INFORMATION AND COMMUNICATION TECHNOLOGY COMPETENCIES OF TEACHERS AND ONLINE LEARNING OF STUDENTS

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Abstract: This study aimed to determine which domain of ICT competencies of teachers best influence online learning of students. This study utilized the non-experimental quantitative research design using descriptive technique involving teachers in one District of Davao Occidental Division, Philippines. The study was conducted on the second semester of school year 2021-2022. Research instruments on ICT competencies of teachers and online learning of students were used as source of data. Using mean, pearson-r, and regression as statistical tools to treat the data, the study showed the following results: the level ICT competencies of teachers is very high, the level of online learning of students is high, there is a significance on the relationship between relationship between ICT competencies of teachers and online learning of students, the domain of ICT competencies of teachers best influences online learning of students are Pedagogical Competency and Social and Ethical Competency.

Keywords: Information and Communication Technology Competency of Teachers, Online Learning of Students, Educational Management

1. Introduction

Online learning as a new modality for some students, has received much attention and interest among educators despite posing issues for both teachers and students. While teachers must be competent in designing lessons for online class, students need also to master technical proficiency to fully enjoy the materials prepared by teachers. True enough, teachers and students have to deal with the adjustments in this new wave of education (Almahasees, Mohsen & Amin, 2021).

In order to facilitate smooth online class sessions, teachers need to have a good deal of information and communication technology skills. This does not only advance the goal of teaching but also it might make learning among the students easy and fun. When teachers are competent to hold online class and they have a wealth of knowledge in using various online learning tools, students learn at a fast rate (Supardi, Juhji, Azkiyah, Muqdamien, Ansori, Kurniawan & Sari, 2021).

However, students feel that have issues in online class especially when they are new to attend online class. The adaptability struggle that students experience is quite a stress on them. The switch from the traditional face-to-face learning to computer-based learning sometimes bring inconveniences to students and others might take a little more time before they can learn to navigate once they overcome the transition phase (Axmedova & Kenjayeva, 2021).

Another common problem in an online class is the technical issues that most students experience. The geographical location of some students does not warrant a good bandwidth or reliable internet connection that can facilitate active participation in an online class. As a common result, there are many students who cannot participate in activities as their internet connectivity is not enough to let them join the class. Some instances include being disconnected while students give their answers or the materials, they view on the screen do not move or take time to display in the monitor (Elayan, 2021).

In the local context, students also have their share of experiences in terms of online learning. Their common issue is on computer literacy. Although most of these students are tech savvy, there are some of them do not have a basic knowledge to operate programs such as Microsoft Word or PowerPoint. This has added to the growing concern of teachers since some materials are in these formats.

The problem-situations mentioned are the experiences of the students in the online learning. The need to address the problem will ensure greater learning opportunities for the students. Hence, the researcher is prompted to conduct this study to address the knowledge gap in terms of finding relevant evidence in the local context regarding information and communication technology competencies of teachers and online learning among the students as the researcher has rarely come across with the same study on the same topic in the local setting.

Research Objectives

This study aims to find out which domain of information and communication technology competencies of teachers' best influences online learning among the students. Specifically, this study sought to answer the following objectives:

1. To describe the level of information and communication technology competencies of teachers in terms of:
1.1. Technology Operations and Concepts;
1.2. Social and Ethical competency;
1.3. Pedagogical competency, and
1.4. Professional Competency.
2. To ascertain the level of online learning among the students in terms of:
2.1 Ability and Confidence with Online Learning Technology;
2.2 Effectiveness of online learning, and
2.3 Online Learning Enjoyment.
3. To determine the significant relationship between information and communication technology competencies of teachers and online learning among the students.
4. To determine which domains of information and communication technology competencies of teachers' best influences online learning among the students.

2. Methods

This study adopted a non-experimental quantitative research strategy with a correlational approach. A significant amount of quantitative educational research is non-experimental because many crucial factors of interest are uncontrollable. Because non-experimental research is an essential approach used by many researchers, it is critical to have a classification system for non-experimental methods that is highly descriptive of what we do while also allowing us to communicate successfully in an interdisciplinary research context. Correlational research designs assess the type and extent of relationship between two naturally occurring variables.

3. Results

Level of ICT Competencies of Teachers

Presented in Table 1 is the level of *ICT Competencies of Teachers* with the overall mean of 4.75 with a descriptive equivalent of *very high* indicating that all enumerated indicators were oftentimes manifested. The overall mean was the results obtained from the mean of the indicators for the specific items from the questionnaire intended for this particular indicator which is appended in this study. Among the enumerated indicators, *Technology Operations and Concepts* obtained the highest mean score of 4.87 or very high.

As presented in the appended table, the mean ratings of the following items under this indicator were as follows: Identify and define the functions of the main components (i.e. monitor, CPU, keyboard, mouse) of the computer, Use a word processor to enter and edit text and images, Use a presentation package to add text and sequence a presentation, Effectively use synchronous and asynchronous web-based communication tools like instant

messengers, voice, and teleconferencing, and Teach students to use various multimedia materials for the reports and class presentations.

The indicator *Social and Ethical competency* obtained the mean of 4.85 with a descriptive rating of very high. As presented in the appended table, the mean ratings of the following items under this indicator were as follows: understand and observe legal practices in the use of technology like the legal implications of Software Licenses and Fair Use, Acknowledge Intellectual Property Rights, the Ethical use of technology in both personal and professional levels, respect for privacy and cyber etiquette, phone etiquette and similar use of technology, Plan a safe and sound technology- supported learning environment, and model and promote a safe online learning environment.

Pedagogical Competency obtained a mean score of 4.68 or very high. As presented in the appended table, the mean ratings of the following items under this indicator were as follows: plan and design effective learning environments and experiences supported by technology, implement teaching and learning strategies that integrate a range of information and communication technologies to promote and enhance student learning, facilitate and monitor learning strategies that enhance student learning, assess and evaluate student learning and performances, and apply and evaluate the usage of ICT integration in the teaching-learning process and use results to refine the design of learning.

The indicator *Professional Competency* obtained a mean score of 4.62 or high. As presented in the appended table, the mean ratings of the following items under this indicator were as follows: Proactively engage in exploring and learning new and emerging technologies, Identify educational sites and portals suitable to

Table 1. Level of ICT Competencies of Teachers

Indicator	SD	Mean	Descriptive Level
Technology Operations and Concepts	0.58	4.87	Very High
Social and Ethical competency	0.61	4.85	Very High
Pedagogical Competency	0.52	4.68	Very High
Professional Competency	0.56	4.62	Very High
Overall	**0.52**	**4.75**	**Very High**

their subject area, join online communities, subscribe to relevant mailing lists and online journals, recommend useful and credible web sites to colleagues, and continuously evaluate and reflect on the use of technology in the profession for development and Conduct research on the use of technology in the classroom.

The very high level of ICT Competencies of Teachers is due to the high level of rating given by the respondents to the indicator's technology operations and concepts, social and ethical competency, pedagogical competency, and professional competency.

The above practice of teachers is expected to increase their ICT Competencies of Teachers as they congruent to the pronouncement of some authors who stated that the increase in teachers' ICT knowledge triggers the use of

technology in their activities (Dawes, 2012). Without a high ICT knowledge, we should not expect teachers' competence to use ICT in their professional practices to be optimum (Brás Pedro, 2014).

Level of Online Learning of Students

Presented in Table 2 is the level of *Online Learning of Students*. Computations revealed an overall mean score of 3.12 or *high,* indicating that all enumerated indicators were oftentimes manifested. The overall mean was the results obtained from the mean of the indicators for the specific items from the questionnaire intended for this particular indicator which is appended in this study.

Among the enumerated indicators, *Effectiveness of Online Learning* obtained a mean score of 3.18 or high. As presented in the appended table, the mean ratings of the following items under this indicator were as follows: I can learn as well online as I can in the classroom with other learners and the instructor, I see much difference in my learning in an online learning environment compared to

Table 2. Level of Online Learning

Indicator	SD	Mean	Descriptive Level
Ability and Confidence with Online Learning Technology	0.80	3.05	High
Effectiveness of Online Learning	0.83	3.18	High
Online Learning Enjoyment	0.90	3.15	High
Overall	**0.64**	**3.12**	**High**

being in the classroom with other learners and the instructors, I learn better through online learning compared to being in the same room as other learners and the instructor, and I see much difference in my learning in an online learning environment compared to being in the classroom with other learners and the instructor.

Online Learning Enjoyment obtained a mean score of 3. 15 or high. As presented in the appended table, the mean ratings of the following items under this indicator were as follows: I see much difference in my enjoyment between learning online and in the classroom with other learners and the instructor, I enjoy the online learning experience significantly less, I would enjoy the learning experience significantly less online compared to being in the classroom with other learners and the instructor, and I would enjoy the learning experience significantly more online than being in the classroom with other learners and the instructor.

Ability and Confidence with Online Learning Technology obtained a mean score of 3.05 or high. As presented in the appended table, the mean ratings of the following items under this indicator were as follows: I use online learning technology (such as e-mail and the Internet) very much, I use online learning technologies such as e-mail and the Internet for my own personal productivity but not so much for education or training purposes, I am learning online, but I am unsure of my skills when doing so, and I have learned, or I am learning, online and feel comfortable and confident when I do so.

The high level of Online Learning of Students is due to the very high level of rating given by the respondents to the indicator's ability and confidence with online learning technology, effectiveness of online learning, and online

learning enjoyment. The above practice is expected to increase their Online Learning of Students as they congruent to the pronouncement of some authors who stated that Online learning systems are web-based software for distributing, tracking, and managing courses over the Internet (Keis, Grab, Schneider, Ochsner, 2017). It involves the implementation of advancements in technology to direct, design and deliver the learning content, and to facilitate two-way communication between students and faculty (Thanji, Vasantha, 2016).

Correlations between Measures

Illustrated in Table 3 were the results of the test of relationship between the variables involved in the study. The overall correlation had a computed r- value of 0.728 with a probability value of 0.01 which is significant at 0.05 level.

Doing an in-depth analysis, it could be gleaned that the indicators of *ICT Competencies of Teachers* and *Online Learning of Students* revealed a computed r-values ranging from .128 to .384 with probability values of 0.01 which is lesser than .05 level of significance. The significant relationship between the two variables is an indication that the increase in the level of *ICT Competencies of Teachers* led to the increase in *Online Learning of Students.*

There is a significant relationship between ICT Competencies of Teachers and Online Learning of Students. The result of this study is aligned with the statement that says helping teachers to develop technological knowledge and skills in how to use new ICT to teach is a critical component of teacher preparation in the digital age (Adegbenro & Olugbara, 2019). The results of the study confirmed that the professional development of teachers in the use of new ICT in the digital age should be an ongoing effort in all educational institutions and is imperative to train teachers in an innovative method of teaching with ICT resources.

Table 3. Significance of the Relationship between ICT Competencies of Teachers and Online Learning of Students

ICT Competencies of Teachers	**Online Learning of Students**		
	R	**p-value**	**Remarks**
Technology Operations and Concepts	.382	.001	Significant
Social and Ethical competency	.128	.010	Significant
Pedagogical Competency	.384	.002	Significant
Professional Competency	.195	.000	Significant
Overall	**.728**	**.001**	**Significant**

*Significant at 0.05 significance level.

Significance of the Influence of the Domain of ICT Competencies of Teachers on Online Learning of Students

Presented in Table 4 is the regression analysis showing the predictive ability of *ICT Competencies of Teachers* on *Online Learning of Students.* The analysis shows that when *ICT Competencies of Teachers* was regressed on *Online Learning of Students*, it generated an F-value of 76.48 with 0.01. The value of this regression is 76.48 with 0.01. It can be stated that *ICT Competencies of Teachers* influenced *Online Learning of Students*. Among the indicators of *ICT Competencies of Teachers* only one gave significant influence on *Online Learning of Students*, which are *Pedagogical Competency*, t=2.46, P=0.23 and *Social and Ethical competency*, t=1.12, P=0.01

Among the indicators of ICT Competencies of Teachers only two gave significant influence on Online Learning of Students these are Pedagogical Competency and Social and Ethical competency. ICT competence is defined as being able to handle a wide range of varying ICT applications for various purposes (Ilomaki et al., 2011). Several studies revealed that teachers' ICT competence together with their attitudes determine both their initial use of ICT and future behavior towards technology (Chun-Mei et al., 2018; Japhet & Usman, 2018). Sipila (2014) investigated teachers' perceptions of ICT integration, the level of their ICT competence and the factors that might hinder their use of ICT in schools. The study concluded that teachers who are competent in the use of ICT often integrate the technology into their lessons. educational activities across different locations and times.

Table 4. Regression Analysis Showing the Extent of the Influence of Predictor Variables on Online Learning of Students

Online Learning of Students				
ICT Competencies of Teachers	**β (Standardized Coefficients)**	**B (Unstandardized Coefficients)**	**t**	**Sig.**
Constant	1.2834	0.4283	2.15	0.000
Technology Operations and Concepts	-0.09283	0.06283	-0.3	0.552
Social and Ethical competency	0.82734	0.05284	1.12	0.001
Pedagogical Competency	0.08162	0.09271	2.46	0.623
Professional Competency	0.07282	0.07243	0.38	0.635
R	0.162			
R^2	0.728			
F	76.48			
p	0.000			

CONCLUSION

With considerations on the findings of the study, conclusions are drawn in this section. The level of ICT competencies of teachers is very high, the level of online learning of students is high, there is a significance on the relationship between relationship between ICT competencies of teachers and online learning of students, the domain of ICT competencies of teachers' best influences online learning of students are Pedagogical Competency and Social and Ethical Competency.

The results of this study revealed that the level of ICT competencies of teachers is very high. The researcher recommends that the district where the study is conducted in Schools Division Office of Davao Occidental may conduct training that will help improve the aspects of Professional Competency.

Meanwhile, the study revealed a high level of online learning of students. The researcher recommends that the district office may provide Learning Action Cell among the teachers on the topic Ability and Confidence with Online Learning Technology.

The study found a significant relationship between ICT competencies of teachers and online learning of students. The researcher therefore recommends that the District Office may consider the provision of trainings or activities relative to the variables under study to help the school heads and teachers enhance on the indicators which are among the lowest in the indicators of the variables under study.

The study found that the domain of ICT competencies of teachers' best influences online learning of students are Pedagogical Competency and Social and Ethical Competency. The researcher recommends that school heads may provide sessions in Learning Action Cell among teachers for improvement.

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