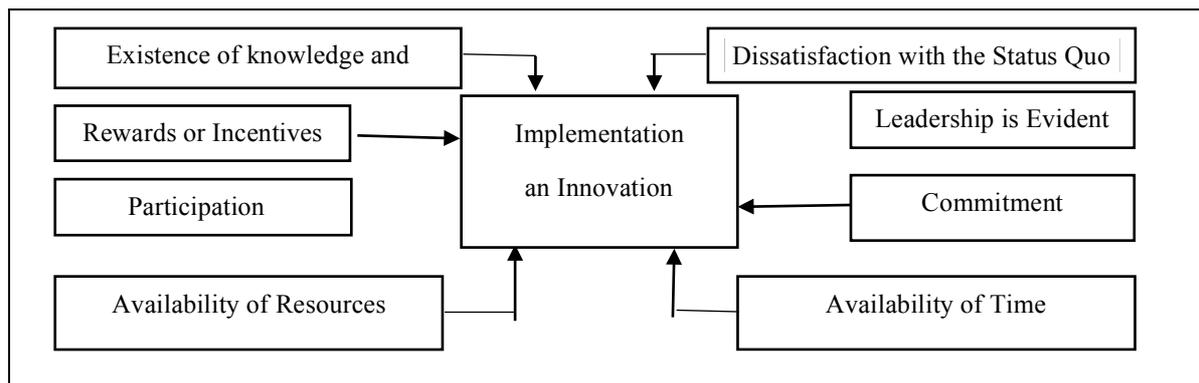


Figure 1: Eight conditions of implementation – adapted from Ely (1990, 1999)

Dissatisfaction with the status quo

This condition originates on the psychological feeling of the users, when they are unsatisfied with what is currently accessible. In this situation users feel that a modification is necessary. Ely (1999) affords a reflective explanation of users who are displeased that gives a feeling of how this situation exists. He states, when users recognize what reasons cause displeasure and the amount of the ICT dissatisfaction, he/she will be able to help modify it, and it is simple to connect inventions to the users. Ellsworth (2000) stressed that recognizing causes and the degree of displeasure will be able to help change the cause to a situation the invention to be supplementary appropriate with users' felt needs. In the case of utilizing ICT, faculty members would accept that using ICT is additional efficient than what they are presently using. Therefore, if faculty members do not have a difficulty, an invention will seem impertinent. In another study Gaubatz, (2012) collected data to study on secondary school science department chairs leading change. The findings of this revealed displeasure with the existing position as the essential situation for successful change. This condition is alike to relative advantage (Rogers 2003) creating a sense (Kotter 1996). Some researchers that mentioned displeasure with the current position include Nawawi, (2005), Surry, et. al(2006).

Existence of Knowledge and skills

For the sake of creating the successful implementation of an innovation, "the people who will ultimately implement any innovation must possess sufficient knowledge and skills to do the job" (Ely, 1999, p. 4). This condition mentions to users having or obtaining the required skills and knowledge to engage the invention. Users who would be engaged in the implementation of new technology should have knowledge, technological information, and abilities to be able to do change in education. Insufficient technological training of users to use ICT is one of the more common reasons for non-adoption or discontinuation (Ellsworth, 2000). According to Surry, & Ely (2002), these situations are those essential by the ultimate user of a new technology. Furthermore, it is essential to remind that this condition not only indicated the proposed users' existing level, nevertheless users' belief in being can improve the required abilities to effectively use an invention. The study by Varkking (1995) indicated ICT training is as important a part of the implementation of an innovation. According to Rogers (2003) the "complexity" of a new technology will have an impact on implementation in that it will need more skill improvement or ICT training by the ICT users. Other researcher Ingram, (2012) examined the role leaders played in the implementation of technology. The result in this study revealed that knowledge and skills was the most important implementation factor for an overwhelming majority of participants. Another study that examined Ely's conditions was conducted by, Tarrant (2004). In this study Ely's theoretical framework was employed, and findings indicated the two most important conditions for implementing curricular change are knowledge and skills, resources and funding. The study by Brush, et.al, (2008), described knowledge and skill affect toward use ICT and has implications for pre-service teacher ICT utilization. Other similar study Dalton (1989) indicated users' technological knowledge and skills, related to the proposed users in to improve the invention, and an understanding requirement to modify old technological methods as reasons that persuade implementation of an innovation. Other investigators have related this condition or technological training to prosperous implementation include Espino, (2012), Haber, & Mills, (2008),



Bingimlas, (2009), Dogra& Thakur(2013), Arouri (2013), Salentiny (2012), Hutchison, (2009), Mutohar, (2012), Muth, (2012) Nawawi, (2005) Surry, et.al (2006).

Availability of Resources

This condition mentions to suitable and sufficient equipment to be accessible and available to the ICT users. As stated by Ely (1999) technological equipment and resources include publications, software, hardware, audiovisual, and training tools. Equipment and resources are the things that are necessary to make implementation lack of those tools, implementation is decrease. Adequate resources mention to the main organization of the infrastructures and how well that organization be able to backing the invention. So, if those resources are unavailable, acquisition of those learning objectives will be significantly impeded. Ely (1993) stresses that a lack of technological resources will make it approximately not possible to implement technological innovations. The study by Dogra& Thakur (2013), emphasized change causes obtaining the essential equipment for implementation an innovation. Other similar study Surry and Ensminger (2002) compared the recognized significance of the factors that simplify implementation in a business and an education environment. Their research supports the importance of Ely's eight conditions, though interestingly they found the two environments resulted in a different perception of the importance of each of the conditions. The finding revealed within the education context the three most important factors for facilitating implementation were reported to be resources, participation, skills and knowledge. Some of investigators who have recognized resources as an imperative part of implementation an innovation include : Espino, (2012), Arouri (2013), Brush, et.al (2008), Hutchison (2009), Dawson(2008), Brush, & Saye (2009), Bingimlas (2009), Goktas, et.al, (2009), Obiri-Yeboah, et.al (2013), Al-Senaidi, & Poirot (2009), Ertmer, et.al(2010), Gülbahar (2008), Gill, & Dalgarno (2008), Türkmen, et.al (2007), Slaouti, & Barton (2007), Muth, (2012); Tarrant (2004); Surry, et.al (2006).

Availability of Time

From the point of view Ely (1999) "the implementers must have time to learn, adapt, integrate, and reflect on what they are doing" (p. 4). Ely states that this condition is essential to make sure that users recognize the invention and improve the abilities to compatible the invention (Ely, 1999,1990).The study by Rogers (2000) indicated problems connected to user engagement in design, inadequate time for education or increasing training with technology, and insufficient resources. The acceptance of the new technology need time and is a long process that requirements to expand at an excellent pace. The study by Alkhalaf, (2010) indicated that opportunity to training or use the invention as important to implementation. Insufficient or inadequate time is recognized as an obstruction to implementation of innovation in universities. Other researcher Muth, (2012) revealed that Ely's conditions; Time, resources, skill and knowledge, leadership, were significant strategic planning challenges. The study by Ensminger, et.al (2004) indicated that receive suitable time and sufficient resources as significant situations will have to improve plans. Furthermore it able to make sure that essential resources are simply available to all users and that users are providing with on the enough time to improve the skills in order to use the new technology. In another research by Surry and Ensminger (2003) compared the understand significance of the factors that facilitate implementation in a business and an education environment. The finding shown within the business context the three most important factors for facilitating implementation were reported to be time, leadership and resources. Others study that highlighting the significance of time in the implementation procedure, and argue this condition as a an imperative implementation of innovation include: Dogra& Thakur (2013), Haber, & Mills (2008), Obiri-Yeboah, et al., (2013), Al-Senaidi, & Poirot, (2009), Ertmer, et al., (2010), Brush, et.al, (2008), Salentiny (2012), Bingimlas (2009), Hutchison (2009), Gill, & Dalgarno (2008), Türkmen, et al., (2007), Slaouti, & Barton, (2007), Gülbahar (2008),

Rewards or incentives exist

It is usual that all ICT users requirement to be persuade, recognized and respected for their operation or use of the invention. Rewards or incentives exist mentions to both extrinsic and intrinsic incentives that outcome from using the invention, these incentives differ from user to user (Ely 1999, 1990). Intrinsic or extrinsic incentives be able to increase some value of the invention, and therefore,

encourage its implementation. Ely (1999) identify Rewards as somewhat that helps as an expectancy of incentives or concern of retribution. Furthermore, Ely states that it attends as a motivation to move users to use of ICT. The study by Haber, & Mills, (2008) argues the use of incentives as portion of ethical support throughout implementation an innovation. Arouri (2013), identified rewards as a significant factor to access ICT and its use. Other similar study Huberman (1972) states that "teachers, and to some lesser extent administrators, are not rewarded for initiating or carrying through innovations" (p. 29). Stockdill & Morehouse (1992) recognized incentives as an important reason in "organizational capacity" (p. 57). Further, Smith & Mourier (1999), Surry, et.al,(2006) mentioned this condition as part of implementation an innovation .

Participation

From the point of view Ely (1999), participation is connection and association decision making among all company. Participants to engage main investors in determinations that involve organization and planning of the invention. This condition in the implementation must be persuade to engage in determinations. Through the chance to connect their planning and ideas, the contributor be able to have feel of the proprietorship of the invention. Furthermore, the connection between all parties be able to support monitor the improvement of the invention. According to (Ely1999, 1990) this condition mentions to the status of participation investors have in the decision making procedure to accept and implement new technology. Ely (1990b) suggests that every potential adopter of technology should be involved in the discussion about its use. He argues that some innovations are rejected just because users are said to use the invention without past caution or involvement in the decision-making procedure. Ely (1993) also emphasizes that every individual "should feel that he or she has had an opportunity to comment on innovations that will directly affect his or her work" (p. 56) .Varkking (1995) indicated "participation in the design phase is in fact the first step of implementation" (p. 35). According to Surry, et.al, (2006) faculty members in higher education as part of the decision making procedures when it comes to innovation implementation. This condition by intend edict users or employees through new technology design was mentioned by investigators such as Sims & Sims, (2002), Smith & Mouier, (1999).

Leadership is evident

Leaderships distinguished as an active participation of the management in the procedure of invention acceptance and implementation. Moreover, leadership is an active engagement by managers in helping the ICT users in implementing the invention. Ely (1999) indicated that this situation includes persuasion to users and supply backing, and character modeling in the use of the new technology. Furthermore Ely says, "Once the executive leadership is evident, then the project leadership becomes even more important because the person who can help with implementation is closer to the user" (p. 5). This condition mentions to the type of proprietorship and backing given by the principal who will administer the everyday activities of individuals using the new technology. As Ely (1993) noted, individuals, particularly in classroom educators, require the stimulus and continued backing from people they respect to facilitate implementation of an innovation. The study by Woldab, (2014) indicated leaders essential actively backing the change and connect their backing to ICT users. Kelin and Sorra (1996) mentioned the value of supervisor backing implementation of innovation. Other similar study Ingram, (2012) examined the Ely's eight factors of technology implementation .The result in this study revealed the role of leadership was viewed as moderately important. Muth, (2012) examined on recognize the involved Lutheran colleges regarding used an innovation. The finding revealed that leadership, was one of the significant strategic planning challenges. Another study that examined Ely's conditions was conducted by Nawawi, (2005) attempted to determine the existence or non- existence of the Ely's conditions in a higher education in Malaysia. The finding in this research revealed only commitment, dissatisfaction with the status quo, skills and knowledge, and leadership were present in the university. The study by Ebersole & Vomdam (2003) identified various variables have an effect on implementation such as; lack of leadership, insufficient time, lack of skills and knowledge, and insufficient resources. Championing or backing of the invention by leaders, is often mentioned as a serious part of the change procedure :Goktas, et al.,(2009), Ertmer, et al., (2010), Espino, (2012),Dogra & Thakur (2013),Gülbahar (2008), Mutohar (2012), Brush, et.al, (2008),Dawson (2008), Bingimlas (2009),Türkmen, et al., (2007), Buchan & Swann, (2007).

Commitment

The final condition in Ely's requires that commitment. Implementation an invention need time and employ many activities. ICT users must be prepared and to anticipate the flexibility of accepting new technology. From the point of view Ely (1999), commitment is most indicate by the primary supervisors of the institute, like a board of directors. Ely indicated that this condition is measured by the comprehensions of ICT users. Nawawi, et.al (2005) revealed factors that necessity be visible support for invention from top organization of the institute, like leaders and head of department to simplify ICT acceptance. This condition is closely related to supervision because a first commitment might come from a principal directorial officer. Other similar study Dhanarajan (2001) revealed that lack of this condition from higher education as an obstacle to implementation an innovation. Another study that examined Ely's conditions was conducted by Surry, et.al (2006). The results of this study exposed that commitment is one of the essential conditions for the successful implementation of an innovation. Others investigators that indicated the significance of commitment in the change procedure include: Buchan and Swann (2007), Meyer, et.al (1999), Espino, (2012), Hamel, Turcotte, &Laferrière, (2013), Ensminger, & Surry, (2008).

Discussion

The research finding described above support earlier work by Ely (1976, 1990a, 1990b, 1999) indicating the Ely's eight conditions are necessary for to implement educational of innovation in various educational settings. On the basis of the discussion regarding conditions suggested by Ely (1976, 1999a, 1993and 1999) and the research finding pertaining to barriers to technology use it appears that some kind of association exists between them .It seem the barriers to technology use are approximately the opposite of the conditions suggested by Ely. First, the presence of this condition (dissatisfaction with status quo)express that ICT users are not glad with the way things are. Researcher revealed that something should be done to expand their situation that would help move them fast. In the case of using ICT, faculty members would be believe that using ICT is more efficient than what is presently used in order to be willing to use the new technology. This means that if a faculty members does not have a problem, invention will seem inappropriate. Hence, change will be facilitated when faculty members believe that using ICT will be more effective than what they are presently using. Second, inadequate hardware, software, and backings are some of the reasons that make ICT integration a difficult and complex procedure. On other words, lack of hardware and software, finances, will make it almost impossible to implement technological innovations. Without these, ICT utilization will be reduced. Third, past research has showed that knowledge and skills is one of the prerequisite of innovation implementation that be able to make innovation more beneficial to the in education. If the lack of knowledge and skills is a barrier to faculty members ICT utilization, then the availability of knowledge and skills in university environment can be a condition that facilitates use of ICT. Fourth, incentives and rewards motivate users to employ the innovation. Incentives can be either intrinsic or extrinsic, and they vary from user to user. If lack of incentives and rewards are barriers to use ICT, then the existence of incentives and rewards will facilitate its use. Fifth, an innovation implementers must have time ,so barriers such as lack enough of time to learn and use ICT, adapt, integration, and prepare for classes using media ,imply that the availability of time facilitate ICT utilization . Sixth, contribution or participation mention to shared decision-making and connection among all ICT users involved. The barrier such as attributed to poor communication channels and collaboration may imply that participation was not encouraged. Therefore, when participation by potential users is expected and encouraged, technology use will be facilitated. Seventh, if the lack of supervisory commitment, does not fully constitute commitment, and linked to poor communication are barrier to ICT utilization, then the existence of commitment to innovation implementation can be condition that facilitate use of ICT. Finally, when barriers such as poor communication and collaboration among all affected by the innovation, time, and inefficient bureaucratic procedure utilization of ICT, point to lack of leadership ,then the existence of leadership and commitment by those involved will facilitate use of ICT.



Conclusion

Undoubtedly to integrate ICT in training process is an invention that has revolutionized the education. In spite of remarkable improvement higher education in many countries integrating ICT into universities to be astonishingly low. The literature review demonstrates that implementing the innovation in higher education is dependent on four important factors namely; existence of knowledge and skills, availability of resources, availability of time, and leadership. Existence of knowledge and skills indicated that users requirement have and obtain the knowledge and skills to use the invention. This condition is necessary for successful invention use. Lacking preparation for knowledge and skills, may ICT users come to be disappointed. Availability of resources indicated that users are required for supportive the invention, like finances, hardware, software, and personnel. Lacking resources, implementation is decreased. Availability of time is situation that mentions to the administration's readiness to prepare time, and the users' readiness to earmark education time for implementation an innovation. It also states to users' requirement suitable time to pick up the new skills of an invention. Finally, leadership is imperative in preparation and implementing any new technology. Lack of leadership can significantly have an effect on the ability to effective implementation an innovation in education.

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