



Research Article

INFLUENCE OF INFORMATION AND COMMUNICATION TECHNOLOGY UTILIZATION ON TEACHERS' PERFORMANCE: TOWARDS ENHANCING TECHNOLOGY-DRIVEN SCHOOLS

LEMUEL NALUGON¹, ALVIN V. NUQUI²

¹La Consolacion University, Philippines

²Don Honorio Ventura Technological State University, Philippines

Correspondence should be addressed to ALVIN V. NUQUI

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ABSTRACT

This research paper sought to investigate how the utilization of Information and Communication Technology influences the teachers' performance among the Religious of the Virgin Mary (RVM) secondary schools in Luzon. The simple descriptive survey and descriptive-correlational research methods were employed in exploring the influence between variables. The level of influence of the teachers' utilization of ICT resources on their performance was statistically analyzed using multiple regression analysis. In this study, it was found that the teachers' utilization of ICT software resources in RVM schools in Luzon exerted significant influence on their performance in terms of promotion of learning environment, diversity of learners, curriculum implementation and spiritual growth. In addition, the teachers' utilization of ICT hardware resources exerted significant influence on their performance in terms of social regard for learning, planning, assessing and reporting, community linkages, personal growth and professional development, and spirituality. An ICT Strategic Plan was derived from the findings of the study to further improve the teachers' utilization of ICT resources.

KEY WORDS: Information and communication technology, teachers' performance, influence

INTRODUCTION

It is understood that the use of ICT in education can increase access to learning opportunities. It can help to enhance the quality of education with advanced teaching methods, improve learning outcomes and enable reform or better management of education systems (UNESCO-IS, 2009).

The integration of ICT into education has been assumed as the latent of the new technological tools to transform an outmoded educational system. Thus, educational reforms to utilize ICT in the classroom need acceptance and assistance coming from teachers and administrators.

Assistance to education is necessary to provide cost-efficient support to teachers and broaden access to educate. It is a support for comprehensive education programs that will contribute to "information literacy as a foundation for subsequent learning, improved teaching and learning through ICT-enhanced classrooms and interactive student centered learning experiences, and teamwork skills that are increasingly required in the labor market" (ADB Strategy 2020, 2009).

The main goal of introducing ICT in the field of education is to help creating constructive, supportive, and rich learning environment in schools in general and classrooms in particular. (Alzaidiyeen and Almwidiah). The ICT integration in school setting improves teaching and learning process and motivates students to learn. ICT-

enabled education system transforms students into dynamic life-long learners and values-centered, productive and responsible citizens (DepEd ICT Plan, 2008). As Siddiqui (Akram, 2010) stated that technology proficiency is but one dimension of teacher competence. The author further discussed that the success of the implementation of innovative technology is depending on the culture of the school. Today's rapid technological changing milieu requires the principal and teachers as a technology leader to become involved in discovering, evaluating, installing, and operating new technologies of all kinds, while keeping teaching and student learning as the guide and driving force behind it all (Gao et al., 2010).

Though several studies and literature were conducted in determining the positive effect of ICT in the teaching-learning process, still there are areas that need to be intensified. In the work of Qablan, et. al. (2009), it was determined how the participants used ICT and if they had any internal and external weaknesses in the way of the effective integration of ICT in the teaching-learning process. The results of the study showed that despite of the considerable political pressure to increase ICT use in the classroom, the following concerns were found out as the problems: most expressed frustration at the lack of ICT tools, support from the national government, school and from the surrounding community.

Another area that needs improvement in the implementation of ICT in the classroom is the training of the faculty members. Citing the study conducted by Olewe and Amaka (2011) that focused on the effective utilization of ICT for sustainable manpower development among computer educators. It was found out that there was poor utilization of ICT in evaluation of learning by the teachers. Based on the findings, it was recommended that retraining programs and workshops should be organized for educators on the use of ICT as a tool for enhancing teaching and learning.

In Philippine scenario, Abcede (2008) of the Department of Education presented the highlights of the integration of ICT in the Philippines' educational system in UNESCO. The author wrote that the Philippine Education Technology Master Plan (2000-2010) has the following operational targets: all public secondary schools shall be provided with an appropriate educational technology package, 75% of public secondary schools shall have a computer laboratory room equipped with basic multimedia equipment, 75% of secondary schools shall have an electronic library system, 75% of public secondary schools' teachers shall have been trained in basic computer skills and the use of the Internet and computer-aided instruction, and all learning areas of the curriculum shall be able to integrate the application of ICT, where appropriate. ICT is introduced at the elementary level as a subject called Home Economics and Livelihood Education (HELE) and in the secondary level as Technology and Home Economics (THE).

2 In the majority of cases, ICT materials (software, multimedia, etc.) are used to supplement instruction. These materials may be produced by teachers themselves (as in the case of animated PowerPoint presentations) or ready-to-use courseware, either purchased from abroad, or leased to the school as part of the hardware. Currently, there is no

integration of the application of ICT with textbooks. However, eighty-one percent (81%) of schools have no access to the Internet. The schools in Metro Manila, the Philippines' capital, have the greatest access to the Internet, but the incidence of connectivity decreases as one goes northwards and southwards throughout the archipelago. The Department of Science and Technology (DOST) conducted a survey of schools that gathered baseline data on schools' Mathematics and Science teachers and the extent of the schools' use of ICT for instruction and other purposes. Interviews of innovative teachers on practices (teacher and student) related to innovation, problems, solutions and prospects for sustaining and continuing innovation. The following were identified as key problem areas for implementing ICT in basic education: few teachers had fear of the technology, some school principals had closed mindset and non-appreciation of ICT in education, constraints of the annual Education Budget, lack of maintenance of ICT resources and technician staff, and limited availability of education software and courseware.

With regards to the integration of innovative technological resources in the classroom, the Religious of the Virgin Mary (RVM) Education Ministry believes that the use of technology-assisted instruction can positively affect the quality of teaching and learning by providing direct access to information and communication technology.

Moreover, faculty members will be able to make their instruction more relevant to the real human experiences by integrating data from an array of electronic sources and through improved resources based on global issues. It envisions empowering students, faculty and staff with the knowledge, skills, values and attitudes to effectively manage, utilize and exchange information through the utilization of technology as part of the teaching-learning process. By effectively integrating technology in the curriculum, the teachers can continue to instruct students of the basics, promote self-worth and active student-centered learning, and equip users to become technology savvy, ready to compete in the global context through programs, projects and activities that include variety of support roles to foster and sustain the continued growth of the use of innovative technologies.

With the immense role of ICT in education, this study is directed towards the utilization of ICT hardware and software resources by the teachers into the teaching-learning process. For this reason, this study is challenged to examine the responsiveness of the curricula, teachers' competency in ICT-related trainings and seminars, and availability of facilities and resources. This study also aimed to draw out implications of ICT policy and come up models of good practices of utilization of ICT hardware and software resources in the classroom. Hence, this study determined how the utilization of Information and Communication Technology influenced the teachers' performance among the Religious of the Virgin Mary (RVM) secondary schools in Luzon

MATERIALS AND METHODS

Descriptive-correlational research method was used in this study because it attempted to present the influence of the

utilization of ICT by the teachers in the teaching-learning process on their performance in Religious of the Virgin Mary (RVM) secondary schools in Luzon. The respondents of the study consisted of all teachers and school principals of the twelve Religious of the Virgin Mary (RVM) secondary schools in Luzon. The instruments were constructed by the researcher guided by the evaluation tool developed by Tinio (2002) that determined the teachers' Information and Communication Technology (ICT) utilization in Philippine public high schools, and the Teacher Performance and Development Framework (TFDF) of the National Competency-based Teachers Standards (NCBTS) of Department of Education. A domain spirituality was added to determine the level of workplace of the teachers based from the indicators of the study conducted by Rhodes (2006).

The first set of questionnaire elicited information on the teachers' utilization of ICT in teaching and major obstacles or problems encountered in the integration of ICT. ICT refers to the use of software and hardware resources in the classroom.

The second set of instrument dealt with the evaluation of Principals on the performance of RVM high school teachers in the light of the following domains: social regard for learning, learning environment, diversity of learners, curriculum, planning, assessing reporting, community linkages, personal growth and professional development, and spirituality.

The data collected were tabulated and processed using Statistical Packages for the Social Sciences (SPSS). In order to analyze and interpret the data gathered, the following statistical measures were used:

- i. The extent of teachers' utilization of ICT software and hardware resources in the RVM secondary schools were quantified using the following scales:

Rating Scale	Range	Analytical Description	Descriptive Equivalent
5	4.50-5.00	ICT utilization is very extensive and functioning excellently	To a Very Great Extent
4	3.50-4.49	ICT utilization is extensive and functioning very well	To a Great Extent
3	2.50-3.49	ICT utilization is adequate and functioning well	To a Moderate Extent
2	1.50-2.49	ICT utilization is limited and functioning poorly	To a Least Extent
1	1.00-1.49	ICT utilization is not available	Not Applied at All

- ii. In this study, the scale of the level of the teachers' performance deviated from the 4-point scale of the NCBTS and adopted the 5-point scale of RVM secondary schools. Thus, the teachers' performance was quantified using the following scales:

Rating Scale	Range	Descriptive Equivalent
5	4.50-5.00	Excellent
4	3.50-4.49	Very Satisfactory
3	2.50-3.49	Satisfactory
2	1.50-2.49	Fair
1	1.00-1.49	Poor

- iii. The frequency count and weighted mean were used to describe the extent of teachers' utilization of ICT software and hardware resources and teachers' performance.
- iv. Regression analysis was used in this study to determine the best predictor among the independent variable (IV) to the dependent variable (DV).
- v. Frequency count and percentage were used in presenting the data regarding the obstacles or problems encountered by the teacher-respondents in utilizing ICT resources.



RESULTS AND DISCUSSION

Teacher's Utilization of ICT Resources

The software resources such as database, encyclopedia/references on CD-ROM, desktop publishing, tutorials, educational games, music composition, statistical/mathematical programs, and simulations were utilized by the teachers to a moderate extent. This means that ICT utilization was adequate and functioning well. Conway (2010) supported the idea on adequately utilizing different resources and that classroom tools come in a variety of forms that could aid in teachers' instruction and students' learning.

Moreover, great extent of software utilization was evident in the following resources: word processing, spreadsheet, presentation software, graphics, recreational games, internet browser, drill and practice programs, e-mail software and video/audio/authorware. This means that the ICT utilization was extensive and functioning very well. According to the Asian Development Bank (2009), the extensive use of ICT shall increase the quantity of quality educational opportunities, making knowledge building possible through borderless and boundless accessibility to software resources.

However, it was noted that RVM high school teachers' utilization of programming languages was limited and functioning poorly. Programming languages available featured Java, Visual Basics, Visual C and other object oriented languages that required technical expertise of the skill, which may be the reason for its poor utilization. This means that intensive training for teachers to improve their technical skills in varied programming languages may be necessary.

In general, the extent of software resource utilization of the 12 RVM high school teachers was to a moderate extent as indicated by the average weighted mean value of 3.43. This means that there was still so much to be desired in terms of teachers' ICT software utilization.

Further, the following hardware resources such as scanner, inkjet printer, CD writer, devices for digital imaging and video processing, and graphical tablet/ interactive board/EduClick/smart board were utilized to a moderate extent. This means that the ICT utilization was adequate and functioning well. Godfrey (Akram, 2010) identified the potential benefits of ICT utilization in terms of presenting rich learning environments, allowing learners to adopt multiple perspectives on complex phenomena, fostering flexible knowledge construction in complex learning domains, and catering for individual differences. The varied hardware peripherals were used to stimulate the learners to develop their knowledge, skills, and values through actual experience in the varied subject areas.

In addition, great extent of hardware utilization of color printer, dot matrix printer, TV and decoder (projection device), and video/LCD projector was found out. This means that the ICT utilization of the aforementioned hardware resources was extensive and functioning very well. In the words of Hill (2010), education can be enhanced by the use of technology. There are many

technology resources that can be utilized to embellish lessons on any topic. Educators can incorporate the use of digital cameras, scan converters, interactive white boards, document cameras and student response systems into their daily lessons and activities. The author further explained that the ICT resources will not only enhance the material being taught, but will increase student motivation and participation.

However, the utilization of laser printer was limited and functioning poorly. It can be observed from the data that the teachers were frequently using dot matrix and ink jet printers. This could be the reason of its poor utilization. This scenario means that there was a need to provide the teachers' technical skills on how to operate a laser printer.

Generally, it can be observed from the data that the extent of hardware resources utilization of the 12 RVM high school teachers was to a moderate extent, which means that there were lots of intensified hands-on or technical trainings to be done for the teachers on how to utilize updated hardware resources.

Teachers' Performance of RVM Secondary Schools in Luzon

The National Competency-Based Teacher Standards (NCBTS) is the proposed common framework for all teaching and teacher development programs in the Philippine formal education sector. The framework focuses on the ideal that teachers serve as positive and powerful role models of the value in the pursuit of different efforts to learn. (DepEd, 2005). The NCBTS defines seven domains within which teachers can develop professionally. Under each domain, specific strands and indicators are defined. These include the social regard for learning, learning environment, diversity of learner, curriculum implementation, planning, assessing and reporting, community linkage, and personal and professional development. The indicator spirituality was added based from the study of Rhodes (2006) in measuring the impact of workplace on organization culture towards improved employee productivity and to determine the level of teachers' spiritual maturity. These domains were utilized in assessing the performance of RVM high school teachers in Luzon.

The high school teachers of the twelve RVM schools in Luzon performed very satisfactorily in terms of implementing school policies and procedures, demonstrating punctuality, maintaining appropriate appearance and being careful about the effect of one's behavior on students.

As Wright (2008) stated that when teachers have social regard for learning, their teaching performances improve. Therefore, it is vital for school principals to encourage the teachers to maintain their high social regard for learning. Since students learn through imitation and by modeling, high school teachers carry the responsibility of being a role model of observing school policies, coming to classes on time, maintaining presentable appearance, and treating the students properly.

The high school teachers of the 12 RVM schools in Luzon performed very satisfactorily in maintaining a learning environment of courtesy and respect for different learners' abilities, culture and gender, providing gender-fair opportunities for learning, recognizing that every learner has strengths, maintaining a safe, clean and orderly classroom free from distractions, arranging challenging activities given the physical environment, using individual and cooperative learning activities, encouraging learners to ask questions, providing learners with a variety of learning experiences, handling behavior problems quickly with due respect to children's rights, giving timely feedback to reinforce appropriate to learners' behavior, guiding individual learner of appropriate social and learning behavior, and communicating school policies and procedures for classroom behavior and seeing to it that they are followed.

Also, the teachers of the secondary school respondents in Luzon performed very satisfactorily in using information on their students' learning styles and needs, establishing goals that define appropriate expectations for all learners, pacing appropriate to their students' needs, providing differentiated activities, initiating other learning approaches, showing sensitivity to multi-cultural backgrounds of their students, setting clear, challenging and achievable expectations on the holistic development of all learners.

The teacher respondents likewise performed very satisfactorily in delivering accurate and updated content knowledge using appropriate methodologies, approaches and strategies, integrating language, literacy and quantitative skill development and values in the subject area handled, explaining learning goal, instructional procedures and content clearly, linking the current content with past and future lessons, aligning lesson objectives with the teaching methods, creating situations that encourage learners to use high order thinking skills, engaging and sustaining learners' interest in the subject, integrating relevant scholarly works and ideas to enrich the lesson as needed, integrating content of subject are with other disciplines, setting appropriate learning goals, making the learners understand the learning goals, linking the goals set with the expectations for every learner, establishing routines and procedures to maximize instructional time, and planning lessons to fit within available instructional time.

Moreover, the teachers of the twelve RVM secondary schools in Luzon performed very satisfactorily in conducting regular meetings with the students and parents, involving parents in school activities, preparing formative and summative tests, employing non-traditional assessment techniques, interprets and uses assessment results to improve teaching and learning, identifying teaching-learning difficulties, and providing timely and accurate feedback to the students.

Also, the teachers of the twelve RVM schools performed satisfactorily in involving community in sharing accountability for the learners' achievement, using community human and material resources to support learning, using the community as a laboratory for learning, and using community network to publicize school events and achievement. In addition, their performance was very satisfactory in participating activities that promote

learning. They performed very satisfactorily in maintaining stature and behavior that upholds the dignity of teaching, allocating time for personal and professional development, manifesting personal qualities such as enthusiasm, flexibility and caring, articulating and demonstrating one's personal philosophy of teaching, participating actively in professional organizations, keeping abreast with recent developments in education, reflecting on the quality of his/her own teaching, receiving favorable rating from students, peers and superiors, accepting personal accountability for learners' achievement, and using self-evaluation to recognize and correct weaknesses. Very satisfactory performances were also noted very satisfactorily in developing and nurturing a personal belief system, discovering the characteristics of selfless and compassionate individual, demonstrating one's ability to cope with life's trials, and demonstrating respect and sensitivity to others' beliefs.

Influence of ICT Utilization on Teachers' Performance

In conducting the study, it was hypothesized that the extent of utilization of Information and Communication Technology does not significantly influence the teachers' performance of the Religious of the Virgin Mary secondary schools in Luzon. To gauge the extent of influence of software and hardware resources utilization on the teachers' performance in terms of their social regard for learning, learning environment, diversity of learners, curriculum, planning, assessing, and reporting (PAR), community linkage, personal growth and professional development (PGPD), and spirituality, the data were subjected to multiple regression analysis.

Influence of Teachers' ICT Utilization on Social Regard for Learning

Results of the regression revealed that the utilization of hardware resources produced B coefficients of 0.288 with associated probability less than the significance level set at 0.05. The findings indicated that for every unit increase in hardware resources utilization could generate a 0.288 increase in teaching performance in terms of social regard for learning. The utilization of software resources also contributed to teachers' social regard for learning but not to a significant effect. The obtained F-ratio of 37.004 which was found significant at 0.05 alpha indicated that the extent of software and hardware resources utilization formed a very significant set of predictor for teachers' social regard for learning.

Influence of Teachers' ICT Utilization on Providing Learning Environment

Regression analysis showed that the teachers' utilization of ICT software resources produced a B coefficient of 0.199 with an associated probability value of 0.003 which is less than significance level set at 0.05. The findings indicated that every unit increase the teachers' utilization of ICT software resources could cause a 0.199 increase on their performance in terms of promotion of learning environment. The utilization of hardware resources also contributed to teachers' performance in promoting learning environment but not to a significant effect. The obtained F-

ratio of 38.006 which was found significant at 0.05 alpha indicates that the extent of software and hardware resources utilization formed a very significant set of predictor for teachers' performance in terms of promoting learning environment.

Influence of Teachers' ICT Utilization on Diversity of Learners

Results of the regression showed that the teachers' utilization of software resources produced B coefficient of 0.178 with an associated probability value of 0.034 which is less than the significance level set at 0.05. The findings indicated that for every unit increase of the teachers' utilization of software resources could influence a 0.178 increase on their performance in terms of diversity of learners. The utilization of hardware resources also contributed to teachers' performance in terms of diversity of learners but not to a significant effect. The obtained F-ratio of 13.312 which was found significant at 0.05 alpha indicated that the extent of teachers' utilization of software and hardware resources revealed as significant predictors for teachers' performance in terms of diversity of learners.

Influence of Teachers' ICT Utilization on Curriculum Implementation

Results of the regression indicated that the teachers' utilization of ICT software resources had a significant influence on their performance in terms of curriculum implementation which produced a B coefficient of 0.251 with associated probability value of 0.001 less than the significance level set at 0.05. The findings pointed out that for every unit increase in teachers' utilization of software resources could cause a 0.251 increase on their performance in terms of curriculum implementation. The utilization of hardware resources also contributed to the teachers' performance in terms of curriculum implementation but not to a significant effect. The obtained F-ratio of 37.384 which was found significant at 0.05 alpha indicated that the extent of teachers' ICT software and hardware utilization formed a very significant set of predictor for the teachers' performance in terms of curriculum implementation.

Influence of Teachers' ICT Utilization on Planning, Assessing, and Reporting

Results of the regression analysis disclosed that the teachers' utilization of hardware resources produced B coefficient of 0.220 with associated probability value of 0.003 which was less than the 0.05 level of significance. The findings indicated that for every unit increase in teachers' utilization of ICT hardware resources could cause a 0.220 increase on their performance in terms of planning, assessing, and reporting. The utilization of software resources also contributed to teachers' performance in terms of planning, assessing, and reporting but not to a significant effect. The obtained F-ratio of 22.402 which was found significant at 0.05 alpha shows that the extent of teachers' utilization of ICT software and hardware resources formed a very significant set of predictor for teachers' performance in terms of planning, assessing and reporting.

Influence of Teachers' ICT Utilization on Community Linkage

Results of the regression disclosed that the teachers' utilization of teachers' utilization of hardware resources produced a B coefficient of 0.230 with an associated probability value of 0.005 which was less than the level of significance set at 0.05. It can be discerned that for every unit increase in teachers' utilization of hardware resources could cause a 0.230 increase on their performance in terms of community linkage. The teachers' utilization of software resources also contributed to teachers' performance in terms of community linkage but not to a significant effect. The obtained F-ratio of 14.891 which was found significant at 0.05 alpha indicates that the extent of teachers' utilization of software and hardware resources figured a very significant set of predictor for teachers' performance in terms of community linkage.

Influence of teachers' ICT utilization on personal growth and professional development

Results of regression divulged that the teachers' utilization of hardware resources produced B coefficient of 0.169 with associated probability value of 0.008 which was less than the significance level set at 0.05. The findings showed that for every unit increase in teachers' utilization of hardware resources could generate a 0.169 increase on their performance in terms of personal growth and professional development. The teachers' utilization of software resources also contributed to teachers' personal growth and professional development but not to a significant level. The obtained F-ratio of 14.225 which was found significant at 0.05 alpha indicated that the teachers' utilization of ICT software and hardware resources formed a very significant set of predictor for teachers' performance in terms of personal growth and professional development.

Influence of Teachers' ICT Utilization on Spirituality

Results of regression disclosed that the teachers' utilization of software and hardware resources produced B coefficients of 0.177 and 0.297 respectively with associated probability values less than the significance level set at 0.05. These findings showed that for every unit increase in teachers' utilization of software and hardware resources could cause 0.177 and 0.297 increases on their performance in terms of spirituality. The F-ratio of 20.525 which was found significant at 0.05 alpha indicated that the extent of software and hardware resources utilization figured a very significant set of predictors for the teachers' performance in terms of spirituality.

Major Obstacles or Problems Encountered in the Utilization of ICT

The rapid development of information and communication technologies (ICT) during the past two decades has had many points of contact with education and training. The development of technology is placing new demands on expertise, and it is also leading to the increased use of information technology (IT) in instruction and learning.

The top three teacher-related identified problems were as follows: insufficient time to prepare lessons in which computers/ the Internet are used (41.77%), no time to explore opportunities for using computers/Internet (41.37%) and lack of knowledge/ skills in using computers/ the Internet for instructional purposes (35.34%). The identified obstacles provided an insight that a faculty development program may be put in place in trying to improve teachers' knowledge, skills, time management, attitude in order to efficiently maximize, integrate, and utilize ICT in classroom teaching.

In terms of school related problems, most of the obstacles encountered by the teacher-respondents were directly linked to the school's willingness to provide supports in updating technological facilities. The top five school-related problems encountered by the teacher-respondents in utilizing ICT resources are as follows: not enough technical assistance for operating and maintaining computers and/or insufficient help for solving technical problems with ICT (68.67%), insufficient peripherals (i.e. printers, scanners, etc.) (64.66%), insufficient number of computers (58.63%), not enough space to place computers appropriately (55.82%), and not enough training opportunities (55.02%).

Policy and Pedagogical Implications Drawn from the Findings of the Study

With the aim of understanding the extent of teachers' ICT utilization in the twelve RVM schools and how this would influence the teachers' performance in terms of social regard for learning, learning environment, diversity of learners, curriculum, planning, assessing reporting, community linkages, personal growth and professional development, and spirituality, this research attempted to develop RVM ICT Strategic Plan in the pursuit of enhanced technology-driven secondary schools. This plan should include:

- i. A shared vision to fully integrate ICT in the secondary school system in improving teaching and learning process aligned to the outcomes-based competencies.
- ii. Setting of technology standards on how to use ICT software and hardware resources depending on the type and size of the school.
- iii. Development of institutionalized ICT Committee for the guidelines, templates, and upgrading of teaching aids for the intensive integration of ICT resources in the curriculum/curriculum phasing guide/learning plans. This committee is responsible for the monitoring and evaluation of the ICT-related programs/activities and, if needed, the revision of the plans to provide necessary recommendations in the technological and educational updates.
- iv. Development and implementation of multi-phasic in-service training program for teachers that suffice the computing and information literacy skills for the 21st century learners, the instructional and non-instructional applications of ICT software and hardware resources, and pedagogical strategies in the integration of ICT resources in the classroom.

- v. A regional and institutional budget plan for the allotment of ICT-related enhancement programs/activities.
- vi. A research capability building for assessing the impact of ICT utilization on student achievement and for evaluating the ICT quotient of teachers on their productivity.

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