

Access Instruction to Digital Edge (AIDE): Technology Resources and Keying its Adoption to Teaching

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Abstract

Institution of learning encompassing pool of individuals, who are considered as spring of knowledge-the teachers; and knowledge catching vessel-the students, were the main respondents of the study. Frequencies, percentages, ranks and weighted means were used for the descriptive data, while the Pearson Product Moment Correlation was used to determine the significant relationship between the level of technology adoption of faculty and their profile variables and attitudes towards technology use in teaching. A total of two hundred sixty-six (266) faculty and three hundred ninety-five (395) students were involved. Findings revealed that the university invested huge amount for educational technology use, but there's little of evidence in ICT adoption and use in instruction. ICT characteristics of faculty presented that there's a need for them to be aware of their attitude toward ICT integration in their teaching because it is fundamental for it can make education logical, efficient, effective and interesting. Also, training on designing instructional material should be extended to them specifically workshops on word processing for their syllabi, assessment paper, reports, spreadsheet application, presentation design which is necessary during their research presentation, desktop publishing, internet technology, adobe photoshop and trouble shooting. For an avenue to effectively use technology in instruction daily activity of faculty, the university extension department in collaboration with the knowledge technology management should design then, a program that would assess the technology training needs of faculty to give way for the development of a regular training activity to non-IT faculty.

Keywords: adoption; AIDE; digital divide; knowledge technology management; technology resources.

1. Introduction

With the many challenges brought about by so-called digital divide in the educational system, school administrators should consider to invest ICT gadgets, solely for instruction purposes which may lead to an interactive teaching and learning process. Technology adoption in instruction bridges the digital gap existing in higher education nowadays. The need for transforming traditional classroom to digital one, addresses academic lags among institution of learning.

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Local classrooms were now transformed into so-called global classroom because of the use of internet serving as information cloud and is greatly contributory to acquisition of learning and efficient teaching. In a national study of the effects and consequences of internet usage in schools with career and technical education programs [1], they concluded that internet was a transformative agent that heightened teachers' professional development opportunities, equalized student opportunities, changed learning, altered social status, and modified teaching-learning systems. But having these ideal points could only be achieved by means of acquiring educational related ICT resources that will be used in instruction and that administration has the greatest responsibility to devote amount for the purchase of these resources. It is a living fact that technology integration to the academe is paramount in the delivery of quality instruction specifically the use of computers because it revolutionized traditional teaching method. But along the way, lot of difficulties were encountered on its integration into teaching and learning process because of its convolution. These difficulties are identified as "barriers" [2]. The need for faculty to be literate in the use of computers in their mode of teaching in the classroom, even addresses the challenge of the 21st century. With the advent of powerful devices, that may be used to enhance the way teaching and learning be executed, numerous factors should be taken into consideration and should be attended to in the fulfillment of the successful attainment of education for the learner and teaching for the faculty. Learning success by all learners may be attributed with the teaching performance and ingenuity of faculty which includes using visual presentations in their delivery of instruction and to mention various technology devices were important tools that need to be taken into account. An awareness to undergo innovation and decision to adopt or discard technology in teaching by faculty who are considered spring of knowledge is staple in the success of every learner. It has been recommended that teacher groundwork should focus on specific types of technology use by novice teachers, such as the practices for using various technologies to support and enrich various aspects of teaching and learning [3]. For a faculty to successfully model and use instructional technologies, hands-on technology training should be made available. Faculty having been experienced on the use of technology like internet where considered to be a vast repository of knowledge can easily acquire learning on their own for the good of the learners. It is a living reality that through computers if and only if one is capable of using it, she/he can be able to access any information needed. Technologies can play a role in student skills, motivation and knowledge and this is according to [4]. Acquisition of learning through technology with the use of computer really leads to advancement for computers development is unpredictable. The yet to come becomes less like the past. And less like we anticipated it to be. We discern that A might lead to E, then on to K and precipitously to Z! This insight calls for an absolutely new way of looking at the future in our organizations, in our societies and in our schools, says [5]. This simply exudes that with computers we expect for an amazing advancement which will lead to everybody's fast attainment of learning that can be used for futures success which will contribute to one's life progress. Ideally, the learning environment called classrooms should be equipped and installed with technology for the use of faculty and students. However, internet access and computer availability are still lacking in the provision of equipment that will enhance the mode of teaching and delivery of instruction, hence, this remains a major concern to be addressed by higher education institutions like Isabela State University. Non-ICT faculty should also be encouraged to embrace technology usage because they will be left behind if they won't. The reality is that, some faculty are no longer taking initiative to use it because for them they have been used to just discuss their lessons using their reference books, chalk, board and let students photocopy the pages of books where their lessons are found. Also, the older

faculty members and those nearing their retirement believed that there is no need to learn or use technology in their work life as teachers. To some extent, it is observed that inadequate school support to ICT and technology usage contributes to technology adoption level of the faculty. While ICT use is not a panacea, but only a tool in the acquisition of learning, school administrators can really make a big difference in attaining success and progress in education if they give priority to ICT acquisition and formulate a policy that will educate faculty in integrating technology in their teaching through providing them technology related trainings. In this way, each of them will be educated as to how technologies greatly help them in making their chosen vocation a joy for every learner. Present scenarios within the university specifically in the field of instruction at this time is that, majority of the faculty do not possess the so-called digital literacies that they are expected to have. Reasons are because of they lack trainings on technology, reluctance because some believed that old ways of imparting learning is still effective than the use of hybrid learning. Also, resources of the university cannot really suffice the need for a digital learning environment. For faculty to be able to have ICT tool to be used in teaching they should have a schedule base on the availability of gadget. If someone is using it, others may be deprived to integrate technology in their teaching. To mention, hardware and software are very few if not, no installed digital device in a classroom that leads for faculty to have no chance to use technology in their teaching. Purchased gadget most of the times were not intended for teaching also. An example of this is the Liquid Crystal Displays Projector. As a matter of fact, the use of blackboard and chalks, photocopied pages of books, reporting through reading photocopied materials, students copying what was written on the board is still observed in instruction within the university. The old ways that is students' amount of learning to be acquired in a certain topic is dependent unto what came out from the lips of their teacher. Why? It is because no digital devices found inside the classroom which can be utilized. There's no even internet connection which is the most important medium to acquire learning today. The administration might be unaware to all these events because they themselves are not conscious how indispensable technology is in the academic setting. With the cited current scenarios, the university is presently having, a policy to strengthen the provision of digital resources in the university should be taken into account. Also, the Information and Communication Technology department should propose a training design for faculty who needs to be trained on digital literacy to produce an ideal teacher inside the classroom. Meaning a teacher that can abreast to the 21st century skill and who is competent to gather and collect data via cloud to impart to his/her students.

1.1. Purpose of the Study

Main purpose of the study was on investigation on the functional technology resources of the university, ICT trainings attended and adoption level of the faculty, the drive including barriers in using technology, their attitudes towards technology use, improve, bring enlightenment and advancement to the teaching strategy especially for the administration to give full attention on the technology needs of the institution which may lead to a decision support system in crafting policies regarding ICT as playing an important role in higher education.

1.2. Research Questions

1. What are the technology resources and status of the different campuses in terms of hardware and software possession, including faculty ICT characteristics?

2. What is the technology adoption level of faculty?
3. How do faculty-respondents assess their attitudes towards technology use in teaching?
4. What is the level of technology adoption of the faculty in terms of extent of use of social networking; audio-visual presentation in classrooms
5. What is the support provided to faculty by the university administration towards technology adoption as assessed by the faculty as to Computer Experience; ICT Related Training/Courses Taken; Purpose of Technology Usage?

2. Methodology

The study may be described as following a correlational design since a large number of faculty were surveyed, interviewed and observed in their teaching with regards to their attitude and the use of computer, with an aim of looking at how different variables affect each other. A structured questionnaire was developed as the principal data gathering instrument. It composed of parts asking the respondents computer-related trainings attended, extent of using social networking sites, technology gadgets they own, etc. Also a survey questionnaire originally developed by [6] which includes sections on levels of instructional computer use and expertise, barriers to computer access, and computer support was used to examine the technology adoption level of the faculty teaching in the university. The correlational design was used to determine the relationship between the technology adoption level of faculty and their profile variables and attitudes towards technology use in teaching and also the relationship between attitudes towards technology use in teaching and level of technology adoption. For the test of relationships Pearsons' Product Moment Correlation was used to determine the significant interrelationship among attitude, extent of use, perceived barriers to computer used, level of support computer to computer use and the frequency of using technology in teaching.

3. Results and Discussion

A variety of technology devices were being purchased by the university. These were received by each department heads meaning they are held liable with it. Despite of the many acquired ICT resources, its use is not observed in instruction. The university invested huge amount for educational technology use but there's a little of evidence in ICT adoption and use in teaching and learning in the university. It is because these bought devices were not intended for faculty use in their teaching. This led not in support with the findings of [7], stating that "access to ICT infrastructure and resources in schools is a necessary condition to the integration of ICT in education, [8], access to technological resources is one of the effective ways to teachers' pedagogical use of ICT in teaching, [9], access to hardware and software is not only important, but also the use of suitable kind of tools and program to support teaching and learning. As to educational software and gadgets owned by the faculty, the data on table 1 below shows that laptop ranked no. 1, followed by iphones/android phones, printers, speakers, e-books, desktop, scanner and least is tablets. This means that faculty in the university is determined to be competitive in addressing global progress in education and that addresses also the digital gap in education and this will only be realized by the faculty if they own or use ICT gadgets intended for integrating technology used in the classroom.

Table 1: Educational software and gadgets owned by the faculty

Gadgets	Frequency	Rank
e-books	76	5
Desktop	70	6
Laptop	192	1
Scanner	61	7
Printer	102	3
Speaker	84	4
iphones/android phones	135	2
Tablet	3	8

Findings unto what adapter category the university faculty belong is shown in the table below. It is good to know that most faculty fit in the innovator category having 23.3%. Meaning, faculty were venturesome to take new ideas or strategies of experiencing teaching in modern ways.

Table 2: Adopter Category

Adapters	Frequency	Percent
Innovator	62	23.3
Early Adopter	59	22.2
Early Majority	59	22.2
Late Majority	18	6.8
Laggard	9	3.4
No response	59	22.2

The faculty members have several reasons for using the computer. Table 3 shows that and they use the technology based from the table, result showed that surfing the internet (86.8%), Electronic mail (85.3%), typing and maintaining files (84.2%), and making videos and PowerPoint presentations (79.7%) are the primary uses of computer technology by the teacher.

Table 3: Purpose and its frequency of using computer technology

Purpose	Percentage of Faculty Involved	Frequency of Use Weighted Mean	Description
Electronic mail (email)	85.3	2.89	Often
Chat rooms	68.0	2.66	Often
Games	73.3	2.31	Sometimes
Surfing the internet	86.8	3.20	Often
Online shopping	54.1	1.94	Sometimes
Entertainment	70.3	2.63	Often
Materials design	51.1	2.88	Often
Web page design	36.1	2.13	Sometimes
Typing and maintaining files	84.2	3.29	Always
Banking	43.2	1.90	Sometimes
Making videos and presentations (PowerPoint)	79.7	3.18	Often
Downloading	71.4	3.13	Often
Overall Weighted Mean		2.68	Often

Legend:

1.00 – 1.75	Rarely
1.76 – 2.50	Sometimes
2.51 – 3.25	Often
3.26 – 4.00	Always

Table 4 revealing the overall mean of 2.72 implies that the faculty used computer for instructional purpose only, even if they have low expertise along the use of computer. This is because their preparation as teachers who played a crucial role in the educational attainment of students with the use of technology appears to be a key component in almost every improvement plan for education and educational efforts [10,11,12]. Faculty should use instructional technology to help their students achieve curricular objectives [13].

Table 4: Level of Instructional Computer Use and Expertise

Skill	Weighted Mean	Description
Word Processing	3.82	Almost every time
Web Browser	3.24	Occasionally/Sometimes
Desktop Publishing	2.27	Almost Never
Spreadsheets	3.08	Occasionally/Sometimes
Virtual Learning Environments	2.28	Almost Never
3D Graphics	1.93	Almost Never
Animation	2.09	Almost Never
Digital Photography	2.08	Almost Never
Video Editing	1.97	Almost Never
Games	2.74	Occasionally/Sometimes
Electronic mail (email)	3.40	Almost every time
Chat rooms	2.93	Occasionally/Sometimes
Surfing the internet	3.69	Almost every time
Instruction (LCD projector)	3.56	Almost every time
FTP (upload/download files)	3.14	Occasionally/Sometimes
Entertainment	2.92	Occasionally/Sometimes
Databases	2.36	Almost Never
Simulations	1.97	Almost Never
Drafting, CAD	1.70	Never Use
Toolbook	1.68	Never Use
Web page design	1.83	Almost Never
Typing and maintaining files	3.61	Almost every time
Research Making	3.55	Almost every time
Making videos and presentations (PowerPoint)	3.54	Almost every time
Overall Weighted Mean	2.72	Occasionally/Sometimes

Legend:

1.00 – 1.79	Never Use
1.80 – 2.59	Almost Never
2.60 – 3.39	Occasionally/Sometimes

3.40 – 4.19 Almost every time

4.20 – 5.00 Frequently use

As shown in Table 5, there was a high support extended to the faculty as evidenced by their response. Findings reveal that the mean of 4.02 which is Agree implies that there is a high level of support of computer use for the faculty-respondents. It is again proven that whole support on access to ICT infrastructure and resources in schools is a necessary condition to the integration of ICT in education [14].

Table 5: Level of support of computer use

<i>Support</i>	<i>Weighted Mean</i>	<i>Description</i>
Maintenance for computer related equipment, software, etc.	4.06	Agree
Encouragement from administration to use computers.	4.12	Agree
Technical assistance for operating and maintaining computers.	3.98	Agree
Expertise (technology-coordinator) to help developing and adjusting software to the curricular needs.	4.00	Agree
Opportunities to discuss computer-related topics with colleagues and exchange ideas about ways of using computers in teaching-learning.	3.99	Agree
Enough time to plan and integrate computer use in your curriculum.	3.97	Agree
Sharing Information and Ideas about Computer Use among Colleagues.	4.04	Agree
Hardware and Software Updates, and Technical Support from Colleagues.	4.00	Agree
Support for Consistent Hardware and Software, and Updates from Administration.	4.00	Agree
Timely Technical Support and Maintenance of Computers from Administration.	3.99	Agree
Workshops and Training on Computer Use from Administration.	4.02	Agree
One-on-one Assistance from an IT Expert in Computer Use.	3.92	Agree
Overall Weighted Mean	4.01	Agree

Legend:

1.00 – 1.79 Strongly Disagree

1.80 – 2.59 Disagree

2.60 – 3.39 Neutral

3.40 – 4.19 Agree

4.20 – 5.00 Strongly Agree

Table 6 overall mean of 3.39 means that faculty members generally agree on the different barriers affecting their computer use. As gleaned from the data, faculty agreed on barriers pertaining to internet connection provision and accessibility, license software, lack of training on existing computers and software, insufficient computer to be used in the classroom, lack of appropriate instructional software, lack of technical support, and lack of time

for instructional computer use.

Table 6: Perceived Barriers to Computer Use

Barriers	Weighted Mean	Description
Lack of Support for Computer Integration into Curriculum.	3.29	Neutral
Lack of Training on Existing Computers and Software.	3.92	Agree
Lack of Appropriate Instructional Software.	3.78	Agree
Lack of Technical Support.	3.55	Agree
Lack of Time for Instructional Computer Use	3.52	Agree
No computers in the office.	2.93	Neutral
Computers were not intended for instruction.	3.31	Neutral
No interest in using computer.	2.37	Disagree
Not enough computers utilized in the classroom.	3.84	Agree
Outdated/incompatible Computers.	3.32	Neutral
Outdated/incompatible Software.	3.33	Neutral
Internet is not Easily Accessible.	4.00	Agree
No internet connection.	3.87	Agree
No licensed software.	3.80	Agree
Overall Weighted Mean	3.49	Agree

Legend

1.00 – 1.79	Strongly Disagree
1.80 – 2.59	Disagree
2.60 – 3.39	Neutral
3.40 – 4.19	Agree
4.20 – 5.00	Strongly Agree

Table 7 overall mean of 3.16 with a descriptive rating of neutral implies that faculty of the Isabela State University showed their being undetermined if they are capable of using computer in their teaching. This exemplifies the lack of confidence within their selves. It may also because of their educational experience in using computer.

Table 7: Attitude towards computer use

Attitude Statements	Weighted Mean	Description
If given the opportunity to use a computer, I am afraid that I might damage it in some way.	2.28	Disagree
I will use computers regularly throughout school.	3.64	Agree
I could probably teach myself most of the things I need to know about computers.	3.56	Agree
I hesitate to use computers for fear of making mistakes I can't correct.	2.40	Disagree
I only use computers at school when I am told to.	2.28	Disagree
I can make the computer do what I want it to.	3.06	Neutral
I don't feel uneasy about using a computer.	3.08	Neutral
I avoid coming into contact with computers in school.	2.24	Disagree
Computers make me feel uncomfortable.	2.18	Disagree
I would avoid taking a job if I knew it involved working with computers.	2.15	Disagree
If I get problems using the computer, I can usually solve them one way or the other.	3.03	Neutral
Using a computer does not scare me at all.	3.89	Agree
I do not need someone to tell me the best way to use a computer.	3.02	Neutral
I hesitate to use a computer in case I look stupid.	2.41	Disagree
I need an experienced person nearby when I use a computer.	2.88	Neutral
Computers help me improve my work better.	4.24	Strongly Agree
I am not in complete control when I use a computer.	2.90	Disagree
Computers make it possible to work more productively.	4.19	Agree
It is not interesting to solve problems using computers.	2.56	Disagree
Computers can enhance the presentation of my work to a degree which justifies the extra effort.	4.22	Strongly Agree
Computers can allow me to do more interesting and imaginative work.	4.25	Strongly Agree
I would work harder if I could use computer more frequently	3.89	Agree
I can learn more in using computer than in reading books	3.72	Agree
Working with computers makes me feel bad.	2.25	Disagree
Social networks like twitter and facebook is the reason why I use computers.	2.29	Disagree
I love discussing my lesson when I use computer.	3.89	Agree
Computers boost my interest in teaching new lessons.	3.99	Agree
I can easily visualize the concepts in my mind when it is presented using the computer.	4.00	Agree
I feel that the use of computers in presenting the lesson is not advantageous in my learning.	2.20	Disagree
I believe that computers help me teach better.	4.12	Agree
Overall Weighted Mean	3.16	Neutral

Legend:

1.00 – 1.79	Strongly Disagree
1.80 – 2.59	Disagree
2.60 – 3.39	Neutral
3.40 – 4.19	Agree

4.20 – 5.00 Strongly Agree

Table 8 below obviously revealed the summary of statistical findings from the responses of all faculty respondents. In terms of faculty computer expertise, the computed value of the correlation is 0.453 at .01 level of significance which indicates that there is a significant relationship between faculty expertise in using computer and their level of technology adoption. This implies that the more experience the faculty has in using computer the greater is the chance of having high computer technology adoption. The test of correlation between the attitude of faculty toward using technology in teaching and level of adoption is also presented in table 13. As revealed by the computed correlation coefficient r value which is 0.043 with 0.486 probabilities, data revealed that there is no significant relationship between the attitudes of ISU faculty toward technology use and level of adoption of computer technology. In the same manner there is no significant relationship between the level of support to computer use of the faculty respondents and their level of adoption of computer technology as a result of the correlation coefficient value of -0.017 with 0.782 probabilities. In terms of faculty performance rating which is shown by the computed correlation coefficient value of 0.768 with probability of 0.000. This indicates that there is a significant relationship between the faculty performance rating and the level of computer technology adoption. This finding implies that the greater is the computer technology adoption level, the higher is the faculty performance rating. For the perceived behavior of the faculty to computer use, the computed correlation coefficient value is 0.225, with the probability of 0.000 could mean that there is a significant relationship between the level of adoption of computer technology and the perceived behavior of ISU faculty towards the use of computer. This implies that the level of computer technology adoption becomes stronger when the perceived behavior toward computer use increases. With regards to the frequency of using technology in teaching, the computed correlation coefficient is 0.783 with 0.000 probability shows that there is a significant relationship when the adoption level of computer technology and frequency of using technology in teaching. This implies that the higher the level of adoption level of computer technology the greater is the frequency of faculty use in computer technology in teaching.

All findings imply that school administration should provide faculty with a lot of opportunities to use computer so their attitude with regards to adopting technology in teaching becomes more positive. A positive attitude towards computer use will definitely help faculty to abreast the challenging approaches of the education system at the moment. If faculty is efficient in using technology in classroom it will lead to prepare students in the outside world and that computer efficacy is important. But only a faculty is efficient if he/she has much experience. According to [15], teachers with more experience with computers have greater confidence in their ability to use them effectively. To conclude [16] reported that faculty competence relate directly to confidence. Faculty confidence also related to their perceptions of their ability to use computers in the classroom, particularly in relation to their students' perceived competence. Attitude of faculty towards technology greatly influence their adoption and integration of computers into their teaching. Their attitudes even influence their acceptance of the usefulness of technology to be integrated into teaching [17].

df = 265

Table 8: Relationship Between Level of Adoption of Computer Technology and Selected Variables

Variables	Correlation Coefficient	Probability	Statistical Inference
Age	-0.502	0.000	Significant at 0.01
Sex	-0.134	0.029	Significant at 0.05
Civil Status	-0.251	0.000	Significant at 0.01
Ethnicity	0.008	0.895	Not significant
Computer Hours Spent	0.532	0.000	Significant at 0.01
Highest Educational Degree	-0.090	0.146	Not significant
Number of years in the Service	-0.324	0.000	Significant at 0.01
Academic Rank	-0.174	0.005	Significant at 0.01
Computer Experience	0.453	0.000	Significant at 0.01
Attitude towards Technology Use in teaching	0.043	0.486	Not significant
Extent of Use of Social Networking	0.635	0.000	Significant at 0.01
Performance Rating	0.768	0.000	Significant at 0.01
Perceived Barriers to Computer Use	-0.225	0.000	Significant at 0.01
Level of Support to Computer Use	-0.017	0.782	Not significant
Frequency of using Technology in Teaching	0.783	0.000	Significant at 0.01

4. Summary

This study determined the technology resources, technology adoption level of faculty and its relationship to teaching performance of the faculty as evaluated by the learners in their teaching when using technology in delivering instruction of Isabela State University. Specifically, the study determined the technology resources of the different campuses, the profile of faculty respondents and their ICT characteristics and the attitudes of faculty towards technology use in teaching. Moreover, the study looked into the level of technology adoption of the faculty, and the relationship between the level of technology adoption of faculty and their profile variables, attitudes towards technology use in teaching and teaching performance. The study was conducted in the four mother cluster campuses of the university, namely; Cabagan, Ilagan, Cauayan and Echague. A total of two hundred sixty-six (266) faculty and three hundred ninety-five (395) students were involved as respondents. Frequencies, percentages, ranks and weighted means were used for the descriptive data, while the Pearson Product Moment Correlation was used to determine the significant relationship between the level of technology adoption of faculty and their profile variables, attitudes towards technology use in teaching and teaching performance.

5. Conclusions

From the above findings, the study concludes that faculty members of Isabela State University have access to technological resources because the University regularly purchase and provide for these resources for use in teaching and administrative work. The faculty members personally own educational software and gadgets for internet surfing, electronic mailing, typing and maintaining of files and for making videos and powerpoint presentations for classroom teaching. Finally, age, sex, civil status, hours spent on computer, number of years in service, academic rank, computer experience, extent of use of social networking and teaching performance are significantly related to level of technology adoption of the faculty.

6. Recommendations

In the light of the findings and conclusions, the administration should purchase laptops or computer set, and LCD projectors or LED television to be installed per classroom for instruction purposes. Application software should also be purchased aside from having it already installed to all sold computer sets for the faculty to use in case they do reformatting and installation of operating system and needed software applications which is needed in troubleshooting activity. Non-IT departments should have also their own ICT laboratory for use. The university library should have huge number of e-books to be used by faculty and even students for research purposes. Or it would be much better if all university campus has internet connection open to all students and faculty meaning not secured. University extension department in collaboration with the knowledge technology management should design an extension program that would assess the computer or technology training needs of the faculty to give way for the development of a regular training activity to non-IT faculty. This will give them the avenue to effectively use technology in their day-to-day activity. The Information and Communication Technology department should establish a training design in the form of conducting a regular extension programs for faculty who needs to be trained on digital literacy to produce an ideal teacher inside the classroom. Technology is practically worthless unless people are equipped with the know-how, and the willingness, to use it. Finally, the whole administration should craft a policy to strengthen the provision of digital resources because it is evident that ICT plays an important role in higher education for the reason that by doing so its educational system can lead to transforming its local classroom to global classroom.

References

- [1] Thomas, R., Adams, M., Meghani, N., & Smith, M. (2002). Internet integration in high schools: Patterns, opportunities, and barriers. St. Paul, MN: National Research Center for Career and Technical Education. (ERIC Document Accession #: ED 476 034). Retrieved on May 24, 2007, from http://www.nccte.org/publications/infosynthesis/r&dreport/Internet_Integration.pdf.
- [2] K Schoepp (2005). Barriers to technology integration in a technology-rich environment Learning and teaching in higher education: Gulf perspectives 2 (1), 1-24
- [3] Russell, M., Bebell, D., O'Dwyer, L., & O'Connor, K. (2003). Examining Teacher Technology Use: Implications for Pre-Service and In-Service Teacher Preparation. *Journal of Teacher Education*, 54, 297-310.
- [4] Grabe, M., & Grabe, C. (2007). Integrating technology for meaningful learning (5th ed.). Boston, NY: Houghton Mifflin.
- [5] Gibson, R. (1997). "Confluence of Culture And Information Technology In Thailand" (1997). PACIS 1997 Proceedings. 68. <http://aisel.aisnet.org/pacis1997/68>
- [6] Isleem, Mohammed I. (2003). The Ohio State University ProQuest Dissertations Publishing, 2003. 3124087.

- [7] Plomp, R. E. Anderson, N. Law, and A. Quale. (2009). Cross-national Information and Communication Technology: Policies and Practices in Education. A volume in Research in Educational Policy: Local, and Global Perspectives (pp. 297-313). Charlotte, NC, USA: Information Age Publishing.
- [8] Yildirim, S. (2007). Current Utilization of ICT in Turkish Basic Education Schools: A Review of Teacher's ICT Use & Barriers to Integration. *International Journal of Instructional Media* Vol. 34(2), 2007.
- [9] Tondeur, J., Valcke, M., & Braak, JV. (2008). A multidimensional approach to determinants of computer use in primary education: teacher and school characteristics Department of Educational Studies, Ghent University, Ghent, Belgium. doi: 10.1111/j.1365-2729.2008.00285.x
- [10] Davis, K. S., & Falba, C. J. (2002). Integrating technology in elementary preservice teacher education: orchestrating scientific inquiry in meaningful ways. *Journal of Science Teacher Education*, 13(4), 303–329.
- [11] Dawson, K., Pringle, R., & Adams, T. L. (2003). Providing links between technology integration, methods courses, and school-based field experiences: a curriculum-based and technology-enhanced microteaching. *Journal of Computing in Teacher Education*, 20(1), 41–47.
- [12] Thompson, A. D., Schmidt, D. A., & Davis, N. E. (2003). Technology collaboratives for simultaneous renewal in teacher education. *Educational Technology Research and Development*, 51(1), 124–128.
- [13] Dichev, C., & Dicheva, D. (2017). Gamifying education: What is known, what is believed and what remains uncertain: A critical review. *International Journal of Educational Technology in Higher Education*, 14(9), 1–36. doi:10.1186/s41239-017-0042-5
- [14] Plomp, Anderson, Law, & Quale (2009). Cross-national Information & Communication Technology Policies & Practices in Education. A volume in Research in Educational Policy: Local, National, and Global Perspectives.
- [15] Peralta, Helena & Costa, Fernando Albuquerque (2007). Teachers' Competence and Confidence Regarding the Use of ICT. *Sisifo. Educational Sciences Journal*, 03, pp. 75-84.
- [16] Jones, A. (2004). A review of the research literature on barriers to the uptake of ICT by teachers: British Educational Communications and Technology Agency (Becta).
- [17] Huang & Liaw (2005). *Computers in Human Behaviour*. Volume 21, Issue 5, September 2005, Pages 729-743.