

## **ASSESSMENT OF INFORMATION COMMUNICATION TECHNOLOGY (ICT) COMPETENCY OF TEACHERS AND STUDENTS AT BATANGAS STATE UNIVERSITY**

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### **Abstract**

With the crucial role played by Information and Communication Technology in improving the quality of education, this study was conducted. It aimed to determine the competence level of Technology Livelihood Education teachers and students of Batangas State University, Batangas City, Philippines based on the National ICT Competency Standards (NICS). Specifically, it assessed the teachers' and students' level of competence along technology operations and concepts, social/ethical, pedagogical and professional dimensions. Significant difference was likewise determined by comparing their responses. This research work made use of descriptive research design and involved 13 TLE teachers and 143 students from BatStateU campuses. Relevant data were collected with the use of researcher-made questionnaire and documentary analysis. The study bared that both the teachers and the students are competent to a great extent in the four dimensions of the National ICT Competency Standards. At the same time, it was found out that there was a significant difference between teachers and students' assessments on their level of competence in some of their skills under the technology operations and concepts and social/ethical dimensions while there was no significant difference between their assessment of their level of competence considering the pedagogical and professional dimensions.

**Keywords:** assessment, ICT competency, education,

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## 1. Introduction

Nowadays, computers are present in practically almost every aspect of education. They have been utilized to facilitate the building of learners' knowledge and skills. They are also used confidently to operate more advanced technological gadgets and devices in order for the acquired know-how to be applied to various educational tasks in everyday lives. Undoubtedly, the teacher serves as one of the most effective means for the acquisition of the technological knowledge and skills. Hence, the need to develop technologically competent teachers has become an inevitable task of the educational system. If the educational system will be able to successfully meet the challenge of producing competent teachers who can teach effectively and accurately using technological devices, then the needed transfer of knowledge to students will definitely take place.

According to Chrisostomou and Bank (2000), information and communication technologies (ICT) are computer based tools used by people to work with information and communication processing needs of an organization. It covers computer hardware and software, the network and other digital devices like video, audio, camera and others which convert information into digital form. Successful integration of ICT in the school system depends largely on the competence and attitude of teachers toward the role of modern technologies in teaching and learning. Thus, experienced teachers, newly qualified and student-teachers need to be confident in using ICT effectively in their teaching.

As a valuable instrument for both teachers and students, computers play a recognized critical role in improving the quality of education. This piece of advanced technology is particularly important in helping them perform more efficiently. Equipped with the suitable ICT competencies, teachers will be in the best position to intensify ICT awareness of their students for them to reap the benefits of the process. To ensure the success of computer education, both teachers and students should observe the key roles they need to play in the teaching-learning process. Therefore, teachers and students' competency in analyzing, designing, developing, educating, applying, evaluating and controlling ICT is highly significant in education.

To support this, the Philippines' National ICT Competency Standards (NICS) for teachers was issued. It defines the competency outcome and supporting knowledge and skills that are needed to utilize ICT in performing their roles in the teaching job. Similarly, it provides the performance displays to assess the level of awareness and competence of teachers to apply ICT in the educational setting. In general, this set of competencies aims to prepare teachers to become users of many ICT equipment and help students gain benefits from the use of technology.

Accordingly, there had been various benefits derived from the use of ICT. The prime advantages of its use are access to information and knowledge resources, communication and knowledge sharing and work competence. The use of ICT as a tool to enhance students' learning and teachers' instruction and as a catalyst for improving access to high quality education in both formal and non-formal setting has become a necessity.

Recognizing the impact of new technologies on the workplace and everyday life, teacher education institutions try to restructure their education programs and classroom facilities in order to husband the potentials of ICT in improving the content of teacher education. ICT as a tool within the school environment include its use for school administration and management, teaching and learning of ICT related skills, for enhancing the presentation of classroom work, teaching and learning repetitive tasks, intellectual thinking and problem solving skills, stimulating creativity and imagination, for research and as a communication tool by teachers and students.

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Hence, Salandanan (2005) viewed ICT in education primarily as a support cognitive tool for the learning process for both teachers and learners. Nonetheless, this view of ICT has implication to teachers' role. The major traditional role of teachers for which they have been trained in formal education is very much involved in the transmission of knowledge. They are the best source of input in the instructional process and their students are the passive recipients of these knowledge. Thus, the quality and quantity of learning is very much dependent on the individual capacity and mental structure of the teacher. The explosion of knowledge is also too much for the teacher to handle and transmit. In fact, students need to explore other sources of information presently available in different modalities. In this regard, teachers and technology should collaborate to support learners in knowledge acquisition and construction.

Knowing the vital role that ICT plays in the success of the teaching-learning process, the researchers found it imperative to assess the level of ICT competency of teachers and students of Batangas State University. They decided to embark on this study to determine what may be recommended to raise the level of their ICT competency more particularly that of the teachers since they are charged with the task of facilitating learning with the aid of computers. At the same time, they also would like to uplift the ICT competence of students through the proposed activities designed for them. On top of these, the researchers strongly believed that through the strengthened ICT skills of teachers and students, they will ultimately prosper in their respective endeavors.

### **1.1. Objectives**

This study was conducted to determine or assess the competence level of TLE teachers and students of Batangas State University based on the Philippines' National ICT Standards (NICS) along the various dimensions such as technology operations and concepts, social/ethical, pedagogical and professional dimensions. The study also determined to find out the significant differences between the extent of ICT competence of the teachers and students with the end view of proposing intervention activities to enhance the level of ICT competencies of TLE teachers and students.

### **2. Materials and Methods**

This study adopted the descriptive survey method in gathering the data needed by the researchers. According to Reyes (2003), descriptive method involved the collection of data in order to test the hypothesis or answer the questions concerning the status of the subjects of the study. The researchers used descriptive research design to acquire adequate data for the study from 13 TLE teachers and 143 TLE students from BSU Main Campus I, Rosario and Malvar Campuses. A researcher-made questionnaire and documentary analysis were used as data gathering tools. The data gathered were treated with the use of statistical tools including frequency count, percentage, weighted mean and t- test.

### **3. Results and Discussions**

Through analysis and interpretation of data, the following notable findings have been raised.

#### **3.1. Assessment of Teachers and Students' Competency Level based on NICS**

This study assessed teachers and students' competency level based on NICS considering technology operations and concepts, social/ethical, pedagogical and professional dimensions.

**3.1.1. Technology Operations and Concepts.** The findings disclosed that both the

teachers and the students are competent to a great extent in understanding the technical operations and concepts and the productivity of various ICT tools as supported by the obtained composite mean of 3.27 and 3.41, respectively. Teachers were found to very much capable of using word processor to enter and edit text and images while students were bared to be proficient in identifying and defining the functions of computer peripherals including printer, scanner, modem, digital camera, speaker and others.

Table 1: Teachers and Students' Level of Competence in Relation to Technology Operations and Concepts Dimension

Technology Operations and Concepts	Teachers		Students	
	WM	VI	WM	VI
1. Identify and define the functions of the main components (i.e. monitor, CPU, keyboard, mouse) of the computer.	3.62	VGE	3.54	VGE
2. Understand the basic functions of the operating system.	3.24	GE	3.54	VGE
3. Organize and manage computer files, folders and directories.	3.31	GE	3.46	GE
4. Identify and define the functions of computer peripherals (i.e. printer, scanner, modem, digital camera, speaker, etc.)	3.22	GE	3.77	VGE
5. Use word processor to enter and edit text and images.	3.77	VGE	3.22	GE
6. Use calculation spreadsheet to enter data, sort data and format cells into table.	3.05	GE	3.46	GE
7. Use presentation package to add text and sequence a presentation.	3.31	GE	3.23	GE
8. Connect to the internet via dial-up or LAN.	3.10	GE	3.23	GE
9. Send and receive emails with attachments, manage emails and use LAN and Web- based mail services.	3.06	GE	3.54	VGE
10. Connect and use shared printers, shared folders and other devices within a network.	3.00	GE	3.15	GE
Composite Mean	3.27	GE	3.41	GE

**3.1.2. Social/Ethical Dimension.** Upon assessment, it showed that both the teachers and the students are competent to a great extent in relating the social, ethical, legal, human issues and community linkages with the use of ICT as evidenced by the obtained composite mean of 3.42 and 3.24, respectively. Teachers were uncovered to be very capable in preparing lessons and activities appropriate to the level of learning and cultural background of the students. On the other hand, students were found to be good in maintaining a clean and orderly learning environment.

Table 2: Teachers and Students' Level of Competence in Relation to Social/Ethical Dimension

Social/ Ethical	Teachers			Students		
	WM	VI	RANK	WM	VI	RANK
1. Understand the legal implication of software licenses and fair use.	3.38	GE	6	2.81	GE	10
2. Understand and explain the basic concepts of intellectual property rights.	3.31	GE	7	3.01	GE	7
3. Differentiate and identify the copyright, trademark, patent of various	3.23	GE	8	2.90	GE	8

products.						
4. Detect plagiarism in student work.	3.08	GE	9.5	2.83	GE	9
5. Show respect for privacy and cyber etiquette, phone etiquette and similar use of technology.	3.54	VGE	4.5	3.26	GE	4
6. Demonstrate proper handling of computer devices and use of application.	3.62	VGE	2.5	3.38	GE	2
7. Monitor how students use computer specifically on software, hardware, computer games and internet activities.	3.08	GE	9.5	3.24	GE	5
8. Maintain a clean and orderly learning environment for students.	3.62	VGE	2.5	3.43	GE	1
9. Design class activities to minimize the effect on students being disadvantaged or left-out.	3.54	VGE	4.5	3.17	GE	6
10. Prepare lessons and activities appropriate to the level of learning and cultural background of the students.	3.77	VGE	1	3.37	GE	3
<b>Composite Mean</b>	<b>3.42</b>	<b>GE</b>		<b>3.14</b>	<b>GE</b>	

**3.1.3. Pedagogical Dimension.** The results revealed that teachers and students are competent to a great extent in considering the use of technology in the instructional process as manifested by the obtained composite mean of 3.31 and 3.13, respectively. Teachers were found to be skillful in using electronic means of administering quizzes and examinations while students were exposed to be adept in using appropriate slide presentations, videos, audio and other media in the classroom.

Table 3: Teachers and Students' Level of Competence in Relation to Pedagogical Dimension

Pedagogical	Teachers			Students		
	WM	VI	RANK	WM	VI	RANK
1. Make students use data bases, spreadsheets, concept mapping tools and communication tools, etc.	3.38	GE	4.5	3.08	GE	6
2. Encourage students to do data analysis, problem solving, decision making and exchange of ideas.	3.31	GE	6.5	3.17	GE	4
3. Use appropriate slide presentations, videos, audio and other media in the classroom.	3.69	VGE	2	3.43	GE	1
4. Teach students to use various multimedia materials for the reports and presentations.	3.46	GE	3	3.31	GE	2
5. Use various synchronous and asynchronous communication tools (email, chat, white boards, forum, blogs).	3.31	GE	6.5	3.13	GE	5

6. Design rubrics for assessing student performance in the use of various technologies.	3.38	GE	4.5	3.24	GE	3
7. Use electronic means of administering quizzes and examinations.	3.85	VGE	1	3.02	GE	7.5
8. Use emails, group sites, blogs, etc. for disseminating information directly to students, colleagues and parents.	2.92	GE	8.5	2.99	GE	9
9. Use emails, group sites, blogs, etc. to collect information and feedback directly from students.	2.92	GE	8.5	3.02	GE	7.5
10. Set up online databases/repositories of students' work.	2.85	GE	10	2.87	GE	10
Composite Mean	3.31	GE		3.13	GE	

**3.1.4. Professional Dimension.** Considering the professional dimension, teachers and students were disclosed to be competent to a great extent in embarking into activities promoting professional growth and development, research, innovation and collaboration as shown by the obtained composite mean of 2.94 and 3.17, respectively. Both the teachers and the students were discovered to be capable of conducting research on the use of technology in the classroom.

Table 4: Teachers and Students' Level of Competence in Relation to Professional Dimension

Professional	Teachers			Students		
	WM	VI	RANK	WM	VI	RANK
1. Identify educational sites and portals suitable to their subject area.	2.92	GE	5	3.16	GE	2.5
2. Join online communities, subscribe to relevant mailing lists and online journals.	2.85	GE	7	3.01	GE	7
3. Review new and existing software for education.	3.00	GE	3	3.16	GE	2.5
4. Recommend useful and credible web sites to colleagues.	3.00	GE	3	3.12	GE	4
5. Conduct research on the use of technology in the classroom.	3.23	GE	1	3.29	GE	1
6. Follow online tutorials or online degree programs.	2.77	GE	9	2.85	GE	9
7. Actively participate in the online forums and discussions.	3.00	GE	3	2.87	GE	8
8. Publish (formal/informal) research on the use of ICT in education.	2.85	GE	7	3.03	GE	5
9. Share lesson plans, worksheets, templates and teaching materials through course website.	2.85	GE	7	3.02	GE	6
Composite Mean	2.94	GE		3.17	GE	



Table 6 presents the summary of competencies of teachers and students considering the four NICS dimensions. As could be reflected, teachers are most competent in complying with the social/ethical use of ICT with the highest composite mean of 3.42. This concurs with the findings of Bingcang (2014) that teachers' highest mean score was on the item indicating the ethical use of technology. Likewise, they were bared to be least competent when it comes to the use of ICT for professional development with the lowest composite mean of 2.94.

Table 5: Summary of Competencies in terms of the Four NICS Dimensions

Dimensions	Teachers			Students		
	WM	VI	RANK	WM	VI	RANK
1. Technology Operations and Concepts	3.27	GE	3	3.41	GE	1
2. Social/ Ethical	3.42	GE	1	3.14	GE	3
3. Pedagogical	3.31	GE	2	3.13	GE	4
4. Professional	2.94	GE	4	3.17	GE	2

### 3.2. Comparison of Assessments between Teachers and Students

The assessments made by teachers and students on their level of competency based on the National ICT Competency Standards were compared. Considering their competency level on the technology operations and concepts domain, there was a significant difference between teachers and students' assessment on their skills in identifying and defining the functions of computer peripherals and in using word processor to enter and edit text. In terms of teachers and students' competency level on the social/ethical domain, there was a significant difference on their assessment of their skills in understanding the legal implication of software licenses and fair use and in preparing lessons and activities appropriate to the level of learning and cultural background of the students. Meanwhile, for teachers and students' assessment of their competency level considering the pedagogical and professional dimensions, there was found to be no significant difference.

Table 6: Comparison of Assessments on the Level of Competence of Teachers and Students based on the National ICT Competency Standards in terms of Technology Operations and Concepts

Technology Operations and Concepts	$t_c$	$Df$	p-value	Decision on $H_0$	Interpretation
1. Identify and define the functions of the main components (i.e. monitor, CPU, keyboard, mouse) of the computer.	-0.350	13	0.732	Accept	Not Significant
2. Understand the basic functions of the operating system.	1.486	154	0.139	Accept	Not Significant
3. Organize and manage computer files, folders and directories.	0.801	154	0.424	Accept	Not Significant
4. Identify and define the functions of computer peripherals (i.e. printer, scanner, modem, digital camera, speaker, etc.).	2.372	154	0.019	Reject	Significant
5. Use word processor to enter and					

edit text and images.	4.056	18	0.001	Reject	Significant
6. Use calculation spreadsheet to enter data, sort data and format cells into table.	1.907	154	0.058	Accept	Not Significant
7. Use presentation package to add text and sequence a presentation.	-0.354	154	0.724	Accept	Not Significant
8. Connect to the internet via dial-up or LAN.	0.556	154	0.579	Accept	Not Significant
9. Send and receive emails with attachments, manage emails and use LAN and web-based mail services.	1.963	154	0.051	Accept	Not Significant
10. Connect and use shared printers, shared folders and other devices within a network.	0.688	154	0.492	Accept	Not Significant

$\alpha=0.05$

Table 7: Comparison of Assessments on the Level of Competence of Teachers and Students based on the National ICT Competency Standards in terms of Social/Ethical

Social/Ethical	$t_c$	Df	p-value	Decision on $H_0$	Interpretation
1. Understand the legal implication of software licenses and fair use.	2.445	154	0.016	Reject	Significant
2. Understand and explain the basic concepts of intellectual property rights.	1.375	154	0.171	Accept	Not Significant
3. Differentiate and identify the copyright, trademark, patent of various products.	1.493	154	0.137	Accept	Not Significant
4. Detect plagiarism in student work.	0.946	154	0.346	Accept	Not Significant
5. Show respect for privacy and cyber etiquette, phone etiquette and similar use of technology.	1.273	154	0.205	Accept	Not Significant
6. Demonstrate proper handling of computer devices and use of applications.	1.246	154	.215	Accept	Not Significant
7. Monitor how students use the computer specifically on software, hardware, computer games and internet activities.	- 0.761	154	0.448	Accept	Not Significant
8. Maintain a clean and orderly learning environment for students.	0.957	154	0.340	Accept	Not Significant
9. Use emails, group sites, blogs, etc. to collect information and feedback directly from students.	1.920	154	0.057	Accept	Not Significant
10. Prepare lessons and activities appropriate to the level of learning and cultural background of the	3.003	17	0.008	Reject	Significant



students.					
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$\alpha=0.05$

Table 8: Comparison of Assessments on the Level of Competence of Teachers and Students based on the National ICT Competency Standards in terms of Pedagogical

Pedagogical	$t_c$	Df	p-value	Decision on $H_0$	Interpretation
1. Make students use data bases, spreadsheets, concept mapping tools and communication tools, etc.	1.428	154	0.155	Accept	Not Significant
2. Encourage students to do data analysis, problem solving, decision making and exchange of ideas.	0.631	154	0.429	Accept	Not Significant
3. Use appropriate slide presentations, videos, audio and other media in the classroom.	1.498	154	0.136	Accept	Not Significant
4. Teach students to use various multimedia materials for the reports and presentations.	0.694	154	0.488	Accept	Not Significant
5. Use various synchronous and asynchronous communication tools (email, chat, white boards, forum, blogs).	0.784	154	0.434	Accept	Not Significant
6. Design rubrics for assessing student performance in the use of various technologies.	0.717	154	0.474	Accept	Not Significant
7. Use electronic means of administering quizzes and examinations.	-0.719	154	0.473	Accept	Not Significant
8. Use emails, group sites, blogs, etc. for disseminating information directly to students, colleagues and parents.	-0.261	154	0.795	Accept	Not Significant
9. Use emails, group sites, blogs, etc. to collect information and feedback directly from students.	-0.404	154	0.687	Accept	Not Significant
10. Set up online databases/repositories of student works.	-0.065	13	0.949	Accept	Not Significant

$\alpha=0.05$

Table 9: Comparison of Assessments on the Level of Competence of Teachers and Students based on the National ICT Competency Standards in terms of Professional

Professional	$t_c$	Df	p-value	Decision on $H_0$	Interpretation
1. Identify educational sites and portals suitable to their subject	-1.137	154	0.257	Accept	Not Significant

area.					
2. Join online communities, subscribe to relevant mailing lists and online journals.	-0.699	154	0.485	Accept	Not Significant
3. Review new and existing software for education.	-0.737	154	0.462	Accept	Not Significant
4. Recommend useful and credible web sites to colleagues.	-0.528	154	0.598	Accept	Not Significant
5. Conduct research on the use of technology in the classroom.	-0.250	154	0.803	Accept	Not Significant
6. Follow online tutorials or online degree programs.	-0.349	154	0.728	Accept	Not Significant
7. Actively participate in the online forums and discussions.	0.510	154	0.611	Accept	Not Significant
8. Publish (formal/informal) research on the use of ICT in education.	-0.731	154	0.466	Accept	Not Significant
9. Share lesson plans, worksheets, templates and teaching materials through course web site.	-0.655	154	0.513	Accept	Not Significant

$\alpha=0.05$

### 3.3. Proposed Intervention Activities to Enrich the Level of ICT Competency of TLE Teachers and Students

Intervention activities were proposed based on the areas of the four dimensions of the National ICT Competency Standards where students and teachers were assessed to have low competency level. In this regard, teachers and students are expected to enrich their ICT skills considering the technology operations and concepts, social/ethical, pedagogical and professional domains.

## 4. Conclusions and Recommendation

The National ICT Competency Standards (NICS) has objectives, domains and standards that define the knowledge and skills an individual must possess at a recognized level of competence in specific ICT areas. Teachers and students are to a great extent competent in using ICT relative to its technology operations and concepts, social/ethical, pedagogical and professional dimensions. Teachers and students differ on their assessment of their level of competency on some skills under the technology operations and concepts and social/ethical dimensions while they have similar assessment on the level of their skills in terms of the pedagogical and professional dimensions. The intervention activities are proposed to enrich the level of ICT competency of teachers and students.

The proposed intervention activities may be reviewed and modified before adoption to enrich the competency level of teachers and students in using ICT in the teaching-learning process. TLE teachers and students should give priority in attending more trainings and seminars to enhance their competency in using ICT. The objectives of the National Information and Communication Technology (ICT) Competency Standards should be observed by TLE teachers to be able to enhance their competencies in the use of ICT in instruction and school-initiated activities designed to enhance ICT skills should be given among students.

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