Digital Competencies and Challenges on Teachers' Instructional Capabilities Among Public Elementary Schools

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Abstract

This study was undertaken to determine the relationship between instructional capability of the teachers and their digital competency and challenges. It shows the competency level of teachers in utilizing technology and finds out if it stimulates their instructional capability. One-hundred sixty teachers served as respondents of the study. Descriptive correlational-survey method was use and questionnaires served as the main tool gathering information. Statistical tools were used such as descriptive and inferential statistics. The relationship was tested at the 0.05 probability level.

The findings gathered in the study led to the following conclusion. All measures of digital competencies are significantly related to the instructional capabilities of teacher-respondents. While only three digital challenges are significantly related to instructional capabilities in terms of planning, methodology, and strategy. Therefore, the posited hypothesis for the study is not sustained since there is significant relationship between digital competency and digital challenges with instructional capabilities of teachers.

Keywords: Digital challenges; Digital Competencies; Instructional Capabilities; Methodology; Planning; Strategy.

1. Introduction

Based on the DepEd Order No. 21 s, 2019, the Enhanced Basic Education Program or K to 12 Basic Education Program responds to the needs and desires of the national and international society. The graduate students in this program are expected to have the communication, learning, and innovation skills, as well as the life and career skills, to meet the problems and seize the possibilities of the twenty-first century. Through the implementation of programs and projects, the delivery of basic education in the nation is enlarged and enhanced. Additionally, it will bring the Philippine basic education system up to par with other developed nations by making sure that it is relevant, adaptive, and topical to the students. The curriculum is seamless, based on research, uncluttered, and organized around standards and competencies. After each level, a spiral growth approach is employed to make sure that the knowledge and skills have been learned. Information and communication technology (ICT) competencies have been included into the curriculum to better prepare students for the technical needs of today.

Furthermore, the Department of Education under DepEd Order No. 12 s, 2020 acknowledged the expanding significance of technology in education throughout the epidemic time. The pandemic forced the nation to adopt distance education. The education secretary, Leonor Briones, anticipates that schools will

gradually "decrease dependence" on modular instruction. The enormous need for paper makes modular learning expensive and harmful to the environment based on Magsombol (2020).

In line with this, the researcher aims to know the teachers' digital competency level in terms of information, communication, content creation, safety and problem solving; digital challenges they faced in terms of ICT training, attitude toward ICT, infrastructure, technical support and time; and the level of teacher's instructional capability in terms of planning and organization, methodology, strategy and evaluation have been the focus of the researcher to conduct the study to know the relationship of teachers' level of digital competency and their challenges as part of their instructional capabilities. The researcher wants to prove that learning is a continuous process. In this study, results will tell how ready teachers are, for the beginning of the new way of teaching and learning process in the adaptation of technology in all aspects of education.

1.1. Background of the study

Recently, many technological tools have been developed with educational goals in mind. The bulk of these applications complement an existing teacher-centered instructional approach, even though some of them make mention of novel teaching methodologies. Technology usage, in the opinion of Augustus Richard (2016), enhances teacher preparation programs. This encompasses the implementation of technology as a medium in the framework of teacher training institutions. As both pre-service training students and children, it has been noticed that new teachers usually instruct in the same way that they were instructed. Additionally, instructors have used computers along with other information technology to enhance student learning.

Using tools that allowed for both asynchronous and synchronous interactions with the entire class, groups, and individual children or young kids, access to learning materials, and engaging in collaborative activities and projects, technological advances took part in an essential part that enables educators to teach students at a distance. According to Starkey (2021), this special edition looks at how governments around the world responded, new opportunities and factors to consider, as well as lessons we may apply to the present application of technological advancements within schools in times of adversity. This supports the idea of the researcher to work on learning module or workbook that matches the digital competency level of teachers in the division of Sto. Tomas, Sto, Tomas City, Batangas.

In line with these ideas, the researcher is interested to know the digital competency level of teachers and make a connection if these levels may affect their perception towards challenges they are experiencing today and their instructional capabilities.

1.2. Theoretical Framework

The foundation of this study is TPACK (Technological Pedagogical Content Knowledge) model by Mishra and Koehler's (2006) is the representation of the professional knowledge instructors ought to have. It focuses specifically on teachers' technology knowledge (TK), which is a supplement to a simpler concept of teachers' knowledge as defined by Shulman (1987). The TPACK model outlines different points where technology knowledge intersects with content knowledge as well as pedagogical knowledge, and this intersection is frequently represented by a Venn diagram. The entire relationship of educator expertise categories is known as TPACK.

Digital literacy is more than just being able to use technology effectively. According to Jones-Kavalier and Flannigan (2006), it also requires a specific set of abilities that are used when carrying out tasks in digital environments, such as knowledge construction while web browsing, interpreting user challenges,

engaging in online or digital games, searching databases, creating and sharing web content, messaging, and chatting on social media. In addition to these cognitive abilities, the user also needs interdisciplinary and emotional skills to be successful and productive in the digital environment.

The ability to use technology effectively is a transversal important talent that everyone can develop. Additionally, being digitally competent entails having the confidence and ability to use ICT for job, education, self-development, and participation in society. The primary five areas of competence in the Digital Competence Framework for Teachers (DIGCOMP) were also explained by Vuorikari (2015) in her study. And these are 1) Information skills for recognizing, locating, collecting, storing, organizing, and analyzing digital information, as well as for determining its use and importance; 2) With the use of digital means, communication involves connecting and cooperating with people, exchanging resources via the internet, and interacting with and taking part in online communities and networks; 3) It involves combining and expanding on prior information and contents to produce new ones, performing artistic performances, multimedia contents, computer programming, and having the necessary expertise to protect one's intellectual property and use licensing on one's works; 4) Personal information and electronic identification protection expertise are all part of safety, as is correct security usage.; and lastly, 5) Evaluating digital resources and necessities, selecting the best digital tool for the job, leveraging digital media to solve conceptual and technical challenges, utilizing technology creatively, and enhancing one's own expertise are all part of problem-solving skills.

According to Almerich's (2016) study, instructors' educational skills were influenced by their technical proficiency. They also discovered that the technological and instructional competences, which are subgroups of competency, are influenced by contextual and individual factors. According to Cooper (1986), these pedagogical skills are the teachers' knowledge, effectiveness, and skill in teaching and learning. This includes the competence of instructors to plan, organize, strategize, and manage the methodology of teaching and learning all the way through the evaluation process. If used properly, he thinks a teacher's technology skills can support or enhance their instructional approach. The ability of the teachers to integrate technology should always be based on the particular demands of the students.

While according to Voss, Kunter, and Baumert's (2011) study, the components of teachers' instructional capacities, or pedagogical competences, include lesson planning, managing the classroom, methods of instruction, classroom evaluation, and teaching strategy. Which outside resources or teaching instruments may have an impact upon.

This summarizes the readings on the importance and connections of the research topic. Such reading offers perspectives that act as frames of reference in conceptualizing the study.

1.3. Findings

This tables which present the findings of this study with their corresponding interpretations. The data are analyzed and interpreted so that conclusions and recommendations can be drawn from the results of the study.

Table 1. Summary of Teacher's Level of Digital Competency

	Variables	Mean	Verbal Interpretation
1.	Information	4.24	Expert
2.	Communication	4.32	Expert
3.	Content Creation	4.12	Expert
4.	Safety	4.32	Expert
5.	Problem Solving	3.98	Expert
	Overall	**4.20**	**Expert**

Legend:1.0-1.49 (Newcomer); 1.50-2.49 (Explorer); 2.50-3.49 (Integrator); 3.50-4.49 (Expert) 4.50-5.0 (Pioneer)

Vuorikari's (2016) proposed the six stages or levels that the usual development of educators' digital competence follows are identified by the DigComp (Digital Competence Framework). A role descriptor that highlights the specific focus of technological use usual for the competency stage is supplied for each stage. The relative roles and strengths of educators within their respective community are also discussed in these job descriptors. And as shown in the table 7, the overall mean of 4.20 with verbal interpretation of "Expert" based on the framework, it indicates that they use a range of digital technologies confidently, creatively, and critically to enhance their professional activities. They deliberately choose which digital technology to use for specific circumstances and research the advantages and disadvantages of various digital tactics. Knowing there are numerous things they haven't tried yet. They are eager and receptive to new ideas. Their repertory of tactics is expanded, organized, and solidified via experimentation. And when it comes to implementing innovative practices, specialists are the foundation of any educational organization.

In overall performance of the teacher-respondents, they all fall in the category of Expert which is the second highest level in the framework next to pioneer. Based on the researcher's observation they have the resources and devices in each school that is why they easily adjusted in the full-time utilization of technology in teaching during the online-modular method during the lockdown due to the pandemic. They are also given various webinars that let them practice the actual devices or applications in training activities and workshops. With that, they became more experienced in the digital community.

Table 2. Summary of the Perception of the Teacher-Respondent on their Degree of Digital Challenges

	Variables	Mean	Verbal Interpretation
1.	ICT training	3.27	challenged to a moderate extent
2.	Attitude toward ICT	3.24	challenged to a moderate extent
3.	Infrastructure	3.37	challenged to a moderate extent
4.	Technical support	3.37	challenged to a moderate extent
5.	Time	3.22	challenged to a moderate extent
	Overall	**3.29**	**challenged to a moderate extent**

Legend:1.0-1.49 (Not at all); 1.50-2.49 (Challenged to a less extent); 2.50-3.49 (Challenged to a moderate extent); 3.50-4.49 (Challenged to a great extent) 4.50-5.0 (Challenged to a very great extent)

As shown in table above, when it comes in the degree of digital challenges of teacher-respondents, all indicators fall into same verbal interpretation which is "challenged to a moderate extent" and has overall mean score of 3.29. This may indicate that teachers still experience quite challenges when it comes in dealing with technological tools and terms. And it also reveals that the highest mean score 3.37 is the infrastructure and technical support. As stated by Muinde & Mbataru (2019), this indicates that the supply of electricity in schools also seems to be reliable, which can be linked to the government's dedication to and investment in digital learning in the nation's public elementary schools. Since not all schools have a one-to-one ratio of technology resources, such as notebook computers and laptops, Heinrich et al. (2020) propose that the teachers in these types of situations may adapt their approach by promoting peer-shared instruction as students share the available resources.

In line with this, the teacher-respondents has various ways in training about ICT innovations for the past years, for some, the numbers of trainings are overwhelming since it compromises on the short time that the skills need to obtain. Attitude toward ICT is positive for most of the teachers since it helped big time on the time that the traditional method of teaching is not possible. For infrastructure and technical support, the higher management of the division helps teachers to lessen the challenges they are supposed to encounter and prevented it from happening.

Table 3. Summary of the Perception of the Teacher-Respondent on their Instructional Capability

Variables	Mean	Verbal Interpretation
1. Planning and organizing	3.94	Capable
2. Methodology	3.99	Capable
3. Strategy	3.96	Capable
4. Evaluation	4.00	Capable
Overall	**3.97**	**Capable**

Legend:1.0-1.49 (Not capable); 1.50-2.49 (Somewhat capable); 2.50-3.49 (Moderately capable); 3.50-4.49 (Capable) 4.50-5.0 (Highly capable)

The table shows the summary of the instructional capabilities of teacher-respondents. It is evident that they were all capable in every indicator that is given. By that, when it comes in lesson planning and organizing, utilizing technology helps them to ease their job and maximize their time allotted in the process. The technology tools also helped teachers to be able to adjust with ease into different learning methodologies during and after the pandemic. While for the strategy of teachers, it is not new that they are using technology devices to make their teaching process more engaging with the learners, and lastly for the evaluation, there are plenty of applications and processor that can help teachers to compute learners' score in an instant.

The highest mean score of 4.00 is obtained by the indicators under Evaluation and it can be based on the experience of teachers especially during the computation of grades at the end of quarter. Microsoft Excel offers automatic computation just with the help of the correct formula used, it will make this task incredibly easy by just encoding the raw score and the result will show the computed grade at the end.

Table 4. Test of Relationship between Digital Competency and the Instructional Capability of the Teacher-Respondents

Digital Competencies	Instructional Capabilities			
	Planning	Methodology	Strategy	Evaluation
Information	.589**	.641**	.636**	.576**
Communication	.513**	.499**	.479**	.399**
Content Creation	.600**	.634**	.527**	.417**
Safety	.547**	.541**	.438**	.395**
Problem Solving	.485**	.525**	.526**	.478**

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

The statement suggests that a study was conducted, and the results are presented in Table 18. The study aimed to examine the relationship between two constructs: digital competencies and instructional capabilities. According to the table, the test of correlation between these two constructs showed a significant correlation, indicating that they are related to each other.

Furthermore, the majority of the variables in the study were found to be moderately associated. This means that there is moderate relationship between the different aspects of digital competencies and instructional capabilities. In particular, the construct of digital competencies related to information and content creation was found to be strongly correlated with the construct of instructional capabilities in terms of methodology and strategy. This means that individuals who are proficient in creating and managing digital content are also likely to possess effective instructional capabilities, particularly in terms of the methods and strategies they use to teach others.

This conclusion shows that 21st-century skills transcend beyond digital literacy and is supported by the study of Van-Laar et al. (2018). In contrast to digital capabilities, 21st-century talents are not necessarily supported by ICT. On the other hand, Dáz et al. (2016) looked into the relationships among students between pedagogy, ethics, and ICT in their research. In this regard, they noted that the use of ICTs occurs when the learner develops a complete understanding of both cognitive processes for putting them to use in order to advance their knowledge. They concluded that the level of ICT integration into learning approaches was moderate and was based on recent technological advancements. The factors that influence the adoption and use of ICT in teaching and learning have been studied by researchers, who also noted that ICT refers to the use of contemporary technology in the education sector as a whole and not only for one particular purpose.

The teacher-respondents used technology as their medium of instruction, and this has been observed for a long time. For kinder teachers at the division, they have training and seminars that deal with the innovative tools that they can use in teaching the young minds. Since kids nowadays were mostly into the technology devices, teachers used television to get their attention or to motivate them. Playing a song or short story through video presentations catches the learner's eyes and ears. This type of video can have relation on the topic also, they are enjoying the process while learning. With that, the learning process will flow in each mind of the students with less pressure to them to learn a certain skill or to do a task.

Overall, the findings of the study suggest that there is a positive relationship between digital competencies and instructional capabilities, and that these two constructs are interrelated in various ways. These results may have important implications for educators, instructional designers, and others involved in designing and implementing educational programs and interventions that rely on digital technologies.

Table 5. Test of Relationship between Digital Challenges and the Instructional Capability of the Teacher-Respondents

Digital Challenges	Instructional Capabilities			
	Planning And organizing	Methodology	Strategy	Evaluation
ICT Training	.170*	0.099	0.110	0.045
Attitude toward ICT	0.068	0.081	0.071	-0.003
Infrastructure	.179*	.165*	0.125	0.017
Technical support	-0.014	-0.016	0.076	0.068
Time	.176*	0.092	.174*	0.090

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

The table above reveals the results of the correlation of digital challenges and instructional capability of teachers. It is evidently shown that among digital challenges variables, ICT training, infrastructure and time only is significantly related to planning and organizing. This implies that when it come in lesson planning and organizing, teachers only got affected by the challenges related in training of teachers in ICT, their ICT infrastructure, and the time management in ICT integration.

While infrastructure is the only variable that resulted significantly correlated in lesson methodology. This indicates that having an accessible infrastructure in a school, it can make a way to improve the experiments and make the process of learning more visible in other cases that experiments or activities would not even be possible to do without computers.

While in lesson strategy, time is the only digital challenges that resulted to be inter-correlated with. This implies that the teachers' strategies are affected by the time given or allotted in planning the lesson with the integration of technology. Furthermore, the effectivity of the strategy also relies on the time that teachers were able to execute the lesson.

And it also shows that infrastructure appeared significantly related to methodology which means, the methods used by the teachers can be affected by the degree of difficulty that the teachers were experiencing in terms of infrastructure. It is resulted that challenges in terms of time serve as contributor in the instructional capability of teachers in terms of strategy. Other factors, though no correlation in instructional capabilities of teachers contribute to the positive development of teachers' capabilities as indicated in the previous discussions.

Training and seminars act as a bridge for teachers in shifting from the traditional method to the new normal that offers online, modular, and blended types of learning. Specifically, ICT training helps the enhancement in productivity of teachers. In one instance, a webinar occurred on the Division of Santo Tomas during pandemic. It is about reskilling on the preparation of Lesson Exemplar, this type of training helps teachers to update what they already know and what more is needed to learn in lesson planning and organizing. The presenters and speakers of the training shared various techniques in teaching through video presentation. They showed their content made with the detailed demonstration teaching on the trainees. This helps teachers to refresh and get new ideas on making video presentations that is applicable for online methods of teaching. Aside from that, the district webinar on the preparation of ICT-enabled activities with online demonstration teaching. This training helps teachers to prepare their activities and lessons with the use of different applications and programs online. Adobe, Canva and Edmodo is one of the few applications that were introduced or explained. These applications, if learned, may produce an innovative teaching aid.

Overall, the findings of the study suggest that there is a positive relationship between digital challenges and instructional capabilities, and that these two constructs are interrelated in various ways. These results may have important implications for educators and others involved in providing solutions for the challenges that teachers encountered during the integration of technology in the teaching process.

In today's interconnected world, collaborations are crucial aspect in lesson planning and organizing. With the use of technological advancements, teacher-respondents easily obtained resources and other information within and outside their group. Considering that teachers at the division frequently experienced training and workshop, teachers within each Zone collaborate to create content and output that they can implement and be part of their teaching process.

SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

This chapter summarizes the results, conclusion, and recommendations, based on the information gathered, examined and interpreted.

Summary

This study was undertaken to determine the relationship of instructional capability of the teachers and their digital competency and challenges. It shows the competency level of teachers in utilizing technology and finds out if it stimulates their instructional capability level. A total of 160 teachers served as respondents of the study. Descriptive correlational-survey method of research was use and applied questionnaires served as the main tool gathering need information. The researcher used statistics such as mean, standard deviation and Pearson-product moment correlation. The relationship was tested at the 0.05 probability level.

Significant of Findings

Based on the tabulated results, the researcher has come up with the following:

1. The perception of the teacher-respondents on the level of digital competencies in terms of information, communication, content creation, safety, and problem-solving is practiced.
2. The extent of digital challenges experienced by the teacher-respondents in terms of ICT training, attitude toward ICT, infrastructure, technical support, and time is challenged to a moderate extent.
3. The level of the instructional capability of the teacher-respondents in terms of planning and

organizing, methodology, strategy, and evaluation is capable.

4. The instructional capability of the teacher-respondents shows significant correlation with digital competency level and the degree of challenges they faced.

Conclusions

The findings gathered in the study led to the following conclusion.

All measures of digital competencies in terms of information, communication, content creation, safety, and problem-solving, are significantly related to the instructional capabilities of teacher-respondents. While digital challenges in terms of ICT training, infrastructure, and time only are significantly related to instructional capabilities in terms of planning, methodology, and strategy. Therefore, the posited hypothesis for the study is not sustained since there is significant relationship between digital competency and digital challenges with instructional capabilities of teachers.

Recommendations

Based on the above findings and conclusion, the following recommendations are given:

1. The school administrators may organize professional development sessions to encourage cutting-edge methods of technology integration.

2. Universities and other institutions that train teachers should improve and strengthen their instruction in ICT pedagogy.

3. Teachers may be encouraged to take part in training offered to further develop their digital literacy and promote collaborative learning with peers to practice new technical skills and discover new practical applications online that can aid in enhancing their teaching abilities.

4. Future researchers may conduct similar descriptive correlational studies about instructional capabilities of teachers in corresponding with technology integration for innovative instruction.

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