Integration of Information and Communications Technology (ICT) Tools in the Instructional Program of a University

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Abstract: The integration of ICT is seen as one of the most important priorities of universities. Yet despite the existing infrastructure facilities and professional development, little appears to be happening in the classrooms. This study ascertained the integration of ICT in the instructional program of a university. Furthermore, this study examined the benefits of ICT tools in teaching as perceived by the faculty, competencies of the faculty in the use of ICT in teaching, accessibility of ICT tools and extent of support, staff development activities related to ICT tools, extent of utilization in terms of frequency and activities, and the problems that the faculty have encountered in their use of ICT in teaching. Using the descriptive design, the researcher-made questionnaire served as the main instrument in gathering the data. The study was conducted in a university in Cebu City. The respondents were 221 faculty members of the university. Results showed that the respondents perceived the use of ICT tools as very much beneficial to instruction. They perceived their ICT skills as less competent on database, web & multimedia, graphics & animation, and computer-based pedagogical skills. ICT hardware, software and internet facilities and resources were less accessible in terms of curricular and pedagogical ICT tools in instruction. The respondents claimed that they were supported in the use of ICT tools in instruction. The training opportunities were not sufficient to enable faculty to use ICT in actual teaching. There was very little use of ICT to facilitate higher order thinking skills among students. Respondents also revealed the serious problems facing the faculty in the use of ICT: no enough training opportunities; insufficient number of ICT hardware such as computers and peripherals; and insufficient time for teachers to prepare lessons using ICT. While the faculty of the university found it essential to integrate ICT tools for instructional purposes, there was limited use of these tools. Thus, there is a need to promote the integration of ICT tools in the instructional program, enhance the competencies of the faculty in the use of ICT tools in instruction, provide adequate infrastructure facilities, show presence of on-going support, and increase frequency of utilization and activities.

Keywords: ICT Hardware, Accessibility, Philippines

1. Introduction

At this time when the rapid effects of ICT are being felt in all walks of life, education, which is an instrument of adapting to change, has to undergo unprecedented reforms. The global educational

landscape has been transformed as educational technology has converged with information and communications technology. This has largely affected the way teachers teach, the way students learn, and the way educational institutions are being supervised and managed (Garo, 2008).

The University of Cebu (UC), whose role is the delivery of high quality, relevant tertiary level education that meets the human development needs, finds itself having to respond to a number of challenges in the 21st century or digital literacy era. As education becomes increasingly competitive, UC like any educational institution, believes ICT is a catalyst to respond effectively to the demands of the time. This challenge, coupled by the need to deliver to rapidly increasing number of students, has led UC to respond by implementing a number of ICT initiatives. ICT is successfully integrated in various curricula either as part of a course, and as a course by itself. However, ICT is still seen as an extra or add-on rather than an integrated resource within teaching.

The University Chancellor established the Information Resources and Technology Advancement (IRTA) committee also known as the Information Technology Think Tanks under the leadership of the University Information Technology Director with the Information Technology (IT) Deans and Electronic Data Processing Heads as its members. This committee is responsible for IT planning in support of the University's academic plan, particularly relating to teaching and learning, research and administration. It is supposedly the key committee for reviewing and making recommendations on ICT plans and policy. One of the key ICT issues facing the university identified by the committee is how to harness the power of ICT instructional medium. However, since its establishment in 2006, IRTA was unable to formulate institutional policies and to develop a master plan to promote the greater adoption and diffusion of ICT to improve capacities in all academic and administrative units of the university.

In the absence of a clear ICT direction, the deans and department heads make decisions about their respective ICT development needs on an on-going basis. However, the focus of most deans has always been on the passing percentage in the professional licensure examinations, studying course contents, course format and the like. Expanded classes are being offered purposely to finish the syllabi. But less attention is given to how these courses can be taught effectively with the use of the latest technology. Other deans are concerned simply on providing more ICT resources but less is done to ensure that existing resources are utilized and managed more effectively to increase awareness and access to support instruction.

The faculty development program of the university has been formulated and implemented to enhance the knowledge and skills of the faculty along their field of specialization, thus, improving their teaching competence. Though ICT literacy is included in the program, most ICT-related seminars and trainings attended by teachers are usually on basic computer operations and applications such as word processing, Powerpoint for teaching presentation, spreadsheet for grades computation and internet browsing for research purpose. UC strives to continuously improve its ICT infrastructure. Every now and then, procurement and upgrading of ICT hardware and software resources are being done as the need arises. There is no ICT planning and budgeting done by the deans and department heads. Sometimes, teachers are not informed about the availability and existence of ICT resources as well as its potentials within

their respective colleges and departments. The sharing of relatively expensive ICT resources among the various colleges and departments is seldom practiced.

The need for a supportive environment is an essential component of ICT integration. At present, most faculty draw out technical support and advice from few colleagues rather than the technicians and librarians. Support from the top is also essential to ensure that they feel supported in terms of fair and equal opportunities for training and development and there is someone they can turn to for advice when necessary.

The absence of comprehensive database on ICT deployment in the university system makes it impossible to determine the actual level of ICT resources and their instructional use. Information on the actual use of ICT to promote active, individualized instruction and to improve student achievement is quite limited. The extent of investment of the university in ICT is likewise difficult to estimate especially on hardware peripherals which deepen the educational functionality of computers (i.e. scanners, projection devices, imaging and studio tools, etc.) and on software applications to realize the curricular usefulness of ICT. It is on the above context that the researchers ascertained the integration of ICT tools in the instructional program of the University of Cebu. The findings served as basis for a proposed ICT development plan.

2. Framework

The study was anchored on the Theory of Diffusion of Innovation, and the Instructional and Learning Theories. Roger's Theory of Diffusion of Innovation mentions that the implementation of an innovation is just one phase of a five-stage diffusion process. The main elements in the diffusion of new ideas are: (1) an innovation, (2) that is communicated through certain channels, (3) over time, (4) among the members of a social system. An innovation is an idea, practice, or object perceived as new by an individual or other unit of adoption. The characteristics of an innovation, as perceived by the members of a social system, determine its rate of adoption (Rogers, 1986).

Rogers' theory explains how innovation is communicated to the would-be innovators in five stages, namely, knowledge, persuasion, decision, implementation, and confirmation. Knowledge requires exposure to the innovation and understanding how to use it. Persuasion refers to the development of a favorable attitude towards the innovation. Decision refers to the commitment to its adoption. Implementation is putting the innovation to use, whereas confirmation refers to the reinforcement resulting from favorable outcomes (Rogers, Medina, Rivera, & Wiley, 2003).

The instructional and learning theories which are used to support this study are the social constructivism, activity theory and situated learning paradigms of the constructivitist learning theories. Lucido (2007) describes in social constructivism, the construction of knowledge is governed by social, historical and cultural contexts. In effect, the learner who interprets knowledge has a predetermined point of view according to the social perspectives of the community or society he lives in. Instead of giving students prior ideas or teaching theories about the world, teachers would pose questions or problems to students and ask them to generate their own ideas, concepts, theorems or theories. The teacher is not merely instructing students on concepts and ideas but is also facilitating exploration and discovery.

Web-based environments are important forums for joint problem-solving, knowledge building and sharing of ideas. Online learning management systems such as moodle are based on social constructivism where a culture is fostered by the collaboration of groups to construct knowledge (Nevgi, Virtanen, & Nieme, 2006).

3. Related Studies

Researches on the effectiveness of ICT in teaching have been an on-going process. According to Salvador (2006), good teachers always cultivate information and communication skills and interpersonal and self-directional skills. However, the challenge is how to integrate learning skills deliberately and strategically. Educators can create learning contexts that make content relevant to students' lives; take students out into the world and create opportunities for students to interact with other students, with teachers, with knowledgeable adults in authentic learning situations. With the advent of ICT, learning is not confined in the classroom, and open learning, which is ideal in a knowledge-based society, becomes a reality. It is of utmost importance that both hardware and software are continuously provided to our schools to help our learners. Hook (2004) found that the use of ICTs enhanced the transformation of learning outcomes for the gifted and talented. With ICTs, teachers were able to teach, communicate, maintain good records and evaluate these groups of children with high level of potentialities in them.

Woodbridge (2003) finds that integrating technology effectively was demonstrated across grade levels and course content using such constructivist teaching strategies as active, authentic, constructive, cooperative, and intentional/reflective learning. Results revealed that technology integration varied according to individual teaching beliefs, perceptions towards technology innovations, and how the teacher practiced and put technology to work in the classroom. Active, authentic, constructive, cooperative, and intentional/reflective learning were teaching strategies found in 50% of the classroom observations.

In "Breaking the IQ Myth" the author Teele was quoted by Tenedoro (2003), saying that to create a quality learning environment, every aspect of the school, including the facilities, the instruction and curricula, methodology, personnel as well as the attitude of the personnel, should be representative of a student-centered environment. Students are not failing because of the curriculum. Students can learn any subject matter when they are taught with methods and approaches responsive to their learning style's strengths. Finally, ICTs are seen as means to reform and innovate teaching, that is, to stimulate learners to learn actively and independently is a self-directed way and/or in collaboration with others (Kirschner & Woperies, 2003).

In spite of these ICT recognized potentials, empirical findings have indicated that teachers do not integrate them in their teaching. As another finding from a study titled University Teachers' Views on the Use of Information Communication Technologies in Teaching and Research in Iranian Universities, the analysis of data showed that Iranian university teachers strongly agreed with the educational benefits of ICTs in higher education. However, they reported infrequent uses of ICTs for research and instruction. Limited resources and facilities, insufficient skills, lack of time of initial preparations, and policy-makers' little support and encouragement were reported as the most serious problems facing

university teachers in the use of ICT (Zare-ee, 2011). Keong et al. (2005) identified some major barriers hindering the implementation of ICT in mathematics teaching such as the lack of time in school schedules, the lack of adequate technical support, inadequate teacher training opportunities, the lack of knowledge about ways to integrate ICT to enhance the curriculum and to integrate and use different ICT tools in a single lesson.

From a survey on ICT utilization in the Philippines Public High Schools revealed that the 5 obstacles to their school's use of ICT for teaching and learning are lack of computers, lack of enough technical support for operating and maintaining ICT resources, lack of teacher training opportunities, lack of space for computers and the general lack of funds for operations including maintenance of equipment, purchase of supplies, and electricity (Tinio, 2002). Surveys conducted at Stanford University in 1989 and 1997 indicated that the overhead projector and VCR were the two most frequently used machines in the classroom. The findings further revealed that computers, while used in the preparation for instruction, are very rarely utilized during the instructional process (Cuban, 2001).

Pierson (2001) noted that educational reform efforts should not only focus on acquiring more machines for classrooms but also on developing teaching strategies that complement technology use within the curriculum. Of primary concern to the university is the issue on what technology and technology applications teachers ought to learn. The issue of what to teach about technology is complicated. It is argued by some that the most important thing the university can do to teachers is to help them understand the implications of technology developments in general on the perspectives and lifestyles of teachers. That is, the university ought to teach teachers ICT as content as well as ICT as instructional tool.

A study in Northern Malaysia examined the extent of ICT utilization among the members of Faculty A of four public higher learning institutions (IPTA) and seven private higher learning institutions (IPTS). Its focus is on a) to investigate the extent of ICT resources provided by university authorities, b) focus on types and extent of ICT usage in daily activities, c) to explore the ICT proficiencies level and d) to investigate the level of ICT integration in teaching activities. Findings indicate that in the IPTA, though the facilities provided are not as plenty as in IPTS, the level of usage is quite encouraging. While in the IPTS, the levels of ICT usage among the educators are still not satisfactory. Results also indicated that usage frequencies are more prone on informative in nature, besides integrating computer technology. Furthermore, the study also indicates that there were considerable differences in the use of ICT by educators in their perceived proficiencies and integrating computer technology (Dawam et al., 2009).

4. Objectives

The study ascertained the integration of the Information and Communications Technology (ICT) tools in the instructional program of the University of Cebu for academic years 2010-2011 and 2011-2012. The results of the study served as bases for a proposed development plan. Specifically, answers to the following queries were sought:

1. How beneficial is the use of ICT tools in teaching?

2. What are the respondents' perceived competencies in the use of ICT tools in teaching?
3. How accessible are the ICT tools?
4. What is the extent of support in the use of ICT tools?
5. What staff development activities related to ICT tools were supported by the university?
6. What is the extent of utilization of ICT tools in terms of:
6.1. frequency; and
6.2. activities?
7. What were the problems encountered in the use of ICT tools?
8. Based on the findings of the study, what development plan may be designed to promote the integration of ICT tools in instruction?

5. Methods

This study utilized the descriptive quantitative design. It was conducted at the UC Main and UC METC. The respondents of the study were 221 regular, tenured, full-time professional and general education college faculty members. Table 1 shows that a considerable number of the respondents were from UC Main at 66.1% while UC METC has 33.9%.

Table 1: Research respondents

Campus	f	%
UC Main	146	66.1
UC METC	75	33.9
Total	221	100

UC Main is located in Sanciangko Street, Cebu City, Cebu, Philippines. It has an average student population of approximately 16,000 from pre-school to college. Over the years, UC Main prides itself for continuously producing board topnotchers and champions in various curricular, co-curricular and extra-curricular competitions. The UC METC at Alumnos, Cebu City, Cebu, Philippines is accessible through the South Reclamation Project which houses the Maritime Education programs. METC has an in-house training and assessment centers duly accredited by Maritime Training Council (MTC). UC METC is ISO and DNV accredited since 1998 and affiliated with the Norwegian Shipowners Association. The researchers distributed the questionnaire to the respondents. The researcher-made instrument consists of seven parts. This was supplemented by interviews to augment relevant information relevant to the study. Before the formal construction of the questionnaire, the researcher reviewed the different materials, books, journals and studies that dealt with ICT as instructional tools.

Part 1 of the instrument was designed to get the teachers' perceptions on the benefits of using ICT tools in teaching. Part 2 of the instrument obtained the teachers' perceptions on their ICT competence relative to using the computer for various purposes. Part 3 was designed to get information from respondents about ICT resources available in the workplace for their use. Part 4 gathered information from respondents on the level of academic, technical and administrative support provided by the university. The following scales were used.

Scale	Part 1	Part 2	Part 3	Part 4
5	Very much beneficial	Very much competent	Very much Accessible	Very much supported
4	Much beneficial	Much competent	Much accessible	Much supported
3	Beneficial	Competent	Accessible	Supported
2	Less beneficial	Less competent	Less accessible	Less supported
1	Not beneficial	Not competent	Not accessible	Not supported

Part 5 of the instrument was designed to get information on staff development activities related to ICT tools supported by the university. Part 6 was the extent of ICT utilization and was divided into two components namely, frequency which refers to the number of times the faculty is able to utilize for instructional purposes, and activities relative to specific teaching activities performed using ICT tools. Finally, part 7 was designed to know the instructor's problems on the use of ICT tools in instruction. Treatment of data included simple percentage and weighted mean. Using the computed interval, a distribution was made:

For benefits of ICT tools in instruction

Mean ranges	Interpretation
4.20-5.00	Very much beneficial
3.40-4.19	Much beneficial
2.60-3.39	Beneficial
1.80-2.59	Less beneficial
1.00-1.79	Not beneficial

For perceived competencies in the use of ICT tools

Mean ranges	Interpretation
4.20-5.00	Very much competent
3.40-4.19	Much competent
2.60-3.39	Competent
1.80-2.59	Less competent
1.00-1.79	Not competent

For level of accessibility of ICT tools

Mean ranges	Interpretation
4.20-5.00	Very much accessible
3.40-4.19	Much accessible
2.60-3.39	Accessible
1.80-2.59	Less accessible
1.00-1.79	Not accessible

For extent of support in the use of ICT tools

Mean ranges	Interpretation
4.20-5.00	Very much supported
3.40-4.19	Much supported
2.60-3.39	Supported
1.80-2.59	Less supported
1.00-1.79	Not supported

For extent of utilization of ICT tools in terms of frequency of usage

Mean ranges	Interpretation
4.20-5.00	Daily
3.40-4.19	Weekly
2.60-3.39	Monthly
1.80-2.59	Semestral
1.00-1.79	Yearly

6. Results and Discussion

ICTs support and facilitate teachers' professional activities and therefore make the school more efficient. ICTs foster innovative teaching which facilitates learners to learn actively and independently, or in collaboration with others. It can enhance learning and teaching within the system (Kirschner & Woperies, 2003). Table 2 reveals the ICT benefits. It showed that the use of ICT tools in instruction has helped in increasing students' interest in the subject matter, improving presentation of work, promoting active learning strategies, and improving students' achievement. Similar to the study of Zare-ee (2011), teachers from an Iranian University strongly agree with the educational benefits of ICTs in higher education. Some teachers who were interviewed said that they are willing and enthusiastic to use computers in teaching however they found it frustrating when there was no one to troubleshoot on problems related to computers. Some teachers also believed that using ICT in teaching during classroom observation periods by their respective deans ensured them of higher ratings. They would also like to be "techy" in the eyes of their students and peers.

Overall, the respondents' rating reached the mean of 4.3. They perceived the use of ICT tools as very much beneficial in instruction and regard ICTs more powerful than the traditional method. Furthermore, the faculty believed that ICT can be used to foster effective teaching and learning environments. Clearly, the respondents exhibit willingness to adopt ICT tools for instructional use. This coincides with Roger's Innovation Diffusion Theory (2003) which holds the formation of favorable attitude and the decision to adopt or reject it. This implies that the teachers' perceived usefulness of ICT may have a direct effect on their intention to use it. This was a promising result and foundation upon which to build programs to promote the expanded use of ICT in the university.

Table 2: Benefits of ICT use in instruction

Benefits	Mean	Description
1. The use of ICT tools increases students' interest in the subject matter.	4.4	Very much beneficial
2. ICT tools improve presentation or work.	4.4	Very much beneficial
3. ICT tools help better communication with the students.	4.3	Very much beneficial
4. ICT tools develop students' independence and responsibility for own learning.	4.3	Very much beneficial
5. ICT provides avenue to discuss problems and ideas.	4.1	Much beneficial
6. ICT tools make lessons more fun.	4.3	Very much beneficial
7. ICT tools promote individualized student learning experiences.	4.3	Very much beneficial
8. ICT tools promote active learning strategies.	4.4	Very much beneficial
9. ICT tools improve students' achievement.	4.4	Very much beneficial
10. ICT tools encourage more cooperative and project-based learning.	4.2	Very much beneficial
11. ICT tools make administration more efficient.	4.3	Very much beneficial
12. It is easy to think of new lesson ideas using ICT tools.	4.3	Very much beneficial
13. ICT tools make lesson more diverse.	4.2	Very much beneficial
Grand Mean	4.3	Very much beneficial

According to Tinio (2002), one of the factors which contribute to the success of technology integration in the classroom is the teacher. Teachers must possess curricular, pedagogical, technical and ICT competencies. The school should also be equipped with ICT infrastructure and resources. Table 3 shows that the respondents were much competent in the areas of operating a computer, word processing, electronic mailing and World Wide Web browsing with weighted means of 3.7, 3.6, 3.2 and 3.1, respectively. The respondents were less competent on web page creation and editing, creating and editing video/audio, database creation, course management systems, writing simple programs, installing peripheral components, software & drivers, and computer preventive and corrective maintenance.

The findings showed that the faculty were less competent in the use of ICT (2.5). Thus, there is a need to retool the faculty to be able to keep up with the changing landscape of education. Based on Roger's theory, the teachers of UC might have a genuine understanding of ICT integration but many teachers are still in the knowledge stage. In another study survey on ICT Utilization in Philippine High Schools, it

revealed that 92% of the respondents who are teachers of the public school said that there is a need for more information on how to use ICT to support the curriculum and 96% of the respondents need to develop skills on hands-on activities to share with their students (Tinio, 2002).

According to Pedro (2005), heavy investment in ICT must be taken seriously by university authorities in order to improve the teaching quality. He further stated two reasons for such investment. The first reason is the university has a responsibility to ensure that future graduates are well versed in the use of ICT, since in a knowledge economy, such technologies are very important tools of everyday life when a student enters the work market. The second reason is that ICT may contribute to more and better learning to improve the effectiveness of university education.

Table 3: Respondents' perceived competence in the use of ICT Tools

Competence	**Mean**	**Description**
1. Operating a computer	3.7	Much competent
2. Word processing	3.6	Much competent
3. Electronic mailing	3.2	Much competent
4. World wide web browsing	3.1	Much competent
5. Accessing library resources using World wide web	2.3	Competent
6. World wide web page creation and editing	1.9	Less competent
7. Preparing presentation using powerpoint, persuasion, etc.	2.3	Competent
8. Creating and editing video/audio	1.9	Less competent
9. Drawing, graphics and animation software	2.1	Less competent
10. Using spreadsheets	2.3	Competent
11. Database creation	1.9	Less competent
12. Course management systems	1.7	Less competent
13. Writing simple programs	1.7	Less competent
14. Installing peripheral components, software and drivers.	1.9	Less competent
15. Computer preventive and corrective maintenance.	1.8	Less competent
Grand Mean	2.5	Less competent

In an unstructured interview, the faculty expressed that their deans and department heads sometimes failed to publicize and inform them of available ICT resources in their respective colleges or departments and within the university for their use. They are not made aware of the existence of ICT resources (e.g. location, availability, and operability). Furthermore, according to the teachers, although there is already a directive from the University President and the Chancellor for the sharing of ICT resources especially for relatively expensive equipment such as DLP projector, laptop and digital

camera, borrowing of these items are sometimes difficult. The teachers are hoping that each college and department will be provided with adequate ICT resources. As pointed out by Salvador (2006), it is of utmost importance that both hardware and software are continuously provided to help teachers and learners. A necessary condition for technology integration in the school system is the presence of ICT infrastructure such as computers, printers, and multimedia equipment. The technical specifications of computers are also a good indicator of the extent to which these devices can be used as an instructional tool, particularly its efficiency in running multimedia applications. Multimedia computers are those with a DVD/CD-ROM drive and a sound card. Many educational softwares are multimedia in form, thus the number of multimedia computers available to teachers and students in a school is indicative also of the usefulness of a school's ICT resources for teaching. Hardware peripherals such as printers, scanners, and digital cameras also expand the functionality of computers, and the presence of such device in the school suggests the extent use of computers for educational purposes. Sixty (60) or 46.5% of the college faculty of the university revealed that the desktop computers are very much accessible for their use. This is evidenced by a weighted mean of 4.17. About 44% of the faculty said that laptops, CD-ROM/DVD players, digital camera, scanner, cable television access, plotter, and multi-media/LCD/DLP projector were not accessible in their respective colleges/departments. Likewise, the teachers revealed during the interview that some computers provided for educational purposes in the university are unable to support multimedia applications.

Table 4: Accessibility of ICT hardware resources

ICT hardware resources	**Mean**	**Interpretation**
1. Desktop computer	4.17	Very Accessible
2. Laptop computer	1.17	Not Accessible
3. Overhead projector	3.19	Accessible
4. CD ROM/DVD player	1.84	Less Accessible
5. Digital Camera	1.36	Not Accessible
6. Scanner	1.07	Not Accessible
7. Cable Television access	1.06	Not Accessible
8. Dot Matrix Printer	1.83	Less Accessible
9. Inkjet Printer	2.27	Less Accessible
10. Laser Printer	1.74	Less Accessible
11. Plotter	1.89	Not Accessible
12. CD/DVD Writer	1.94	Less Accessible
13. Multimedia/LCD/DLP projector	1.61	Not Accessible
14. Floppy Disks	2.90	Accessible
15. Flash Memory	1.89	Less Accessible
Grand Mean	2.00	Less Accessible

For peripherals available for the faculty, printers predominate. However, the faculty revealed that printers such as dot matrix, inkjet, and laser were less accessible. During the interview, the faculty said that printers usually ran out of ink and replenishment may take three to four weeks. Overall, the ICT

hardware resources are found to be less accessible to the faculty. The choice of instructional activities and on lessons that could be developed and implemented through ICT are limited by the lack of ICT facilities. Thus, according to Garo (2008), to be able to integrate the technology, it is imperative that the teacher knows their uses. Table 5 shows that the top three (3) ICT software tools which are very much accessible by the faculty are word processing, spreadsheets, and presentation software. Faculty members revealed that the university's ICT software was accessible (2.7). However, software resources that were not accessible include the electronic encyclopedia, tutorials, educational games, drill and practice program, video/audio/authorware and simulations.

Table 5: Accessibility of ICT software resources

Software resources	**Mean**	**Interpretation**
1. Word Processing (e.g. MS Word)	4.4	Very Much Accessible
2. Spreadsheets (e.g. MS Excel)	4.2	Very Much Accessible
3. Presentation software (e.g. MS Powerpoint)	4.2	Very Much Accessible
4. Graphics/Animation	3.3	Accessible
5. Database	3.5	Accessible
6. Electronic references on CD ROM	3.3	Accessible
7. Electronic encyclopedia	1.7	Not Accessible
8. Desktop publishing	2.7	Accessible
9. Tutorials	1.0	Not Accessible
10. Educational Games	1.9	Not Accessible
11. Drill and Practice Program	1.6	Not Accessible
12. Video/Audio/Authorware	1.8	Not Accessible
13. Programming Languages	3.9	Much Accessible
14. Statistical and Mathematical Programs	1.8	Less Accessible
15. Simulations	1.2	Not Accessible
Grand Mean	2.7	Accessible

Both internet access and local Area Network (LAN) are rated “Much Accessible” since these network resources are provided to all college offices and faculty rooms excluding the ICT laboratories. This is evidenced by the weighted means of 3.8 and 3.9, respectively. Faculty can access the Internet for a limited time and not exclusively of educational purposes. The Internet access in most cases is shared between administrative and educational use. However, as mentioned by the faculty during casual interviews, the internet speed is very slow especially during class hours where faculty and students go online simultaneously. Bandwidth (or the speed by which data can be transmitted through the network) is a limiting factor. The wireless facility is not accessible by all colleges and department except IT departments. Generally, the findings revealed that the ICT network resources of the university are accessible to facilitate the teaching activities of the faculty.

Table 6: Accessibility of network resources

Devices	Mean	Interpretation
1. Internet Access	3.8	Much Accessible
2. LAN	3.9	Much Accessible
3. Intranet	2.0	Less Accessible
4. Wireless	1.0	Not Accessible
Grand Mean	2.67	Accessible

The extent of technical, academic, and administrative support is one of the key issues for a successful integration of ICT in many schools and universities. Technical support refers to the availability of specialist or trained technical staff to troubleshoot, repair and maintain the school's ICT facilities which ensures optimum performance throughout the school day. Academic support refers to the presence of a school personnel or a faculty coordinator who can provide assistance to the faculty for the effective utilization of the school's available ICT resources and give guidance on how to incorporate these ICT resources into their teaching. This type of support is essential because there are only few teachers who have the know-how to apply ICT in teaching especially on specific subjects. The other type of support is the supervisory support which refers to the help when supervising students which include the availability of working students, aides and assistants during teachers' actual demonstration/presentation, drills and simulation exercises using specialized software, internet/online access and hands-on activity of the students. Table 7 shows the respondents' rating on the extent of support provided by the university. Generally, the extent of support is rated by the faculty as 'Much Accessible' with a weighted mean of 3.2.

Table 7: Respondents' rating on the extent of support in the use of ICT tools

Type of support	Mean	Interpretation
1. Technical Support	3.4	Supported
2. Academic Support	2.5	Less Supported
3. Supervisory Support	3.2	Supported
Grand Mean	3.03	Supported

The technical support was rated “supported” with a mean of 3.4. The faculty revealed that the laboratory supervisors and EDP technical staff are prompt in attending to their request for minor problems such as loose/bad or disconnected cable, printer jam, virus scan, software installation, and hard disks formatting. However, the faculty mentioned that the university has no in-house technician to handle repairs in case of equipment breakdown or failure. As per Property Custodian’s Office, these services are outsourced or repaired somewhere else upon the recommendation of the laboratory supervisors and EDP technical staff. Repairs will take around two to four weeks depending on the gravity of the damage. Sometimes, the purchase of a new unit is recommended for hardware units which are beyond repair. For DLP units, in case of bulb breakdown, the Purchasing Department usually recommends for the purchase of a new unit instead of bulb replacement because the cost of the bulb is more or less the same as the price of a new DLP unit.

Likewise, the respondents revealed that the laboratory supervisors and EDP technical staff are prompt to their request for repairs. They are also found to have the technical skills and expertise which are requisites of the job. However, in an informal conversation with some of the laboratory supervisors and technical staff, they experienced few training opportunities. They are seldom sent to seminars and training especially on latest ICT technology. They acquire their skills through self-study only.

In terms of the academic support, the mean is 2.5 or "less supported." The faculty expressed that they just relied on their colleagues for help in terms of using ICT for instructional purposes. But, at the end of the day, the support they are able to give depends on the quality of their own knowledge and skills. They could not expect as much help as they wanted from their colleagues because they seldom meet due to difference in class schedules. Using ICT would also require ample time for preparation which is difficult considering their heavy teaching loads. Likewise, some faculty articulated that using the computers to teach in the classroom would be difficult without good technical support from the technicians. It seems that teachers were discouraged to use the computer to teach if they had to solve technical problems by themselves.

The supervisors support is rated "supported" evidenced by the mean of 3.2. The university has available working students to assist the faculty in their ICT use. These working scholars are deployed in all the colleges and departments computer laboratories and offices. However, most of the teachers prefer to have working scholars who are knowledgeable and proficient in ICT operations. Overall, the extent of ICT support in the use of ICT tools is rated as "supported." Thus, there is a substantial teacher support which is essential to the decision to ICT adoption according to Rogers' theory.

Support from the top is an essential component of ICT development. Faculty are often challenged in terms of resource provision and access to technical and educational support. The faculty clamors for a fair and equal opportunities for training and support in a form of in-school technicians or a designated individual to guide them in using ICT resources where appropriate. A supportive environment which encourages teachers to see ICT as an integral tool for instruction is imperative as any training initiative.

An employee's educational background is not a sufficient index of his skill and efficiency in a particular job or task. Thus, training and seminars in one form or another is a must in any firm or organization. Though considered intangible, the benefits of training and seminar can be measured in terms of skills, efficiency, and productivity of the employees or the teachers to be specific. It is one of the most effective tools in the educational institution to bring out the best of the teachers. Meanwhile, Schwach (2004) and Demetriadiset (2003) argued that the effective use of technology in the classroom is not only limited to the teachers' perception on how to use technology in class but also through professional development for teachers. Their study indicates that training is needed in order for teachers to be able to integrate ICT in their classroom practice.

Table 8: Seminars, training and staff development activities related to ICT for the last 3 years (n=221; multiple responses)

Seminars, training and staff development	**f**	**%**
1. Integrate ICT in instructional activities.	31	14.0
2. Use internet or other online services.	70	31.7
3. Use course management services.	11	5.0
4. Create multimedia presentation.	26	11.8
5. Create web pages.	22	10.8
6. Create charts, graphs and drawings.	44	19.9
7. Connect skills instruction with real world.	7	3.2
8. Improve students' critical thinking.	12	5.4

The data collected on ICT-related training, seminars and staff development revealed the scarcity of professional development opportunities. For example, 105 out of 221 respondents or 47.5%, have not attended a seminar or training on ICT over the last three years. The other respondents attended seminars such as how to use internet or other online services (31.7%), how to create charts, graphs, and drawings (19.9%), and how to integrate ICT into instructional activities (14.0%). This is a clear indication that the members of the faculty of the university have less opportunity to participate seminars and training related to ICT. According to Newstrom (2007), training and seminars for specific skills and for building a stable and component teaching force is a program designed by the management to achieve the objectives such as productivity, effectiveness on the present job or task, qualification for a better job and morale booster. The teachers believed that the lack of computer skills prevented them from using ICT in teaching. During informal interviews, the teachers articulated the need for more training programs on ICT operations. Thus, training should be made an integral part of professional development. It is significant that ICT usage in classroom should be more widespread, and faculty members should be supported both technically and educationally and the process should be institutionalized via framework of the policies and strategies. One of the keys to effective implementation of ICT in teaching lies in skills and knowledge of the faculty in the use of ICT. It is clear that the majority of the faculty have not received from the university ICT-related training to enhance their technical skills. There is a need to develop teachers' confidence in using ICT as a necessary pre-requisite to exploring more effective ways of integrating ICT in the classroom.

Technology can play various instructional roles and it is the responsibility of the instructors to decide how to best use technology to support student learning. Having a complete infrastructure of the ICT will go meaningless if it is not utilized to the fullest capacity. According to Dawam et al., the professional view on ICT usage in classroom among educators relies heavily on the extensiveness of computer resource availability at their premise. ICT is a valuable instructional tool and by utilizing it in their preparation for teaching materials and in class teaching will enhance their professional development. They also agreed that utilizing ICT in the curriculum will boost their confidence as a competent educator. Furthermore, they also believe that it will promote their development of communication skills in writing and presentation. However, past researches had indicated that in general that level of ICT use in teaching and learning among teachers was low.

Furthermore, Tinio (2002) pointed out that ICT use in some of the schools has also not been formalized. Only 76 of the schools have a written policy or statement regarding the use of computers and/or the internet. In most cases these written policies focus on present and future use of the computers, staff development, and the assignment of computer-related tasks, less so on hardware and software-related issues or on the issue of "equity of access," i.e., ensuring equal access to all students and staff. In table 9, the respondents were asked to indicate their frequency of use for each type of seventeen (17) types of ICT hardware resources listed.

Table 9: Frequency of usage of ICT hardware resources

ICT hardware resources	**Mean**	**Interpretation**
1. Desktop computer	3.8	Weekly
2. Laptop computer	2.2	Semestral
3. Overhead projector	3.0	Monthly
4. CD ROM/DVD Player	2.9	Monthly
5. Digital Camera	2.2	Semestral
6. Digital Scanner	1.8	Semestral
7. Cable Televesion Access	2.4	Semestral
8. Dot Matrix printer	1.9	Semestral
9. Inkjet printer	3.2	Monthly
10. Laser	3.1	Monthly
11. Plotter	1.0	Yearly
12. CD/DVD Writer	2.2	Semestral
13. Multimedia LCD/DLP projector	2.7	Monthly
14. Sound system e.g. speaker	1.9	Semestral
15. Floppy disks	1.9	Semestral
16. Flash memory	3.0	Monthly
17. Optical disks CD/DVD	1.9	Semestral
Grand Mean	**2.48**	**Semestral**

As reflected in the above table, the majority of the faculty of the university are using desktop computers on a weekly basis evidenced by the mean of 3.8. However, according to the faculty interviewed, most of the computers available for their use cannot support a number of latest multimedia applications. These computers do not have CD ROM, drives and sound cards. The least utilized ICT hardware resources are digital scanner, dot matrix printer, sound system, floppy disks and optical disks.

Notably, sixty two (62) or 28.1% out of 221 faculty were using desktop computer on a daily basis and 86 or 38.9% are using desktop computer on a weekly basis. Only a few or 2 out of 221 never used a desktop computer. However, 81 or 36.7% of the faculty, have never used a laptop computer. Per interview, the number of laptop computers issued to departments is not sufficient for their use. The faculty would like to own a personal laptop so that they would not be so dependent on the university resources. They are

hoping that management would come up with a laptop loan with an easy payment scheme through salary deductions.

Moreover, only 9.8% of the faculty are utilizing multimedia LCD/DLP projectors on a weekly basis. This is consistent with the Keong's research finding that teachers used LCD projectors for infrequently or only 29 hours over the duration of two years. School administrators should encourage teachers to enhance teaching (2005). In general, the faculty of the university are using ICT hardware resources on a semestral basis as supported by the grand mean of 2.48.

The respondents were asked to indicate their frequency of use for each of the fourteen (14) types of software application listed. Their responses were scored as follows: daily = 5, weekly = 4, monthly = 3, semestral = 2, and yearly = 1. Table 10 shows the types of application that are present in the university and the frequency of use of these different types of software applications.

Table 10: Respondents' frequency of usage of software resources

Software resources	**Mean**	**Interpretation**
1. Word Processing (e.g. MS Word)	3.7	Weekly
2. Spreadsheet (e.g. MS Excel)	2.8	Monthly
3. Presentation Software (e.g. MS Powerpoint)	2.9	Monthly
4. Graphics/Animation	1.9	Semestral
5. Database	1.4	Yearly
6. Electronic References on CD ROM	2.3	Semestral
7. Desktop Publishing	1.1	Yearly
8. Tutorials	1.7	Yearly
9. Educational Games	1.9	Semestral
10. Drill and Practice Program	1.4	Yearly
11. Video/Audio/Authorware	1.5	Yearly
12. Programming Languages	1.3	Yearly
13. Statistical and Mathematical programs	1.0	Yearly
14. Simulations	1.0	Yearly
Grand Mean	**1.85**	**Semestral**

As shown on the above table, among the software resources, word processing is the most utilized software application as evidenced by fifty-five (55) out of 221 faculty or 25.2% who are using it on a daily basis, ninety-eight (98) or 45.2% on a weekly basis and thirty-seven (37) or 17% on a monthly basis. This is followed by spreadsheet with sixty-two (62) out of 210 or 29.5% who are using it on a monthly basis. Sixty-three (63) out of 210 or 30.2% of the faculty are using presentation software on a monthly basis. Only about 10% of the faculty have never used spreadsheet and presentation software.

This is consistent with a study done by Chong et al. (2005) that showed most of the educators use word processing, spreadsheets, and search engines.

The least utilized software applications are desktop publishing (50.5%), database (49.5%) and statistical and mathematical programs (47.7%). Results of the interview conducted to the faculty revealed that the respondents are less familiar with these types of software and their uses. This implies that ICT tools are rarely utilized as constructive tool for the construction and facilitation of higher-order thinking skills based on Lim and Tay (2003) theory. In addition, this finding supported a study which was conducted by Castillo (2005) that showed majority of the educators do not use new opportunities that are available in ICT such as graphic animation, multimedia and some authoring applications in teaching activities. Similarly, the respondents seldom use other ICT opportunities such as multimedia and graphic animation in teaching. In general, the faculty members of the university are using word processing (3.7) on a weekly basis, and spreadsheet (2.8) and presentation software (2.9) on a monthly basis. On the average, the faculty use ICT software resources on a semestral basis. The findings show that applications available are predominantly office programs thus faculty are limited to "teaching ICT tools" rather than "teaching with ICT." There is relatively a dearth of variety of subject-specific application types which will fully and effectively realize the ICT integration in the curriculum.

Connectivity is an added value to the University ICT resources. This allows that teachers and students to communicate and access online resources. Internet access is an important facility to enrich the teaching and learning process. Table 11 shows the frequency of use of the different available network resources. Among the four (4) network resources, the internet is the most utilized as evidence by seventy-nine (79) out of 219 or 36.2% of the faculty are using it on a weekly basis. As mentioned by the faculty, they used the internet for various purposes such as browsing, e-mail, chat, discussion forums and other purposes. This implies that the majority of the faculty of the university utilized ICT as an informative tool through the use of the internet to access global information, however, about 40% of the faculty never used wireless and internet access. This is due to low internet speed access shared by all the users of the university. Moreover, not all areas in the university are WIFI-enabled. The respondents hope that the university's internet facilities or infrastructure be improved to realize its usefulness thoroughly. Generally, the faculty are using the ICT network resources on a monthly basis, evidenced by the grand mean of 2.5.

Table 11: Respondents' frequency of usage of network resources

Network Resources	**Mean**	**Interpretation**
1. Internet Access	3.4	Weekly
2. LAN	2.3	Semestral
3. Internet	2.5	Semestral
4. Wireless	1.8	Yearly
Grand Mean	**2.5**	**Monthly**

As revealed in Table 12, the faculty members make use of ICT most in creating and updating syllabus (81.9%), searching educational resources or course materials (80.5%), communicating with students

and/or parents (77.4%), recording and calculating grades (74.7%), and creating presentation (72.4%). The university has conducted several teachers training on word processing, presentation and basic internet operations. This explains the proliferation of the use of ICT tools in these teaching activities. However, there is less utilization of ICT tools in activities such as keeping track of students' learning progress (3.2%), administering examination (6.8), developing activities that imply research (15.4), developing activities that imply problem solving (19.6%), and developing drill and practice exercises (22.1%). This implies that the university should come up with advanced ICT training to beef-up utilization of ICT tools in these areas. Furthermore, the university should develop policies to enhance the utilization of ICT in instruction and to provide technical and educational support to the faculty.

Table 12: Instructional activities performed using ICT tools

Instructional Activities	**f**	%
1. Creating and updating lesson plans, syllabus, and other teaching aids.	181	81.9
2. Searching educational resources or course materials.	178	80.5
3. Creating presentation, integrating text and sound, video and animation.	160	72.4
4. Creating charts, graphs, and drawings for use in lesson.	130	44.0
5. Developing activities that imply problem-solving.	34	15.4
6. Exchanging ideas with peer/subject matter experts.	131	59.3
7. Sharing course materials among teachers within school and/or with other schools.	118	53.4
8. Developing activities that imply research.	43	19.6
9. Communicating with students and/or parents.	171	77.4
10. Developing drill practice exercises.	49	22.1
11. Post student work, suggestion for resources, ideas and opinions.	117	53
12. Administering examination.	15	6.8
13. Recording and calculating students' grades.	165	74.7
14. Keeping track of students' learning progress.	7	3.2

Table 13 shows the respondents obstacles to their use of ICT tools for instructional purposes.

Table 13: Problems in using ICT tools in instruction

Problems	**f**	**%**
1. Insufficient number of ICT hardware (computers and peripheral).	195	88.2
2. Not enough training opportunities.	207	93.7
3. Lack knowledge and skills in using ICT for instructional purposes.	183	82.8
4. No time in teachers' schedules to explore opportunities for using computers/internet.	165	74.7
5. Not enough copies of software for educational use.	179	81
6. Insufficient time for teachers to prepare lessons in which ICT are used.	188	85.1
7. ICT resources are not accessible.	156	70.6
8. Absence of/or outdated school network/LAN.	150	67.9
9. Problems in scheduling enough ICT time for different classes.	168	76
10. Not enough types/variety of software.	150	67.9
11. Software too complicated for teachers' use.	138	62.4
12. Teachers feel uncomfortable because some students are more competent in ICT.	124	56.1
13. Others: No budget in acquiring laptop to be used in the delivery and effectiveness of instruction.	3	1.4

The top three (3) problems to using ICT for instructional purposes identified by the faculty are not enough training opportunities (93.7%), insufficient number of ICT hardware-computers and peripherals (88.2%), and insufficient time for teachers to prepare lessons in which ICT are used (85.1%). The result is consistent with Zara-ee (2011) findings that limited resources, insufficient skill, and lack of initial time for preparation are among the most serious problems faced by the English department faculty. The lack of ICT facilities limited the choice of topics that could be developed into a lesson, and, consequently it also restricted the level of ICT implementation, which is the fourth stage according to Rogers' theory.

As suggested by the faculty of the university, in order to improve their knowledge and skills in ICT, ICT training should be made part of the yearly in-service training program of the university since not all faculty have the opportunity to be sent to off-campus training/seminars. Furthermore, in an unstructured interview, some faculty members revealed that they do not have enough time to use the computer since most of their vacant periods are spent on checking and recording of test papers. One of the teachers shared that he had to reserve the PC or laptop with DLP projector at least about a week ahead if he wanted to use these tools for visual presentation purposes.

Many teachers are discouraged from using the internet due to low internet speed, hardware failure, difficulties in making arrangements and seeking permission to use the tools, which tempts them to prefer traditional lecturing. Another respondent pointed out that most of the senior faculty are unwilling to adopt ICT use and that working students are not always available to help them.

The results further revealed that the lack of ICT facilities specifically those which will support multimedia applications limited seriously the choice of topics that could be developed into a lesson and, consequently, it also restricted the level of ICT application in teaching. The lack of ICT skills prevented the faculty for using ICT in teaching. The training opportunities were not sufficient to enable faculty to use ICT in actual teaching and/or the content of the training programs has to be more responsive to specific pedagogical needs.

7. **Conclusion**

In conclusion, the faculty of the university found it essential to integrate Information and Communications Technology tools for instructional purposes. But the faculty had limited ICT. Thus, to promote the integration of these tools in the instructional program of the university, there is a need to enhance the competencies of the faculty in the use of ICT tools in instruction, provide adequate infrastructure facilities, provide on-going support from administration, and increase the frequency of utilization and activities.

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