

Dave E. Marcial

PhD in Education, Associate Professor, Dean
College of Computer Studies, Silliman University, Dumaguete City, Philippines
ORCID ID 0000-0003-0006-8841
demarcial@su.edu.ph

FACILITATING AND HINDERING FACTORS OF TECHNOLOGY-ASSISTED TEACHING AND LEARNING: EVIDENCE FROM A DEVELOPING COUNTRY

Abstract. Information and communication technology (ICT) redefines the landscape of education. It changes the way teachers teach and students learn. However, achieving innovative teaching and learning is not an easy task because technology-assisted teaching and learning are affected by many variables. Teachers are challenged to utilize new teaching strategy to fill in the gap with the millennial learners. This paper presents the experiences of 16 teacher educators from the Philippines who underwent intensive training on the use and integration of ICT in the classroom. Specifically, this article describes the facilitating and hindering factors of innovative teaching and learning as experienced by the respondents. Likewise, this paper articulates the lessons learned of ICT integration as experienced by the respondents. Further, this article presents the recommendations to achieve innovative teaching and learning using ICT. Results reveal that portability, usability, creativity, independent learning, commitment, dedication and administrative support are the facilitating factors in ICT integration in the classroom. On the other hand, time constraint, lack of technical and administrative support, and poor flexibility of the technology are the hindering factors in technology-assisted teaching and learning. Results show that there is a positive change as experienced by participants in using the technology in the classroom, in spite of obstructions which are always present in any classroom integration of technology. The study concludes that innovative teaching and learning are a responsibility not only of teachers but all stakeholders in the teaching and learning processes. Innovative teaching and learning are possible, yet, they need enough time and investments, especially in a developing country like the Philippines.

Keywords: ICT in Education; innovative teaching and learning; e-learning.

1. INTRODUCTION

Being innovative is one of the many characteristics that a teacher must possess. Teachers are supposed to implement a new teaching strategy to fill in the gap with the millennial learners. This strategy involves “classroom and course management innovations, including new ways of teaching that promote student engagement, reorganization of a course(s) that improves students’ ability to apply what they learn, course content that clarifies historical changes in theory, novel assignments that lead to increased student engagement, student publications, and/or activities that bring students from diverse backgrounds together” [1].

The ITL Research, sponsored by Microsoft Partners in Learning, emphasizes practical transformation in teaching practices [2]. In 2011, they presented the five key findings. First, “innovative teaching supports students’ development of the skills that will help them thrive in future life and work.” Secondly, “however, students’ opportunities to develop these skills are typically scarce and uneven, both within and across the sample of schools in the study.” Third, the research also found out that the use of ICT among students is still uncommon. Teacher collaboration, professional development, and school culture are the three essential aspects of innovative teaching practices. Lastly, they found out that there is still absence of coherent and integrated support for the adoption of innovative instruction in most of the schools and all of the systems in their study. The result was articulated by UNESCO stating that “ICT has great potential for supporting innovative pedagogies, but it is not a magic

ingredient”. This finding suggests, as posted in UNESCO Bangkok website, “that when considering ICT it is important to focus not on flash but on the student learning and 21st-century skills that ICT can enable”.

A research on ICT in teacher education in Central Visayas, Philippines was funded by Philippine’s Commission on Higher Education with the hope to achieve innovative teaching and learning. The project highlights four phases: benchmarking, training, technology development, and evaluation. Year 1 of the project is the benchmarking phase that assessed the landscape of ICT in the teacher education programs in Region 7 using international and national competency standards. The first year of the project also includes training activities that aimed to improve ICT skills among teacher educators in Region 7. Year 2 of the project is technology development that sought to develop two different but interrelated instructional digital tools for teachers in the education program. These proposed digital devices are 1) portable learning management system and 2) mobile application for teachers. Similarly, Year 2 was also intended to measure the acceptance level of the two proposed tools as perceived by the pilot group of users. Furthermore, Year 2 of the project is the evaluation phase which is to assess the project in terms of its ultimate goal – innovative teaching and learning. This paper is part of the research above. In this article, the facilitating and hindering factors in ICT integration as identified by teacher educators are presented.

The problem statement. Achieving innovative teaching and learning is not an easy task for any stakeholders. Innovative teaching and learning are affected by many variables. For Heick [3], his ingredients for innovative teaching are having the sense of priority, selflessness, time and energy, models, willingness to take risks, and trust. “Peer-to-peer sharing, an audience for children's work, and freedom for students to follow through ideas” are some of the captivating elements in classroom innovation [4]. Another essential factor that affects innovation in the classroom is the school administrators. In the website of Digital Promise, it is mentioned that administrators must “view their role as giving guidance on how to manage technological infrastructure, providing professional development, conducting internal research, and scaling teacher practices that make an impact for students.” The 2011 ITL Research [5] found out three key factors that promote innovative teaching and learning. These are “a) teacher collaboration that focuses on peer support and the sharing of pedagogical approaches; b) professional development that involves the active engagement of teachers, particularly in practicing and researching new teaching methods, c) a school culture that offers a common vision of innovation and consistently encourages new types of teaching”.

However, there are many challenges and barriers to integrating ICT into the classroom. These barriers include cultural, behavioral, technical and financial aspects [6]. Shown in Figure 1 is the distribution of teacher-reported barriers to ICT integration by the ITL Research in 2011. It indicates that the lack of hardware is the primary problem, and it was followed by insufficient preparation time.

Marcial [7] ranked the following obstacles to ICT integration as encountered by teachers in higher education: 1) Limited number of Internet-connected PCs in the faculty room; 2) Inadequate number of electronic audio and visual equipment; 3) Limited bandwidth that results in slow Internet connection for online activities; 4) Inadequate number of computers available in the faculty room; 5) Lack of knowledge and training in using the available e-learning tools; 6) Not enough time to develop e-learning materials for classroom instruction; 7) Contentment with the traditional mode of instruction; 8) Reluctance to use computers and other electronic equipment, and 9) Unavailability of software applications installed on the computer for faculty use. Likewise, the study [8] ranked the barriers to ICT integration particularly in online learning from the most severe barrier to the least severe barrier as perceived by the teacher respondents. The said study showed that the most serious

impediment is the issue of cost and access to the Internet, which is followed by technical difficulties, and the least severe barrier is the problem of social interactions. In another study [9] using the same tool, cost and access to the Internet ranked only sixth, whereas social interactions ranked first or the most severe barrier to online learning. The same study revealed that administrative or instructor issues, academic skills, technical skills, learner motivation, and time and support for studies are barriers to online learning.

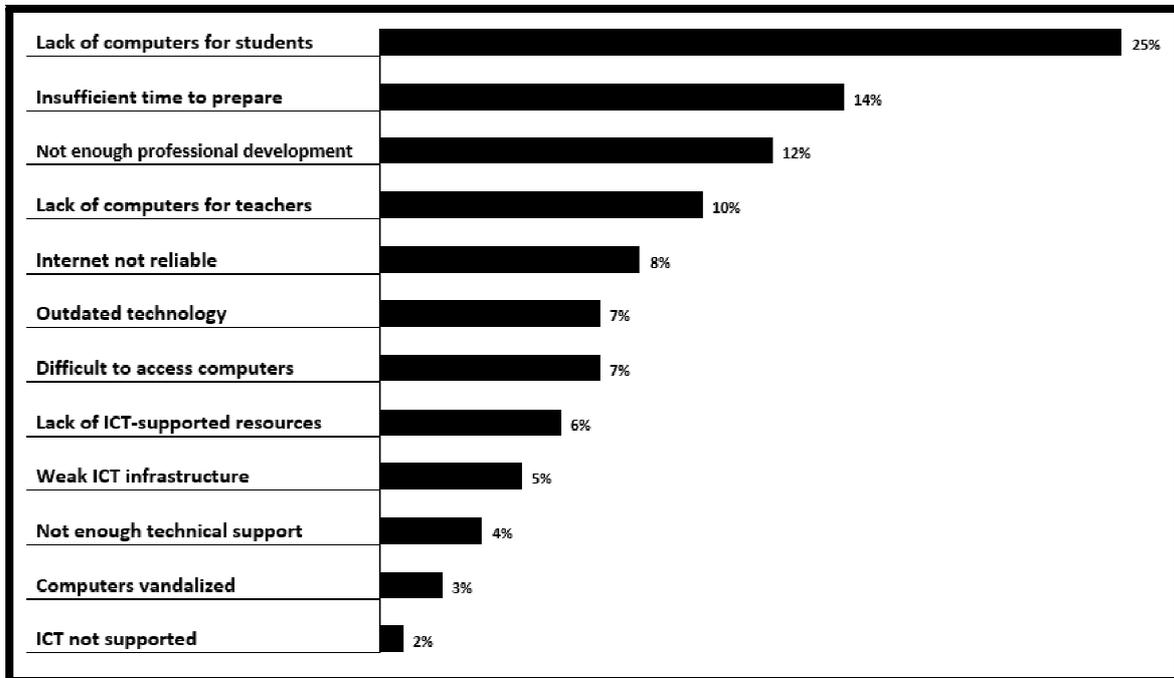


Figure 1. Teacher-reported barriers to ICT Integration [2]

Analysis of recent studies and publications. ICT redefines the landscape of teaching and learning. It changes the way teachers teach, and students learn. It transforms pedagogy, as posted on the website of Teaching Teachers For The Future. Collaborative and interactive teaching strategies require a new method of pedagogy like the ICT integration in teaching and learning. Likewise, the study [10] suggested a pedagogical-independent definition of ICT-related pedagogical innovations in schools. They state, “pedagogic innovations in the use of ICT in schools are those activities where innovation agents integrate existing or new ICT-related pedagogic theories, knowledge, processes and/or products in schools.” They cited that pedagogical practices include: promoting active learning, providing students with competencies and technological skills, stimulating students in collaborative and project-based learning, providing students with customized instructions, addressing issues of equity for students, “breaking down the walls” of the classroom, and improving the social cohesiveness and understanding. ICT is a knowledge construction tool helpful in achieving authentic and realistic problem-based approaches to teaching and learning [11]. “ICT is an all-encompassing term that includes the full gamut of electronic tools by means of which we gather, record and store information, and by means of which we exchange and distribute information to others” [12]. See Figure 2 for the list of technologies.

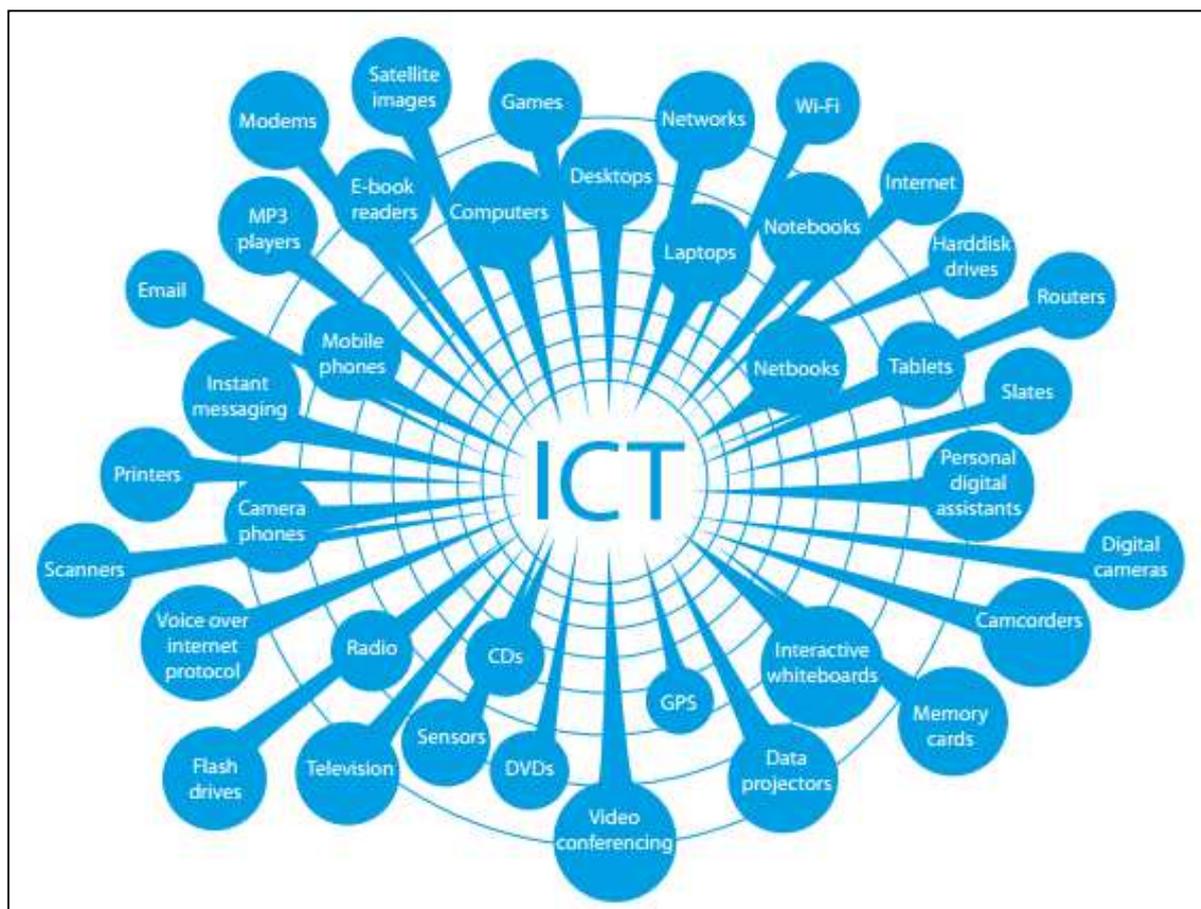


Figure 2. The Web of ICT Tools [12]

The study [13] presented some innovative ways in the classroom by infusing digital media. The study proposed to try something new like technology that can offer the 21st-century skills. He suggested trying the flip classroom model with the use of videos and other media for the students to authentically build knowledge. He also recommends maximizing the use of the Internet and social media to discover new information, connect to real-world challenges, and discuss the experiences of the world. Undoubtedly, ICT integration in the classroom is also affected by multi-faceted components. Kwek [14] concluded in his study that teachers' convictions as regards ICT integration "are forged within the crucible of personal beliefs, prior knowledge of teaching and learning, and beliefs about the value and worth of investing in change." He explained that there is a need to cultivate "design thinking as a tool that inspires teachers to use it in their classrooms."

The article's goal. The primary goal of this article is to describe the experiences of 16 Filipino teacher educators who underwent intensive training on the use and integration of digital teaching tools in the classroom. Specifically, this article lists and describes the facilitating and hindering factors of innovative teaching and learning as experienced by the respondents. This article discusses the lessons learned from ICT integration as experienced by the respondents. Further, this article presents the recommendations to achieve innovative teaching and learning using ICT.

2. RESEARCH METHODS

2.1 Design and Environment

The study employed a qualitative analysis. A one-day learning workshop was conducted. The workshop was conducted in Bohol, Philippines and it was attended by teachers in higher education institutions offering various teacher education programs in the four provinces in Central Visayas, Philippines. A teacher education program refers to degree programs such as Bachelor of Science in Secondary Education and Bachelor of Science in Elementary Education offered in public and private HEIs. All private and public HEIs including community colleges were included. See figure 3 for the map.

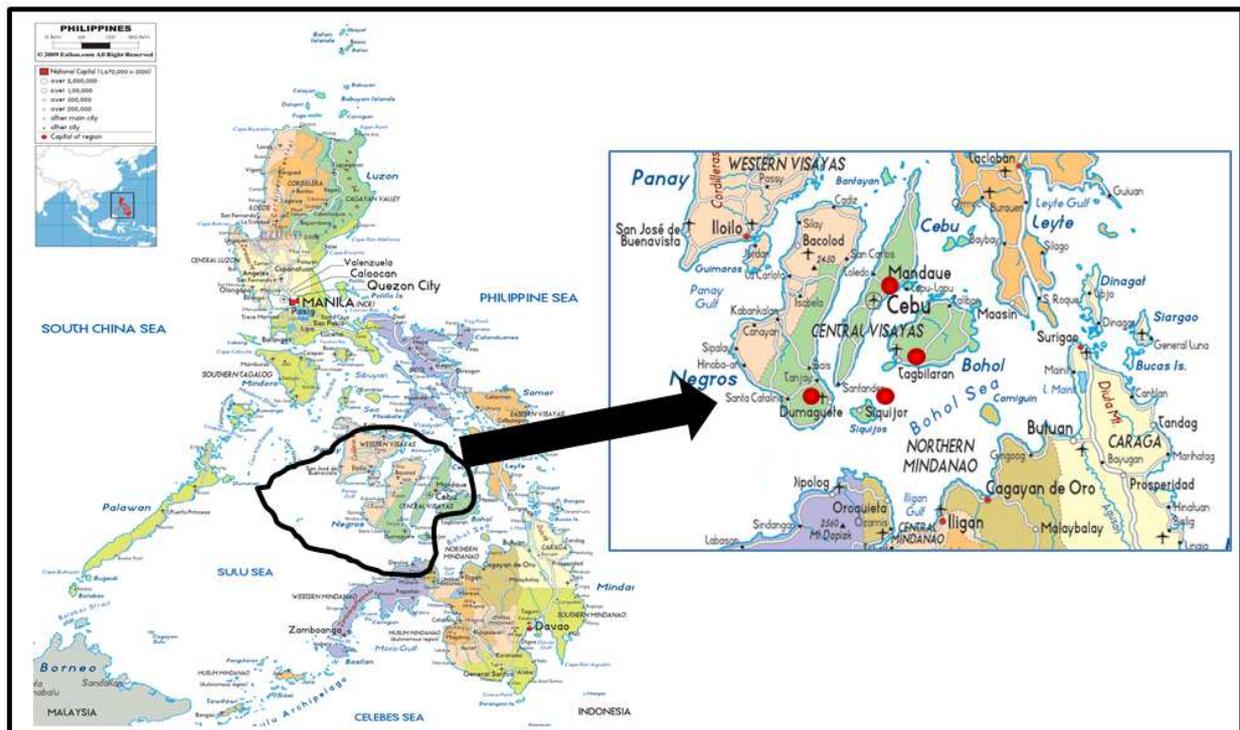


Figure 3. Map of the Philippines illustrating the study sites
(Map is downloaded from <http://www.ezilon.com/maps/asia/philippines-maps.html>)

2.2 Participants

The respondents of the study are teachers handling any professional or specialization courses of teacher education program in the provinces of Bohol, Cebu, Negros Oriental, and Siquijor. There are seven teachers coming from Negros Oriental, one from Siquijor, three from Cebu, and five from Bohol. For presentation, Negros Oriental and Siquijor are taken as one. This is also for privacy reasons of the only teacher from Siquijor who was part of the study. There are six males and ten female participants of the workshop. More than the majority (11, 68.75%) are aged 18-40 (68.75%) and are married (9, 56.25%). There are many who have 4-6 years of experience in teaching (see Table 1).

In terms of technologic profile, more than half have (10, 62.50%) an Android tablet. Only five (31.25%) have an iPad, and 10 (62.50%) have a desktop computer. All respondents have a laptop computer and a Smartphone (see Table 2).

Table 1

Demographic Profile of the Learning Workshop Participants

Profile	Provinces						Total	
	Negros Oriental & Siquijor		Cebu		Bohol			
	f	%	f	%	f	%	f	%
Sex								
Male	2	25.00	2	66.67	2	40.00	6	37.50
Female	6	75.00	1	33.33	3	60.00	10	62.60
Total	8	100.00	3	100.00	5	100.00	16	100.00
Age								
18- 40	6	75.00	3	100.00	2	40.00	11	68.75
41 – 65	2	25.00	0	00.00	3	60.00	5	31.25
Total	8	100.00	3	100.00	5	100.00	16	100.00
Number of years in teaching								
< 4	0	0.00	1	33.33	1	20.00	2	12.50
4 – 6	5	62.5	1	33.33	0	0.00	6	37.50
7– 9	0	0.00	1	33.33	0	0.00	1	6.25
10 – 15	2	25.00	0	0.00	1	20.00	3	18.75
16 – 20	1	12.50	0	0.00	1	20.00	2	12.50
> 21	0	0.00	0	0.00	2	40.00	2	12.50
Total	8	100.00	3	100.00	5	100.00	16	100.00
Status								
Single	3	37.50	1	33.33	2	40.00	6	37.50
Married	5	62.50	2	66.67	2	40.00	9	56.25
Widow	0	0.00	0	0.00	1	20.00	1	6.25
Total	8	100.00	3	100.00	5	100.00	16	100.00
Highest Educational Attainment								
Bachelor's Degree	3	37.50	1	33.33	1	20.00	5	31.25
Master's Degree	3	37.50	2	66.67	2	40.00	7	43.75
Doctoral/PhD	2	25.00	0	0.00	2	40.00	4	25.00
Total	8	100.00	3	100.00	5	100.00	16	100.00

These respondents had undergone several capability training sessions on the classroom use and integration of two newly developed digital teaching tools. First, the respondents participated in a 3-day train-the-trainers (TTT) training on October 19-21, 2015 at Silliman University, Dumaguete City, Philippines. The TTT training was face-to-face, and it aimed to demonstrate, practice, and do hands-on activities with the use and classroom integration of the two developed digital teaching tools. One of the training's outputs is the participants' list of steps to achieve their training goals; they were made to provide their action plan. Terms of Engagement were signed agreeing to use and integrate the tools in any of their classes during the second semester of the school year 2015-2016. At the end of the training, these ambassadors received a Samsung Galaxy tablet installed with mClassRecord and a USB 3.0 flash drive saved with the PLMS.

Table 2

Technologic Profile of the Learning Workshop Participants

Profile	Provinces						Total	
	Negros Oriental & Siquijor		Cebu		Bohol			
	f	%	f	%	f	%	f	%
Android Tablet								
Yes	5	62.50	1	33.33	4	80.00	10	62.5
No	3	37.50	2	66.67	1	20.00	6	37.5
Total	8	100.00	3	100.00	5	100.00	16	100.00
iPad Computer								
Yes	3	37.50	2	66.67	0	0.00	5	31.25
No	5	62.50	1	33.33	5	100.00	11	68.75
Total	8	100.00	3	100.00	5	100.00	16	100.00
Laptop Computer								
Yes	8	100.00	4	100.00	5	100.00	16	100.00
No	0	0.00	0	0.00	0	0.00	0	0.00
Total	8	100.00	3	100.00	5	100.00	16	100.00
Desktop Computer								
Yes	5	62.50	2	66.67	3	60.00	10	62.5
No	3	37.50	1	33.33	2	40.00	6	37.5
Total	8	100.00	3	100.00	5	100.00	16	100.00
Smartphone								
Yes	8	100.00	3	100.00	5	100.00	16	100.00
No	0	0.00	0	0.00	0	0.00	0	0.00
Total	8	100.00	3	100.00	5	100.00	16	100.00

Secondly, the respondents participated during the two-day region-wide user training on the classroom use and integration of mClassRecord and PLMS. As ambassadors, they served as assistant trainers on their respective provinces. Three user training activities were done for the two digital tools. These were conducted in Silliman University for Negros Oriental and Siquijor Batch on October 26-27, 2015, University of Cebu – Main Campus for Cebu batch on October 28-29, 2016, and Holy Name University for the Cebu teacher educators on October 30-31, 2015.

A preliminary evaluation workshop was also organized for the seventeen respondents. The workshop is a one-day affair to gather initial feedback on the teacher's use of mClassRecord and PLMS. Likewise, it was aimed to compare notes on the teacher's use of these two digital applications. The preliminary review workshop was held on December 19, 2015, at Silliman University Dumaguete City, Negros Oriental, Philippines.

2.3 Workshop Instrument and Activities

Responses were gathered through the four activities in the learning workshop. One of the activities is a force-field analysis. It is an exercise to identify the facilitating and hindering factors in achieving innovative teaching and learning. In this activity, some of the reflection questions include a) What teaching benefit will the change deliver? b) Who supports the

change? Who is against it? Why? c) How easy will it be to make the change? Do you have enough time and resources to make it work? d) What costs are involved? e) What other processes will be affected by the change? f) What are the risks? These questions and the force-field analysis template are adapted from MindTools.com.

2.4 Workshop Administration

The learning workshop was conducted on April 4, 2016, in a convention center in Bohol, Philippines. It is a one-day learning workshop that was aimed at documenting the experiences and lessons learned from the pilot users of the two digital teaching applications - mClassRecord and PLMS. Likewise, it also aimed at evaluating the facilitating and hindering factors using force-field analysis. Moreover, the learning workshop solicits from the participants' suggestions and recommendations for future actions to help achieve innovative teaching and learning. The workshop started with the opening remarks and presentation of rationale by the project leader – the facilitator. The facilitator also emphasized the expected deliverable and outcomes of the seminar as well as the different barriers to capturing lessons learned. The opening ceremonies ended with a brief introduction of each of the participants.

The workshop proper was facilitated in four different formats. The second activity, which is the focus of this article, was done by groups according to the degree of integration as perceived by the facilitator. Each team presented their output. The activity runs for two hours.

3. THE RESULTS AND DISCUSSION

3.1 Experiences and Lessons Learned

Group 1 listed seven facilitating factors and six hindering factors. On the other hand, Group 2 identified 11 facilitating aspects and five hampering issues that affect innovative teaching and learning. Both groups listed and rated “portability” highest in a score of the facilitating factors. Group 1 has a total score of 28 facilitating factors against the 21 hindering factors. The facilitating factors identified by Group 1 include portability, usability, paperless method, availability of technology, ease of file exporting, independent learning, and time-saving as the lowest score (see Table 3).

Table 3

Facilitating and Hindering Factors by Group 1

Facilitating Factors	Score	Rank	Hindering Factors	Score	Rank
Portable	7	1	Time constraint	6	1
Usable	6	2	Lack of technological support	5	2
Paperless	5	3	Clash with school policies	4	3
Availability of Technology	4	4	Lack of support from admin	3	4
Ease of file export	3	5	Complicated process	2	5
Independent learning	2	6	Non-applicability of PLMS to other subject	1	6
Time-saving	1	7			
Total Score	28		Total Score	21	

The output of group 1's facilitating factors was presented by a female teacher from Bohol. She started by mentioning that the two apps are portable (first in rank) and that they are usable (second in rank). She explained that there are other factors under usability; it is useful when it is effective (“it does what it is intended to do”), efficient when it could save the user's time, and easy to use. The third facilitating factor is that it is paperless, and the fourth is the availability of technology, especially because the pilot users were provided with tablets.

The fifth one is “ease of file export” to Excel and the like. The sixth is independent learning, in which PLMS facilitated, and the seventh is having mClassRecord as time-saving.

Regarding the hindering factors, the time constraint is the highest, followed by lack of technological support, contradiction with school policies, lack of support from administration, complicated process, and non-applicability of the tool to other courses. The number one hindering factor for group 1 is time constraints. Teachers have other teaching priorities. On her part, she cannot oblige her students to buy flash drives, so she asked their IT head if she could place the content on the server, but she was denied due to the server’s limited storage capability. By January, she was informed that she could use the server for PLMS; unfortunately, she was already caught up with other priorities to integrate the portable system in her class. The second hindering factor is lack of technological support, especially when students do not have the necessary flash drives. The next hindering factor is the “clash with school policies.” She cited that some schools require teachers to have written class records, so it clashes with the function of mClassRecord to go paperless. The fourth factor is lack of support from administration, and the fifth is that it is a complicated process. Their last hindering factor is the non-applicability of PLMS to other subjects. She cited that her groupmate who teaches Physics needs more of animation file uploads for the simulation, which again goes back to time constraints.

Group 2 members yielded a score of 62 on facilitating factors against the 15 hindering factors. The driving factors towards innovative teaching and learning as experienced by the participants include: ease-of-use, innovativeness, scalability, easy retrieval of data, efficiency, clear and understandable, commitment and dedication, positive idea, with administrative support being the lowest score (see Table 4).

Table 4

Facilitating and Hindering Factors by Group 2

Facilitating Factors	Score	Rank	Hindering Factors	Score	Rank
Portability	10	1	File Corruption	5	1
Ease-of-use	9	2	Poor flexibility	4	2
Innovative	8	3	Virus scanning/cleaning takes time	3	3
Scalability	7	4.5	Copying PLMS to flash drives takes time	2	4
Data retrieval	7	4.5	Class data can't be emailed	1	5
Reliability of data	6	6	Total Score	15	
Efficiency	5	7			
Clear and understandable	4	8			
Commitment and dedication	3	9			
Positive idea	2	10			
Administrative support	1	11			
Total Score:	62				

On the contrary, vulnerability to file-error is the highest score in terms of the limiting factors towards innovative teaching and learning. It is followed by poor flexibility and the time-consuming processes. The hindering factors of group 2 were presented by a teacher from Cebu. They found five hindering factors of the two apps, and file corruption is the first hindering factor. The presenter reiterated that portable apps are susceptible to viruses, and PLMS is not exempted. On his part, he had to negotiate with the school’s IT support to freeze all drives, so that students cannot use them for data transfer; he is hopeful that he can use PLMS through the computer lab of his school starting this summer. The second hindering factor is poor flexibility. For the group, this pertains to mClassRecord being Android-based only and its capability to run only on 4.4 or higher versions of Android. His students were

eager to have it installed on their phones, but it needs a 7-inch minimum screen size; others brought their laptops with them, and he had to explain that it needs a third-party software, such as Bluestacks, for mClassRecord to run. The third hindering factor was “virus scanning/cleaning takes time.” The issue of students not backing up files was also mentioned. He advised his students to save two to three backups and better still, send it through email, in the case of inevitable virus cleaning. The fourth hindering factor is that “copying PLMS to flash drives takes time.” The last hindering factor is that “class data cannot be emailed” or that portable system stops temporarily. He related his experience when he was adding students; he was still on the second student when the system gave him a “temporarily stopped” message. He reinstalled the app, but the same thing happened; he left that particular class and proceeded with the next. He is hopeful that upcoming versions would have resolved that bug.

Group 2 ranked portability as the first facilitating factor primarily because the two apps can be carried anywhere. The group explained that there is ease of use, citing mClassRecord as a great help in facilitating the work of the teacher in checking attendance, especially in monitoring the latecomers and absenteeism which can now be easily detected, in the monitoring of grades, and in performance rating, entry of quizzes, and others. Group 2’s presenter set an example for the teachers by showing to them that he no longer uses the traditional class record, but he is going “paperless” with mClassRecord. Now, with what he learned, he realized that transferring of scores by exporting through email is easy. The group further explained their third facilitating factor, which is the apps being innovative tools. He said that “we are here in the twenty-first century, teaching [students] to be innovative. The two tools introduced to us are really a great help to teachers in becoming innovative, too.” Scalability is the next facilitating factor as explained by the group. As explained by the group, “scalability is actually the mechanism of the system to handle files.” Another presenter of the group cited that in PLMS, initially, she thought that the bigger and the more files uploaded, the slower the PLMS would work. She realized that virus and file corruption were more of the problem over the system being slow due to file overload. She said that even if she had uploaded many files, the system was okay at the time when it was not attacked by the virus yet. This made her conclude that PLMS can “handle the bulk of file which is inside the system,” meaning the uploaded files. However, with the presence of the virus, even if she reinstalled PLMS anew, it easily resulted in file error. Further, the group explained the next facilitating factor, which is reliability. The presenter gave as an example how grading in mClassRecord makes the system reliable wherein grades cannot be altered easily; thus, old-school teachers who tend to question how a certain teacher computed the grades can be shown the actual inputted grades in mClassRecord to avoid doubts. The group ranked efficiency as the next facilitating factor; it was said that everybody would agree that the two apps are efficient. The seventh in rank is “clear & understandable”; he said that information needed for the two apps is clear and understandable, meaning that a user can follow or use the app because it is clear and understandable. He added that his students were able to adjust to PLMS in no time, which indicates that instructions for both apps are clear and understandable. The next facilitating factor in rank was commitment and dedication. For him and the group, teaching with innovative tools adds to the teacher’s commitment to his/her job, especially in the eyes of the students. It takes great effort and a dedication to enhance one’s teaching. On his part, it took him hours in an Internet café to practice using the app and to check his students’ output. Seeing that his students are proud of this high-tech tool used in their class, it came to him as a challenge to keep up with the commitment and dedication since he does not want to disappoint his students. He proceeded with the next facilitating factor, which is the tools being a “positive idea” and the next which is admin support. He said that the implementation of the tools is dependent on the support the teacher would get from his/her head. The presenter also explained the added facilitating factor—which is in the same rank as

scalability at number 4—data retrieval. He again cited that scores can be retrieved easily through emailing of scores in .csv format.

3.2 Facilitating Factors

The score of the facilitating factors against the hindering factors means that there is a more positive change in the personal or operational behavior of the participants [15] in using the technology. Needless to say, obstructions are always present in any classroom integration of technology. If the responses of the two groups are to be combined, the following facilitating factors towards innovative teaching and learning are summarized as follows:

1. Portability

Portability of technology is the ability of teachers to access their teaching materials from any location [16]. The result implies that accessibility and transferability of technology is a crucial factor in ICT integration in the classroom. Further, many educational institutions are forward-looking on mobile learning in the classroom because of the portability that many electronic devices offer [17]. The result may suggest that teachers have acknowledged that portability is a factor in achieving mobile learning for them to communicate, share information, and collaborate with their students not only inside the school.

2. Usability

The result means that technology adoption among teachers is dependent on the usability of the technology. Usability is the total assessment of the performance of the system in a particular task [18]. “It is a quality attribute that assesses how easy user interfaces are to use” [19]. The result signifies that effectiveness, efficiency, and satisfaction are (ISO, cited in [20]) facilitating factors to achieve innovative teaching and learning. Moreover, the result denotes that the quality of teaching is a critical factor in technology integration, specifically the learnability, efficiency, memorability, errors, and satisfaction that the technology could offer [19].

3. Creativity

The result suggests that technology augments the teacher’s creativity in the classroom. The combination of digital teaching tools, progressive pedagogy, and creativity allows teachers to humanize the world and its habitants for students (Klein, 2010 cited in [21]). The result denotes that the technology’s ability to assist teachers to model creative and innovative thinking and inventiveness [22] is also a significant influence. In the same manner, the result suggests that the technology’s ability to support the creative process, elaboration, and communication is vital in innovative teaching [23].

4. Independent learning

“Independent learning is a process, a method and a philosophy of education whereby a learner acquires knowledge by his or her own efforts and develops the ability for inquiry and critical evaluation” [24]. This definition supported the result of this study that shows that the teachers value technology as a valuable tool to explore new ideas. The result supports the claim [25] that stated: “effective usage of technology will hugely increase the learner’s capacity to access learning without depending on anyone.” The result implies that the technology’s capacity to assist learners to control their learning responsibly is a significant aspect of innovative learning [26].

5. Commitment and dedication

The result is congruent with the study of Cicero [27] who elaborated that teacher’s commitment is necessary for educational technology. The result may denote that teacher’s engagement coupled with a sense of responsibility is a must in leveraging technology effectively. Likewise, the result suggests that a sense of adherence among teachers is a critical factor that influences innovative learning processes especially among students [28].

6. Administrative support

“The role of administrators is critical to the successful acceptance, adoption, integration, and implementation of technology by teachers” [29]. The result of this study shows that teachers need active leadership to achieve innovative teaching. Leadership may mean that an administrator must be a role model for integrating technology in the classroom, and school leaders must encourage and support innovative teaching and learning [30]. In the same manner, the result signifies that mentor’s and administrator’s roles are essential in ensuring effective technology integration in the classroom [31].

3.3 Hindering Factors

The identified hindering factors towards innovative teaching and learning can be summarized into:

1. Time constraints

Time constraints remain to be the most significant barrier to innovative teaching and learning [32]. Unavailability of time may be the result of overloaded teaching hours, the involvement of teachers in accreditation, and other professional development of teachers. The result denotes that teachers need enough time to learn the concepts of the technology, its operations and the actual integration in the learning. On the contrary, the result may suggest that technology integration is not yet a priority among the respondents.

2. Lack of technical and administrative support

The result implies that the absence of technical and administrative support is a barrier to innovative teaching and learning. The result also suggests that lack of technical and managerial support for a technology integration plan is an obstacle in technology-enhanced teaching and learning. The result shows that missing or incomplete functionalities need more technical assistance as the lack of this support affects positive technology adoption and acceptance. The result may suggest that the feeling of not being provided with enough support affects effective technology integration in the classroom [33].

3. Poor flexibility

In information technology, the meaning of flexibility is premised on three concepts: flexibility in functionality, flexibility in use, and flexibility in modification (Knoll, and Jarvenpaa, 1994 cited in [34]). The result means that poor flexibility of technology is an obstruction to innovative teaching and learning. Likewise, poor structural and process flexibility significantly influences the high adoption of technology in the classroom [35].

4. CONCLUSIONS AND PROSPECTS FOR FURTHER RESEARCH

Achieving innovative teaching and learning is not an easy task. It needs varied but interrelated resources such as time, money, people, and processes. The facilitating factors identified in this paper are among the many familiar drivers towards effective technology infusion in the classroom. Teacher educators believed that there were more enabling aspects towards technology infusion than the barriers. The teacher educators have the depth and breadth of understanding about the purpose of technology in the classroom. On the contrary, technology diffusion is always present in any ICT-based programs for teacher education. Teacher educators are challenged to adapt to technological changes. Stakeholders in higher education institutions must be aware of the facilitating and hindering factors identified in this study. School administrators must take the lead in bridging the generation gap between the teachers and students. Funding agencies and other advocates of ICT in education must realize that technology infusion is not perfect, and it entails hindrances that need to be adequately monitored and controlled.

This study recommends to conduct a quantitative research to further validate the results of this study. Correlative analysis is recommended on the different factors that affect innovative teaching and learning.

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ФАКТОРИ, ЩО МОТИВУЮТЬ І СПРИЯЮТЬ ВПРОВАДЖЕННЮ ТЕХНОЛОГІЙ У НАВЧАЛЬНИЙ ПРОЦЕС: ДОСВІД КРАЇН, ЩО РОЗВИВАЮТЬСЯ

Дейв І. Марціал

PhD в освіті, доцент, декан

Коледж інформатики, Університет Сілліман, Думагет сіті, Філіппіни

ORCID ID 0000-0003-0006-8841

demarcial@su.edu.ph

Анотація. Інформаційні та комунікаційні технології (ІКТ) переосмислюють ландшафт освіти. Вони змінюють підходи вчителів до викладання та учнів до навчання. Проте досягнути рівень інноваційного викладання і навчання не є легким завданням, оскільки впровадження технологій у навчальний процес обумовлюється багатьма різними факторами. Вчителям доводиться використовувати нову стратегію навчання, для того щоб бути на рівні зі своїми учнями. У статті представлений досвід 16 педагогічних працівників з Філіппін, які пройшли інтенсивне навчання з використання та інтеграції ІКТ у класі.

Зокрема, з досвіду респондентів, описано фактори, які сприяють та перешкоджають інноваційному викладанню і навчанню. У статті також представлені висновки, які були зроблені респондентами з їх особистого досвіду впровадження ІКТ. Крім того, надані рекомендації як можна досягти інноваційного навчання та викладання використовуючи інформаційні та комунікаційні технології. Результати дослідження показують, що інтеграції ІКТ у класі сприяють такі фактори як: мобільність, зручність використання, творчість, самостійне навчання, зобов'язаність та адміністративна підтримка. З іншого боку, обмеження часу, відсутність технічної та адміністративної підтримки, невідповідна гнучкість технологій є перешкоджаючими факторами для успішного впровадження ІКТ у навчальний процес. Результати показують, що спираючись на досвід учасників дослідження, незважаючи на перешкоди, які завжди мають місце під час впровадження ІКТ у навчальний процес, все ж таки спостерігаються позитивні зрушення у цьому напрямку. Зроблено висновок, що за впровадження інноваційного викладання та навчання несуть відповідальність не лише вчителі, але й усі, хто задіяний у цьому процесі. Інноваційне викладання та навчання можливо на практиці, але воно потребує достатньо часу та інвестицій, особливо в країнах, що розвиваються, таких як Філіппіни.

Ключові слова: ІКТ в освіті; інноваційне викладання та навчання; е-навчання.

ФАКТОРЫ, МОТИВИРУЮЩИЕ И СПОСОБСТВУЕТ ВНЕДРЕНИЮ ТЕХНОЛОГИЙ В УЧЕБНОМ ПРОЦЕССЕ: ОПЫТ РАЗВИВАЮЩИХСЯ СТРАН

Дэйв И. Марциал

PhD в образовании, доцент, декан

Колледж информатики, Университет Силлиман, Думагет сити, Филиппины

ORCID ID 0000-0003-0006-8841

demarcial@su.edu.ph

Аннотация. Информационные и коммуникационные технологии (ИКТ) переосмысливают ландшафт образования. Они меняют подходы учителей к преподаванию и учащихся к обучению. Однако достичь уровня инновационного преподавания и обучения не является легкой задачей, поскольку внедрение технологий в учебный процесс обуславливается многими различными факторами. Учителям приходится использовать новую стратегию обучения, для того чтобы быть на уровне со своими учениками. В статье представлен опыт 16 педагогов из Филиппин, которые прошли интенсивное обучение по использованию и интеграции ИКТ в классе. В частности, по опыту респондентов, описано факторы, способствующие и препятствующие инновационному преподаванию и обучению. В статье также представлены выводы, которые были сделаны респондентами из их личного опыта внедрения ИКТ. Кроме того, даны рекомендации как можно достичь инновационного обучения и преподавания используя информационные и коммуникационные технологии. Результаты исследования показывают, что интеграции ИКТ в классе способствуют такие факторы как: мобильность, удобство, творчество, самостоятельное обучение, обязательность и административная поддержка. С другой стороны, ограничение времени, отсутствие технической и административной поддержки, неподходящая гибкость технологий является препятствующими факторами для успешного внедрения ИКТ в учебный процесс. Результаты показывают, что опираясь на опыт участников исследования, несмотря на препятствия, которые всегда имеют место при внедрении ИКТ в учебный процесс, все же наблюдаются положительные сдвиги в этом направлении. Сделан вывод, что за внедрение инновационного преподавания и обучения несут ответственность не только учителя, но и все, кто задействован в этом процессе. Инновационное преподавание и обучение возможно на практике, но оно требует достаточно времени и инвестиций, особенно в развивающихся странах, таких как Филиппины.

Ключевые слова: ИКТ в образовании; инновационное преподавание и обучение; электронное обучение.



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