A Critical Reflection on Relationship between ICT and Change Management in Enhancing Teaching and Learning Performances

Ratana SOM
Royal University of Phnom Penh, Phnom Penh, Cambodia
sr.ratanasom@yahoo.com

Danut DUMITRASCU
“Lucian Blaga” University of Sibiu, Sibiu, Romania
dan.dumitrascu@ulbsibiu.ro

ABSTRACT

Numerous studies have pointed out direct positive impacts of Information Communication Technology (ICT) on education quality. From just tool, ICT is being viewed in itself as quality or as catalyst for quality improvement. These findings have led universities worldwide to adopt ICT regardless of uncertainties. Consequently, not all of them succeeded. Proofs from cases around the world show that ICT produces positive impact only in the environment that fits. Such environment is fostered by an effective change management approach. The main aim of this paper is therefore to present the symbiotic relationship between ICT and change management, zeroing on how changes are managed to attain a proper ICT ecosystem for education quality improvement. It also aims to understand, through the conducts of extensive bibliographical research, along with critical content analyses, the roles of ICT in education, its design and impacts, and what constitutes effective change management approach for ICT inclusion. Key findings include: that the integration of ICT alone does not necessarily produce direct positive impact on teaching and learning, but its design; that a good design requires a proper change management process, driven by ICT, and that the involvement of all stakeholders, particularly functional managers, is critical to attain better performances.

Keywords: ICT, Change Management, Enhance Teaching and Learning, Symbiotic Relationship

INTRODUCTION

In past decades, much research focused on the role ICT played in the betterment of education. While some debated that students learned better with the presences of the ICT (Hewitt-Taylor, 2003; Khan, Hasan, & Clement, 2012; Jacobsen & Forste, 2011; Pajo & Wallace, 2001), others disagreed. Kirkwood and Price (2014), for instance, raised the concern on the limited understanding of the benefits of technology in education, questioning the effectiveness of the long-held discussions that technology as tool had a direct positive impact on learning and teaching outcomes. This came after a “negative relationship” was found between the two variants—ICT and teaching and learning enhancement. To Jacobsen and Forste (2011), technology per se could not do much, but its design that shaped the direct influences on teaching and learning performances. As questions intensified,
research focus has been shifted away from the role of media technologies per se, to the design of the technology in education. In an article on Technology-Enhanced Learning and Teaching in Higher Education, Kirkwood and Price (2014) cited the introductory statement of the Director of TELRP who put “Does technology enhance learning? It’s not unreasonable to ask this question, but unfortunately it’s the wrong question. A better question is: how can we design technology that enhances learning…?” (p. 7).

The main objective of this paper is to present the symbiotic relationship between ICT and change management, zeroing on how changes are managed to attain a proper ICT ecosystem for education quality improvement. Along side, this paper also aims to underscore the roles of ICT in education, its design and impacts, and extending to what constitute effective change management approach for ICT inclusion. Given the nature of this topical substance, which will later be used as part of a bigger literature review for ICT and change management, the conducts of extensive bibliographical research, together with critical textual analyses will be used as methodology to achieve the above-mentioned objectives.

For better understanding, the paper is organized as follows: the introduction, the general view of ICT in education, the change in educational landscape, the changing views, symbiotic relationship between ICT and change process, different theories in the field of change management, approaches to managing effective change, and findings and discussions. This paper ends with a conclusion, as other papers do.

**ICT IN EDUCATION**

There is no contest that “current college student population is more digitally active than any previous generation” (Jacobsen & Forste, 2011, p. 275). Their activeness is partly contributed by the advancement of modern technology per se, and more importantly, by its influence on their daily lives. From businesses to public works, media technology has made things easier, more convenient, and even more productive.

In the field of education, media technology has revolutionized the way things are taught and learnt, and to a greater extent, replaced the old school of practices. Hawkridge, Jawoski, and McMoham (1990) suggested the use of ICT could improve performance, teaching, and administration. ICT has a positive impact on education as a whole, and it could also develop relevant skills in the disadvantage communities—helping in liberation and transformation. Though warning of heavier demand from the side of teacher, Keengwe, Onchvar, and Wachira (2008) confirmed concrete benefits of employing ICT in educational field, stressing that technology allows students to work more productively than in the past. Pajo and Wallace (2001) stand on the same premise by agreeing on the importance of ICT in education, seeing its growing power and capacities in triggering change in the learning environment available for education.

McLoughlin and Lee (2007) also confirmed the sophistication of employing media technology to enhance learning through which learners used various tools and multiple forms of interaction to create collective activity, supported by technology affordances. The authors acknowledged the benefits of using information technology in education as it could widen access, decreased need for onsite teaching accommodation, and enhanced explanations by the use of special electronic effects. To the institutional level, including the International Society for Technology in Education (ISTE), the need for technology-based learning is even more obvious (Hamidi, Meshkat, Rezaee & Jafari, 2011).

The perceived benefits of the positive influence of media technology use in education have propelled for quick adoptations and integrations of the ICT into higher education by many educational leaders and governments around the world (Edmunds, Thorpe & Conole, 2012). In 2002, UNESCO launched “the Asia-Pacific ICT in Education” programme in 2002 with partner-countries in order to prepare them for a comprehensive and informed approach to integrating ICT into education (UNESCO, 2002).
THE CHANGING EDUCATION LANDSCAPE

Not long ago, theorists like John Dewey, Jean Piaget, and Lev Vygotsky, proposed the student-centered approach to education. Though there are nuances of explanation and expectation, one common thing exists, that is, students learn better amongst themselves, according to the proposed practice. Constructivist Learning Theorists casted no doubt on this, stressing that the approach relinquishes some teacher’s responsibilities in providing in-class instructions, but yet giving students more autonomy and independence in choosing for themselves both the contents and approach for learning. This approach has later been materialized as ICT comes in full swing for harness.

Khan, et al. (2012) stressed the role of ICT in shaping a new learning process whereby a more collaborative learning environment was made possible, when previously not. Media technology has given ways for classes to be conducted from a far corner of the world using a sophisticated chat-room, and/or teleconferences where teachers and students could comfortably interact with one another. The new tools have genuinely altered the instructional methods and materials, providing simulated practical experiences, and enhancing visual explanation and online discussion between teachers and students (Hewitt-Taylor, 2003; Kirkwood & Price, 2005).

With no surprise, ICT has ushered in a new way of learning and teaching, transforming the so-called correspondent studies into a new e-learning style where classrooms are assisted by new communication technologies systemically connected for content exchanges. Teachers are no longer leading the classrooms, but mere facilitators who direct students to a new type of learning that is, in many ways, assisted by media technologies (Hewitt-Taylor, 2003). Not only does that indicate a sophisticated move from a total teacher-directed instruction to that of a more relaxing student-tailored contents and format, the impact of the change is much greater than one could expect—it requires a change in both classroom format and supports. Soon afterward, the fashion has been adopted worldwide, as a complementary mean to the old teacher-centered approach, and even harsher, replaced it almost completely in many education systems.

With the fast expansion of media technologies, and the sounding proofs of their usefulness in education, governments in many countries have made it imperatives for educational institutions to adopt and integrate ICT into every aspect of school lives, making it even compulsory for staff in certain higher educations to master certain basic skills for their jobs. Cambodia is of no exception. In December 2015, the government has, during its annual national budget adoption, laid out solid planning to address the development of physical infrastructure, highlighting the ICT policy priorities within the fifth legislature and a set of planned actions by various MDAs to implement the prioritized policies (KnowledgeConsulting, 2015).

THE CHANGING VIEWS

Despite the widespread growth in practice, concerns continue to be expressed about the extent to which effective use is being made of technology to improve the learning experiences of students (Kirkwood & Price, 2014). In a search for correlation between media technology use and class grades, Jacobsen and Forste (2011) raised their concern on the limited understanding of the benefits of technology in education, questioning the effectiveness of the long-held discussions on the topic. The concern came after the “negative relationship” was found between the two variants. Jacobsen’s finding supported Schramm’s take, which concluded the absence of evidences to proof the role of technology in enhancing education. According to Schramm (1977), more variances within than between media were found, and hence there was no evidence to suggest that any particular media or technology could in or of itself account for enhancing learning outcomes.

The above findings were also the testaments to what has been highlighted by Alexander and McKenzie (1998) who confirmed a similar thing found now. According to the authors, the use of a particular information technology did not, in itself, result in improved quality of learning or productivity of learning…. Rather, a range of factor was identified which was necessary for a
successful project outcome, the most critical being the design of the students’ learning experiences” (Alexander & McKenzie, p.3). The argument was very much in line with Hewitt-Taylor’s finding who valued more on methodology over technology. According to Hewitt-Taylor (2003), the students could only realize the maximum benefits from technologies when they were properly made.

In a recently published article on “To Improve Education—Focus on Pedagogy, not Technology”, Sharples (2019) reconfirmed the role of pedagogy in enhancing education, putting, “it’s not what you use; it is how you use it. We need to focus on how teachers use technology, not just the technology alone. The key to this is pedagogy” (Sharples, 2019, p. 1).

It could thus be drawn from the above arguments that to understand what contributes to the effective ICT’s design, (or one may call it as pedagogy —how you use technology or ICT environment), one should: first, understand the symbiotic relationship between ICT’s integration and organizational change, and second, what change approach to be adopted for effective ICT design.

SYMBIOTIC RELATIONSHIP BETWEEN ICT AND CHANGE PROCESS

As ICT is increasing its influences on our daily lives, and impacts many aspects of contemporary organizational change (Barrett, Grant, & Wailes, 2006; Love, Gunasekaran, & Li, 1998), any discussion about it draws in discussion about change, and vice-versa. At one point, ICT is being adopted as just tools to assist in some change aspects, at the other time they are the prerequisites for effective change, given the enormous and unpredictable size and pace of change at stake.

Needless to mention earlier takes which gave weigh on the importance of technology as tools (Hawkriddle et al., 1990; Keengwe et al., 2008; Hamidi et al., 2011), other researchers went otherwise into details of technology designs for better teaching and learning performances. Khan et al. (2012) discussed the importance of understanding pedagogical, psychological and cognitive barriers to the successful use of information technology. McFazdean (2001) suggested the process of knowledge acquisition, which required students to participate passionately in order to succeed fruitful outcomes. Other researchers including Kirkwood and Price (2014), Hewitt-Taylor (2003), McLoughlin and Lee (2007), Candy (2000) called on discussions about how technologies are used, in line with appropriate teaching and learning methodology. Byrne, Flood and Willis (2002) acknowledged the technology’s benefits on the condition of the administrator’s knowledge of the student body, and of the environment they learn.

The above rhetoric clearly suggests a different angle of ICT in the change process, particularly at time when subsequent new findings alert change agents to look at ICT beyond its material status; one of the very findings was from Orlikowski and Yates (2006) who argued for the need to see technology out of its contingent determinism box. This later finding supported Gardner and Ash’s take (2003), which suggested that the low benefits obtained thus far from ICT’s integration was mainly because of the absence of concrete understanding of the nature of change in the complex organization. “A clear understanding of dynamics of change at the people/technology interface, and the symbiotic relationship between information systems and strategy, is a prerequisite for the successful business benefits realization” (p. 18).

In an attempt to show the relationship between technology and people, Andersen (2018) views technology as operational work mechanism, linking all people’s actions at all levels of the business. Barrette et al. (2006), while also agreeing to the argument, acknowledges the scarcity of relevant studies on the interconnectedness of ICT and organizational change, saying when there were, such studies tend to ignore or downplay the role of human agency. Nevertheless, what dictates a common frame for all the researchers was the fact that ICT has enormous influence on people, but yet the later is the one to decide (Orlikowski & Barley, 2001).

In sum, integrating ICT needs to be done with high caution as it may change the way we think about work (Zuboff, 1988). While on one hand ICT is required as communicative tools to manage bigger institutional outcome within this increasingly complex organizational environment (Savage, 1996), on the other hand, ICT integration impacts organizational work culture that needs to be
appropriately addressed. To this end, human role is important to mitigate such culture change so that a chance of failure is minimized. To attain success, technology could not be left alone to determine success, but how change agents, including top supervisors, functional mangers, staff alike, use them accordingly to project the wanted outcome.

CHANGE MANAGEMENT THEORIES

Much research has been conducted on how to manage change for success. In businesses, the process of adopting effective changes ranges from a number of strategies; these include the initial step of quality assurance (QA) which cares more on procedure of attaining the best quality, to continuous improvement (CI) which places more emphasis on customer satisfaction and employee participation, towards adopting a continuous change approach to ensure quality, known as total quality management (TQM). At a radical change phase to attain market leadership, companies adopt a radical change to be part of its procedure, called Process Engineering, and to the most, to the whole business process, known as Business Process Reengineering (BPR) (Love et al., 1998).

By (2005) categorized change in three different type—change based on ‘the rate of occurrence’, in which the researcher included continuous change adopted from Burnes (2004), discontinuous change (Grundy, 1993) and incremental changes (Burnes, 2004); change that is based on ‘how it comes about’, in which he observed if the change was planned or emergent, and last, the ‘change based on scale’, which included fine-tuning, incremental adjustment, modular transformation and corporate transformation. Other researchers went down even further into planned internal and external change, and unplanned internal and external change.

Nevertheless, all these were centering around two main approaches. One was Kurt Lewin’s ‘planned approach’, and another was the ‘emergent approach’. According to Lewin (1951), effective change required detailed plans and projection made by top managers. Change had to start from a clear objectives supported by detailed planned actions, and with projectable results. Change was attainable through the process of freezing, unfreezing and refreezing, or termed differently as displacing, reregulating and rearranging (Heifetz, Heifetz, Grashow, & Linsky, 2009; Sporn, 2001). Bamford and Forrester (2003) however challenged the concept casting doubt mainly on the role of top managers. A good change management had to be a bottom-up, and cross-sectional. Changes took place at functional offices governing by functional managers. Senior managers might dictate general policies, but it was the middle managers who were directly “influenced” by events, who liaised with important customer contacts and spent time with both internal and external auditors (Bamford & Forrester, 2003).

Bamford’s challenge gets subsequent supports from researchers who witness the uncontrollable nature of change, which is in most way influenced by advancement of ICT. The notion of emergent is particularly relevant in today’s setting where organizations are greatly affected by the unprecedented environmental, technological and organizational changes which cannot be explained, and prescribed by priority plans and intention (Orlikowski, 1996). Technology has gone too far to make things predictable, and hence effective organizational change must expect the change per se. And change in their views is non-linear, emergent, dynamic and situated in nature (Gardner & Ash, 2003; Orlikowski, 1996).

Though debate is still going, particularly on how to effectively manage the ‘unpredictable’, it seems a common ground was built on the fact that first, the pace of change have never been greater than in the current business environment, and second, change, being triggered by internal and external factors, comes in all shapes, forms and sizes (By, 2005).

APPROACH TO MANAGING EFFECTIVE CHANGE

Although numerous variables have been identified as factors to be keyed in for managing a proper change, three groups of change factors are common to almost all researchers. These include strategy, technology, and human. Orlikowski and Yates (2006) term them in phrase as making
system workable, dealing with materiality, and focusing on practice. Developed from Wagner and Newells’ (2006), Orlikowski referred ‘making system workable’ to a strategy that focused on setting common goals for all change stakeholders in the institution. As for ‘dealing with materiality’, it was referred to the ability to see technology as more than just tools; a notion shared by Bridgman and Willmott (2006) who put it that the challenge was how to articulate a view of technology’s material properties without reifying them through a form of contingent determinism. And ‘making system workable’ touched more on what people did with technologies in practice (what actors at various level within and across organizations are doing with the technology on the ground and over time).

Gadner and Ash (2003) also pointed to a three unifying theme for effective change to take place. To exemplify, emergent change, although difficult to manage in a conventional sense, could be shaped and harnessed under certain conditions which included shared stakeholder goals, a clear understanding of the business model, its objectives (strategy), the role of technology within the process, creation of common “IT change management” protocols and conventions, and on-going use of facilitated forums required to support knowledge integration. Marchesoni, Axelsson, Faltholm and Lindberg (2016) also drew the needs to focus on the aspects of strategy, human, which the authors coined as ‘usability needs’ and technology.

While Muluneh and Gedifew (2018) packaged the change process following adaptive leadership, and design thinking, Milis and Mercken (2002) highlighted the roles of top managers in the design process. Top manager’s decision was in many ways influencing the level of support provided by the functional managers. This supports had a great impact on the behavior of the users. Their idea was however, challenged by Bamfort and Forrester (2003) who saw the roles of top manager as less important, compared to the middle managers. Top managers, though having the overall responsibility for effective change, were not supposed to plan or implement change, but only to create an environment that was conducive to experiment and risk-taking, and to develop a workforce that would take responsibility for identifying the need for change and implementing it. Though issue among these findings was constraint on the definition of human roles in an organization, a great thing of it was a common understanding of the criticality of management involvement in change process.

On part of technology, there is a need to look at it beyond its materiality and deterministic nature. Since 1980s, technology is no longer seen as a material cause, but social shaping agent (Markus & Robey, 1998; Williams & Edge, 1996). Orlikowski (1996), for example, pointed to a mutual relationship between human and technology, stating that ICT was both a concrete artifact and an actor which influenced and was influenced by the cognition and actions of its users. Andersen (2016) similarly acknowledged the reciprocal relation between ICT users and organizational change that increased autonomy and control power of organizational norm and routine could be made by ICT. Short-term results would be achieved, while increasing instability instead of reducing it, if there was a one-side intervention on any of these two variables (Genus, 1998; Hartley, Benington, & Binns, 1997; Senior, 1997). Several attempts have been made to develop conceptual framework that treat technology as both materials and a social object at the same time (Orlikowski & Barley, 2001), but a unified one has yet to be adopted. What dictated a common frame for all the researchers was the fact that ICT has enormous influence on people, but yet the later is the one to decide.

With great people at work, and sophistical technology in hands, one must not forget to make the system workable—the strategy. Though this seems complicated, an understanding that change is emergent, non-linear, and continuous is certainly a prerequisite to develop good institutional strategies (Gardner & Ash, 2003; Andersen, 2018; Bamford & Forrester, 2003). According to Bamford and Forrester (2003), organizational change was a continuous process of experimentation and adaptation intended to match the organizational capabilities to the needs of the changing environment, and hence any view of strategy as a linear process, following a particular set model, and done within a specific timeframe, was doomed to fail (Gardner & Ash, 2003).

Even with these change factors, effective change relies heavily on the process. In summary of Kanter, Stein and Jick’s Ten Commandments for Executing Change (1992), Kotter’s Eight –Stage
Process for Successful Organizational Transformation (1996), and Luecke’s Seven Steps (2003), Muluneh and Gedifew (2018) proposed the following steps to implementing change in people’s working culture by first developing deep investigation and opening discussion of challenges, and next, proposing the use of adaptive design as tool, and last, introducing collaborative thinking for creative solutions. Though the researchers stressed on the need to equip necessary ICT skills for staff at a later stage, clear communication between and among all stakeholders had to be ensured for the whole change process. Muluneh’s proposal shares mostly with Andersen’s proposal (2018), though stressing more on managerial responsibility, which suggested (1) the identification of challenges prior to choice of ICT solutions; (2). training; (3). revision of organizational routines, and (4) negotiations to develop commitment to the new ICT.

FINDINGS AND DISCUSSIONS

Information Communication Technology (ICT) and organizational change are reciprocally interrelated. When we talk about ICT’s integration, one must not avoid discussion on changes needed for a successful integration. In the same token, when one talks about change, one must also not forget to consider ICT, given the size and the current pace of change. Effective ICT’s integration requires an in-depth understanding of relationship between the ICT per se and the environment in which they operate. Getting to know this would give the change agents a better chance of exploiting them where they see fit. To best use them, technology shall be viewed beyond its materiality, that is, not to let technology dictate the results, but using them to determine the wanted results. As for the change agent, they also need to understand the nature of organizational changes.

Change is proven to be emergent, continuous, fast and drastic in nature. This requires the change agents to reconsider its change approach. Latest findings have proved that planned change is no longer relevant given the nature of change, and hence all change agents shall expect the unprepared nature of change. Rather than following a set of rules or models, what is needed in managing organizational change is an operational style that is more reflective and less reactive (Bamford & Forrester, 2003). Functional managers, not top ones, are claimed to be the most important change agents as they are the ones to face directly with changes. Though top managers are still responsible for overall objectives of change intent, it is critical for simultaneous and interactional involvements of all change stakeholders. Their involvement, which is facilitated by a free flow of useful information, would contribute to best work practices that integrate new work procedures, which also include new technology (Andersen, 2018).

Although the pace of change, at a point in time, is radical, change aspect should be in small-scale, incremental, and bottom-up. Over time, these can lead to a major reconfiguration and transformation of an organization (Bamford and Forrester, 2003). To attain this, however, a convincing plan has to be devised, incorporating Muluneh and Gedifew’s (2018) and Andersen’s (2018): (1) create awareness of the change among all key stakeholders, pointing to the motivation for change, including both individual and institutional benefits; (2) give them ownership of the change by involving them throughout the change process; (3) explain them possible consequences of not having changes, but at the same time, ensuring them of possible benefits, such as training, incentives, or new job placement etc. (4) explain the stakeholder roles in ensuring success.

Regardless of field, the adoption of technology has to be well considered with good change management approach. In education, change has to be made for almost all aspects of teaching and learning, at the onset of ICT’s integration, should one expects better teacher-student performances. The need for the inclusion has to be first supported by managers as they have roles, and it shall be then involved others who have stakes. Change is non-linear, and emergent in nature, and according the earlier research, could be dealt with best by functional manager who know the issue well at the ground. The approach to change shall be incremental, flexible and goal oriented. Any attempt to mitigate planned change from top managers may risk a big problem. As ICT could be both tools and process, key stakeholders need to know what function it plays at a particular time.
CONCLUSIONS

A conclusion could thus be drawn that the integration of ICT alone does not necessarily produce direct positive impact on teaching and learning performances, but the overarching process, which requires a proper change management approach. Though ICT is viewed as an inevitable part of the change process, it shall in no way be considered as a determinant for change result. The human indeed has this role and hence, involvement of all key human actors in the change process is deemed critical. Though this paper doesn’t conquer more substantial findings on relationship of ICT and change management, it serves as an important reminder to all who have stakes, and are venturing into the unknown supposition of ICT’s supernatural power. In furtherance, its thorough literature reviews shall form a strong base for future researchers in understanding more in-depth of this same focus in a number of ways, one of which is the symbiotic relationship of ICT and change, that is, ICT is relevant, but not determinant for change.

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