IJORER : International Journal of Recent Educational Research
Homepage : https://journal.ia-education.com/index.php/ijorer
Email : ijorer@ia-education.com

p-ISSN : 2721-852X ; e-ISSN : 2721-7965
IJORER, Vol. 4, No. 5, September 2023
Page 548-569


# Digital Literacy and Digital Competence of Selected Filipino Teachers: Basis for a Post-Pandemic Pedagogy

**Jhessie Lawaan Abella[1*], Elmer Dela Rosa[2]**
[1,2] Central Luzon State University, Distance Open and Transnational University, Philippines


DOI : https://doi.org/10.46245/ijorer.v4i5.378

**Sections Info**
***Article history:***
Submitted: April 16, 2023
Final Revised: June 17, 2023
Accepted: July 13, 2023
Published: September 07, 2023
***Keywords:***
Digital Literacy;
Digital Competence;
Post-Pandemic Pedagogy.

**ABSTRACT**

**Objective:** The study seeks to provide a thorough description of the teachers' digital literacy (DL) and digital competence (DC) and shine a light on the variables that influence the development of their digital literacies and competence. **Method:** Comprehensive data collection and analysis from 274 participants were completed. Descriptive and inferential statistics were conducted to accomplish the objectives of this study. **Results:** It came to light that teachers with less than ten years of experience have higher levels of digital literacy. Pre-service education, having access to ICT resources, and a favorable attitude about using ICT were all strongly associated with DL and DC. The research's essential contribution is its findings affirming the value of DL and DC, which can be utilized to approach new technologies critically and use them as a part of digital pedagogy. **Novelty:** The critical contribution of the research is the result claiming the positive status of DL and DC, which can be used to approach new tools from a critical pedagogical perspective and apply them as part of digital pedagogy.

## INTRODUCTION

The COVID-19 pandemic, known as the Coronavirus pandemic, has dramatically changed the world. The world has been surprised by this unseen enemy who has taken millions of lives and infected millions more by this deadly disease caused by SARS-CoV-2. On March 11, 2020, the World Health Organization declared the COVID-19 outbreak a pandemic, citing the degree of its spread, the number of infected people, deaths, and the number of countries with the disease. This virus's effect is unimaginable, takes a heavy toll across countries' economies, and leaves healthcare near collapsing. Unfortunately, the education sector has not been spared by its ferocity as most countries worldwide impose lockdowns to curve its spread. Due to school closures in response to the pandemic, approximately 1.725 billion students are impacted, as most governments worldwide have temporarily closed educational institutions. The closure of the schools has contributed to minimizing the transmission rate of this disease. This action has been proven effective among closed-contact infections such as influenza and tuberculosis.

In response to the pandemic, the Philippine government has issued Executive Order No. 112, which imposed an enhanced community quarantine (ECQ) in high-risk geographic areas of the Philippines and a general community quarantine (GCQ) in the rest of the country from 01 to May 15, 2020. It has dramatically affected the conduct of classes in areas placed under ECQ and GCQ. In response to the government's mandate, the Department of Education issued DepEd Memorandum 42, s. 2020, which ordered that the 4th quarter examination will no longer be administered. The health crisis has also forced the country to delay the start of the school year to October 5, 2020, and shift.

To remote learning until a coronavirus vaccine becomes available for mass rollout. Additional guidelines have been implemented to conduct remedial lessons, which can be done further in different modalities, including distance learning with technology.

Due to technological, individual, domestic, institutional, and community barriers, the Philippines needs to achieve a digitally prepared educational system. COVID-19 has revealed the significant shortcomings of the Philippine educational system and the ill-prepared teaching staff concerning digital competency. Being digitally skillful is no longer an option but a necessity, especially now. Teachers are urged to use different learning delivery modalities that schools can adopt, which may be one or a combination of the following, depending on the local health conditions, the availability of resources, and the context of the learners in the school or locality such as face to face, distance learning, and blended learning (Batac et al., 2021; Chen & Xu, 2015; D. Agayon et al., 2022; El-Hamamsy et al., 2021; El-Firdoussi et al., 2020; Kallas & Pedaste, 2022; Luke & Kevin, 2022; McGrath et al., 2020). For diverse reasons, these modalities presented enormous challenges and needed to be more attainable for many.

The Philippines has yet to continue providing digital literacy programs to bridge the digital gap. Her study found that teachers, students, and administrators are moderately ready for e-learning. However, utilization and capacity with online learning platforms and teachers' competencies in using digital technology in the Philippines have yet to be explored. It inspired the researcher to look into digital literacy and competence among our teachers and what factors affect the development of these abilities in public and private schools. In addition, there have been limited resources which are available about the current phenomenon under investigation. Therefore, the proponent believes that now is when teachers must become technologically adept to successfully surpass these challenges and enable us to be more equipped with digital knowledge and skills concerning its use in our classroom (Highland & Fedtke, 2023; Onu et al., 2023). This paper further points out the general concept of digital literacy and competence and its role in today's educational challenges brought about by the pandemic. Furthermore, what we can learn from this experience will help us enhance post-pandemic pedagogy and what influences the teacher's digital literacy and competence.

## RESEARCH METHOD

### *Research Design*

The proponents of this study employed a descriptive-correlational research design to shed light on the current phenomenon under investigation.

### *Population Sampling and Respondents of the Study*

This study utilized convenience sampling since most schools in the study locale (Olongapo City) were not in regular operation, and teachers could only work from home due to COVID-19 restrictions, wherein holding classroom classes is still not permitted. A total of 274 participants were recruited to accomplish the objectives of this study.

### *Research Instrument*

The researchers used several adopted instruments from open-source literature. These instruments were content validated, pilot tested, and underwent internal and external consistency evaluation. There were six sections in the instrumentation that were

administered in this study. Approval from the School Division Superintendent was sought before online and in-person data collection using a questionnaire.

The questionnaire on attitudes toward computers was adopted from Selwyn (1997) entitled "Computer Attitude Scale." This questionnaire has been used continuously by many researchers in the 2000s. Being Digital: The Digital Literacy Checklist of The Open University in the United Kingdom was also adopted, which measures four areas of digital literacy: understanding digital practices, finding information, using information, and creating knowledge. The digital competence was assessed using the self-assessment tool developed by the European Digital Competence Framework for Educators. The self-assessment tool allows teachers to reflect on their current take-up of digital technologies for innovative and practical learning. It comprises 22 statements following the concrete action statement as per DigComEdu competence. The scoring rule for the instrument allocates 0 points to the lowest answer options, 1 to the second-lowest, and so on, so that the maximum number of points per question is 4.

### *Statistical Treatment of Data*

Data were analyzed using the Statistical Package for Social Science (SPSS) software. Several statistical tests were run to find the association between the variables and the data sets to answer the $H_0$. Point Biserial Correlations ($r_{pb}$) for nominal dichotomous data, Spearman Rho ($r_s$) for ordinal data, and Pearson R Correlation (r) for continuous data. Finally, a Hierarchical Multiple Regression model was used to examine the prediction between personal and work-related variables, ICT-related variables, and attitude toward the use of ICT and the dependent variables (DL and DC) to isolate predictors that have a significant influence on the respondent's DL and DC.

### *Ethical Considerations*

The study safeguarded participants' freedom to make decisions about themselves. Participants were informed about what is required of them, including the approximate time requirement, questions they may or may not answer, and if they wish to withdraw anytime during the start of data gathering. They were also guaranteed that any information they share in the completion of this study would be highly confidential and would be used to generate quality data for this study.

## RESULTS AND DISCUSSION

### *Results*

This section contains a detailed presentation of data analysis and the results of this study. There were two ways the *p* values were reported (*) means the correlation is significant at 0.050 level, and (**) means the correlation is significant at 0.01 level, both 2-tailed.

### Personal and Work-Related Profile

#### Age

Teachers of all ages were represented in this study. Most respondents were 20-29 years old (52.900%), representing more than half of the respondents. The most senior respondents were 60 and above, accounting for 11 (4.000%) of the respondents. The mean age was computed as 32.500. A mix of Generation Z and Millennial teachers constitute most respondents. This mix of different generations of teachers may bring up a good combination of skills as they can bring new perspectives to the classroom,

especially in using technology while teaching. The digital savviness of millennial teachers can help our new students respond and learn so that they will not lose interest in a discussion since they are proficient in using digital technology in teaching.

**Sex**

The findings of this study showed that male participants dominated the study, accounting for 139 (50.700%), while 135 (49.300%) were females. The presence of both male and female teachers influences students' behavior and gender knowledge. Additionally, the finding suggests that gender inclusion is far more common, particularly in the 21st century, and that gender stereotypes in the teaching profession are a thing of the past, and is evident in the findings where male teachers dominate the research.

**Education Attainment**

Educational attainment, measured by the highest degree of education attained, is linked to several favorable outcomes. Findings showed that more than half of the respondents, or 155 (56.600%), earned a bachelor's degree, while 101 (36.900%) have a post-graduate degree or are currently undergoing post-graduate studies. Only a tiny fraction of the teachers obtained a doctor's degree (6.600%). The COVID-19 pandemic has highlighted the implication of technological adaptation and innovation among teachers and students. Educational attainment among teachers significantly guided them through the horrendous process of technology integration in their classes. Given the findings, even though most teachers only hold BS degrees, they are at an advantage because younger teachers have greater access to technology and are more likely to utilize it regularly for instruction.

**Levels of Students Handled**

According to the findings of this study, 140 (51.100%) handle senior high school (SHS) students, while 134 teachers (48.900%) handle junior high school (JHS) students. Given the limitations and respondents' work arrangements, the distribution of respondents following the inclusion criteria of teaching assignment appears to have a very close representation, indicating that both the population of SHS and JHS teachers were genuinely active during the data collection phase. Since this stage is crucial in training young children to study and master the concepts and life skills to prepare them to be fully integrated into society, the researcher included the teachers handling JHS and SHS students.

**Number of Years in Teaching**

Based on Table 1, most respondents were teaching for less than ten years, 209 (76.300%). A lesser percentage of respondents—8 (2.900%) had been teachers for 30–39 years, and 1 (0.400%) had been in the field for more than 40 years. The average teaching experience was 6.800 years. This outcome is consistent with Table 1 finding that most teachers fall within the age bracket of 20–29. Most teachers with fewer than ten years of experience are seen more favorably than negatively. New-generation teachers have an advantage since they access helpful technology tools. Additionally, it is undeniable that millennials and technology are on par. Therefore, it should be no surprise that millennial teachers are technologically aware and adept at using technology as a teaching and learning tool.

**Employment Sector**

The study's participation rates for public and private school teachers vary slightly. For example, 138 (50.400%) public school teachers and 136 (49.600%) private school teachers participated in the online and in-person surveys. However, the fact that there is a slight disparity in the number of research participants is positive because both sectors were well-represented in this study.

**Table 1.** F Respondent's personal and work-related profile

| **Age** | **Frequency** | **Percentage** |
|---|---|---|
| 20-29 | 145 | 52.900 |
| 30-39 | 69 | 25.200 |
| 40-49 | 36 | 13.100 |
| 50-59 | 13 | 4.700 |
| 60 and above | 11 | 4.000 |
| Total | 274 | 100.000 |
| | $\bar{x}$ = 32.6 *s = 10.8* | |
| **Sex** | **Frequency** | **Percentage** |
| Male | 139 | 50.700 |
| Female | 135 | 49.300 |
| Total | 274 | 100.000 |
| **Education** | **Frequency** | **Percentage** |
| Bachelor's Degree Holder | 155 | 56.600 |
| Master's Degree Holder | 101 | 36.900 |
| Doctorate Holder | 18 | 6.600 |
| Total | 274 | 100.000 |
| **Level of Students Handled** | **Frequency** | **Percentage** |
| Senior High School | 140 | 51.100 |
| Junior High School | 134 | 48.900 |
| **Total** | 274 | 100.00 |
| **Length of Service** | **Frequency** | **Percentage** |
| <10 | 209 | 76.300 |
| 10-19 | 38 | 13.900 |
| 20-29 | 18 | 6.600 |
| 30-39 | 8 | 2.900 |
| 40 and above | 1 | .400 |
| Total | 274 | 100.000 |
| | $\bar{x}$= 6.9 *s = 8.3* | |
| **Educational Institution** | **Frequency** | **Percentage** |
| Private | 136 | 49.600 |
| Public | 138 | 50.400 |
| Total | 274 | 100.000 |

**Faculty Ownership and Utilization of Information and Communication Resources**

The accessibility of ICT resources is crucial to successfully integrating technology in the classroom. In most developing nations, instructors need more ready access to technology to integration (Belay, 2020). Figures 1 and 2 clearly show that Olongapo teachers had access to various personal ICT tools, including desktop and laptop computers, smartphones, internet connections, Microsoft software, and Zoom video conferencing. In particular, 261 out of 274 respondents, or 95.300%, reported having a smartphone and an internet connection. The use of these personal ICT resources was evident from the data, which is encouraging since it shows that these ICT resources

were used daily. Since lessons are typically taken online, the pandemic effect has increased digitalization in students' and instructors' lives and is evident in its daily usage.

**Availability and Utilization of ICT Resources at the School**

A school network's physical and technological elements comprise the ICT infrastructure and resources. The data showed that the School Division of Olongapo had an excellent infrastructure and resources. The teachers' responses demonstrated that they have a computer laboratory (95.600%), an accessible LMS (89.100%), faculty desktops (87.600%), and a reliable internet connection (82.500%), all of which could enhance the teaching and learning process. However, when examining how these ICT school resources are used, teachers must make the most of them, as they did not commonly utilize the LMS and computer lab.

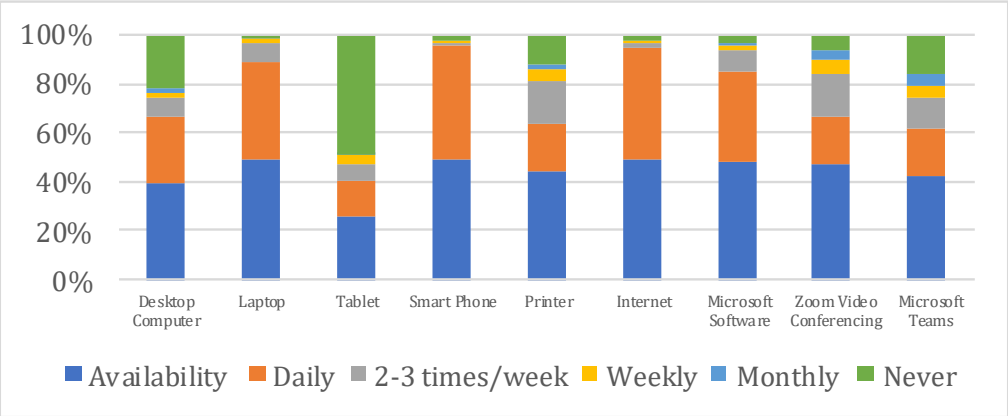


**Figure 1.** Ownership and utilization of faculty ICT.

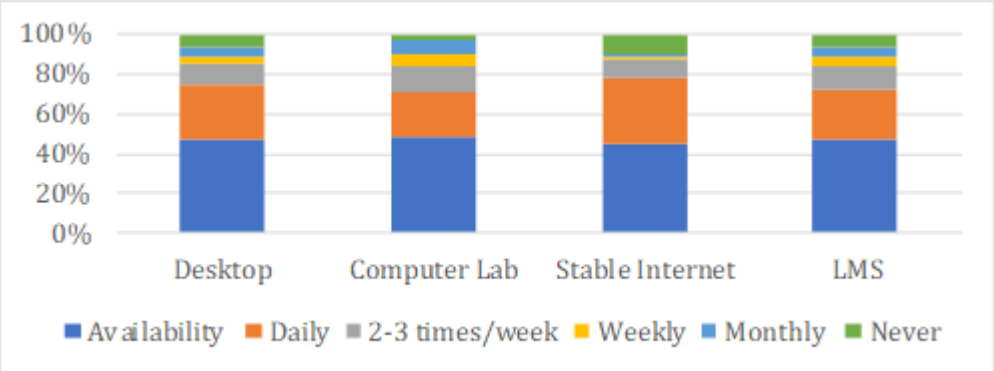


**Figure 2.** Ownership and utilization of school ICT.

**Pre-Service Computer Training**

Most of the study's respondents indicated they had completed computer training during their undergraduate studies. Most respondents—179 (65.300%)—took computer training, while 95 (34.700%) did not. Findings indicated that research participants received additional training in the effective use of technology in the classroom. Both formal methods, such as pre-service training and continual professional development, and informal methods, including teamwork, self-teaching, and repetition, can improve digital competence.

**Attended other ICT Trainings**

Based on Table 2, most of the respondents have received ICT-related training, 155 or 56.600%. Furthermore, one study revealed that teachers who have received ICT-assisted English language instruction training have significantly increased their knowledge of and proficiency with ICT tools for teaching English and their use of ICT tools in that subject. Therefore, ICT training is considered an essential requirement among teachers to develop their knowledge, abilities, and attitudes toward ICT and to support their teaching and learning practices using digital resources and platforms.

**In-Service Training for Teachers**

A teacher's knowledge, skills, and attitude toward various professional practices, including the use of technology in the classroom, are updated through in-service training. The survey found that while 123 teachers (44.900%) had received in-service training regarding using computers and technology in the classroom, 151 instructors (55.100%) had yet to, which is worrisome. A teacher's effectiveness is enhanced through in-service training, particularly with the contemporary style of distance learning, which uses digital technology.

**Table 2.** Frequency and percentage distribution of ICT-related training.

| Training Attended | Frequency | Percentage |
|---|---|---|
| With a pre-service computer course | 179 | 65.300 |
| Attended other training | 155 | 56.600 |
| Received in-service training | 123 | 44.900 |

**Attitude towards the Use of Computer and Digital Literacy (DL)**

The ability to execute a task using the skills acquired via learning is known as competency, and it could be further broken down into skills, knowledge, and attitudes. Nearly every part of modern-day life, including education, has experienced a rapid increase in digitalization processes throughout the height of the pandemic. Therefore, Digital technology function in education has never been more common than it is now, even in the past. Surprisingly, the data indicated positive outcomes, indicating that Olongapo City teachers have a positive affective domain in using computers specifically towards its perceived usefulness ($\bar{x}$ 4.360) and perceived control ($\bar{x}$ 3.490), which overall garners a positive mean rating of 3.500, which is a favorably good indicator.

**Table 3.** Respondents' attitude toward the use of information and communication technology.

| Dimensions | Mean | Standard Deviation | Interpretation |
|---|---|---|---|
| Affective | 3.110 | .710 | Good |
| Perceived Usefulness | 4.360 | .530 | Excellent |
| Perceived Control | 3.490 | .650 | Very Good |
| Behavioral Intent | 3.070 | .820 | Good |
| Total | 3.510 | .520 | Good |

**Digital Literacy Level of Respondents**

Table 4 suggested a favorable results. It could be seen that the respondent got the highest score in finding information (3.950). Overall, it is described that teachers have a very good level of DL. It means that teachers can use information and communication technologies safely and critically for work, both in personal and social classes, which is

the hallmark of a digitally literate individual. Furthermore, the critical features of this ability are the use of computers to find, evaluate, create, display, and share information over the internet. Digital literacy is the ability to function in a society wherein the exchange of information and access is growing through digital technologies such as internet platforms, social media, and mobile devices.

**Table 4.** Respondents' digital literacy score.

| Dimensions | Mean | Standard Deviation | Interpretation |
|---|---|---|---|
| Digital Practice | 3.90 | .740 | Very Good |
| Finding Information | 3.90 | .730 | Very Good |
| Using Information | 3.90 | .780 | Very Good |
| Creating Information | 3.80 | .880 | Very Good |
| Total | 3.90 | .740 | Very Good |

**Digital Competency (DC) Level of Respondents**

This study utilizes the European Framework for the Digital Competence of Educators to describe the DC of the respondents, also known as DigCompEdu, which explains what it means for educators to be digitally competent. The framework assesses 22 skills, which are then organized into six areas. Finally, the level of proficiency is determined by adding the score in all 22 skills questions. The findings provided promising results as they categorized the teachers within the most proficient group of digital competence.

It could be gleaned from Table 5 that respondents were on the expert level, having a mean score of $\bar{x}$ 61.300. An "expert" is characterized as skillfully, creatively, and critically employing various digital tools to advance their professional endeavors. It only further means that the respondent teachers carefully choose which digital technology to use in what circumstances, and they research the advantages and disadvantages of various digital approaches. They also know many things they have not tried yet; they are eager and receptive to new ideas. Their repertory of tactics is expanded, organized, and solidified via experimentation. Experts are the foundation of any educational organization in implementing innovative practices.

**Table 5.** Respondents' digital competence level in terms of their domains.

| Digital Competence | Item Points | Mean Score | Percentage | Standard Deviation |
|---|---|---|---|---|
| Professional Engagement | 16 | 11.100 | 69.600 | 3.300 |
| Digital Resources | 12 | 8.400 | 69.700 | 2.300 |
| Teaching and Learning | 16 | 11.000 | 69.300 | 3.100 |
| Assessment | 12 | 8.400 | 70.000 | 2.300 |
| Empowering Learners | 12 | 8.300 | 69.200 | 2.400 |
| Facilitating Learners' DC | 20 | 14.000 | 70.200 | 3.900 |
| Total | **88** | **61.300** | **69.700** | **14.500** |

*$\bar{x}$= 61.300 s = 14.500*

**Test on the Significant Relationship between Personal and Work-Related Profiles and Digital Literacy**

As shown in Table 6, the respondents' profiles, such as sex ($r = -.170$, $p < 0.010$) and age ($r = -.260$, $p < 0.010$), were negatively correlated with their level of digital literacy. In addition, variables under work-related profiles have shown a negative relationship with digital literacy. Employment sector ($r = -.140$, $p < 0.050$), pre service training ($r=-.170$ $p<0.010$) and finally, years in service ($r = -.190$, $p < 0.010$). Further to these findings,

the digital literacy sub-parameters include digital practice, finding information, using information, and creating significant correlations with the variables.

The theory on which this study is based describes the variables above as personal and positional factors that influence social involvement in technology. Although males and females have equal access to digital technology, there is a significant difference in their digital literacy, which may be attributed to their usage habits. This finding is corroborated by Rizal et al. (2022), who found that male prospective physics teachers have significantly higher digital literacy than female teachers due to their greater use of digital devices.

This study's findings have shown a negative correlation between the employment sector and the DL of teachers. It has implied that public school teachers have lower DL than their counterparts. It is because, despite the availability of ICT resources, access and use still need to be enhanced. Several studies concluded that Filipino Public High School teachers rarely practice digital technologies in teaching and learning during the COVID-19 pandemic (Javier, 2021). In some public schools, ICT resource availability has been an issue that, in turn, affects readiness for the delivery of instruction via distance learning modalities. Among SUCs in Region VIII, the same problem was established. Availability and inadequacy of digital tools and technologies are chronic issues in their locality, and most teachers give less importance to e-learning resources for education. They have yet to use it to its maximum. Continuous utilization of digital technology can enhance an individual's digital engagements and skills. The teachers' ICT access accedes with their level of ICT skill and extent of utilization. Indeed, better access to ICT brings about a higher level of ICT skill and more frequent utilization of ICT.

The advent of technology has significantly transformed teaching pedagogy, which now incorporates digital technologies to support instruction. It has been a significant issue ever since the epidemic began. This study's findings indicate a connection between pre-service training and DL. The findings demonstrate that training activities in digital literacy training for teachers could significantly improve teachers' information literacy skills in terms of identifying various types of potential information sources, using information search strategies into practice, and evaluating the information sources from the web. The majority of the survey participants have less than ten years of experience. Teachers with less professional experience have better digital literacy than teachers with more professional experience. Younger teachers are more digitally literate because they received their education more recently, and everyone is more accustomed to using technology now that it has evolved in this generation compared to earlier.

**Table 6.** Correlation results between personal and work-related profiles of the respondents and teacher's digital literacy.

| Variable | Digital Practices | Finding Information | Using Information | Creating Information | Over-all |
|---|---|---|---|---|---|
| Sex | $r_{pb}$ = -.139* | $r_{pb}$ = -.173** | $r_{pb}$ = -.148* | $r_{pb}$ = -.170** | $r_{pb}$ = -.166** |
| Level of Students Handled | $r_{pb}$ = -.044 | $r_{pb}$ = -.052 | $r_{pb}$ = -.024 | $r_{pb}$ = -.085 | $r_{pb}$ = -.055 |
| Employment Sector | $r_{pb}$ = -.122* | $r_{pb}$ = -.136* | $r_{pb}$ = -.167** | $r_{pb}$ = -.111 | $r_{pb}$ = -.140* |
| Pre-Service Training | $r_{pb}$ = -.134* | $r_{pb}$ = -.178** | $r_{pb}$ = -.158** | $r_{pb}$ = -.177** | $r_{pb}$ = -.171** |
| Training Attended | $r_{pb}$ = -.032 | $r_{pb}$ = -.079 | $r_{pb}$ = -.023 | $r_{pb}$ = -.076 | $r_{pb}$ = -.056 |
| In Service Training | $r_{pb}$ = .013 | $r_{pb}$ = .034 | $r_{pb}$ = .082 | $r_{pb}$ = .085 | $r_{pb}$ = .058 |

| Variable | Digital Practices | Finding Information | Using Information | Creating Information | Over-all |
|---|---|---|---|---|---|
| Age | r = -.221** | r = -.224** | r = -.254** | r = -.270** | r = -.256** |
| Years in Service | r = -.141* | r = -.175** | r = -.203** | r = -.202** | r = -.191** |
| Highest Education Attainment | $r_s$ = .018 | $r_s$ = .024 | $r_s$ = -.021 | $r_s$ = .016 | $r_s$ = .006 |

**Test on the Significant Relationship between Personal and Work-Related Profile and Digital Competence**

Table 7 revealed that age (r = -.157, p <0.010) and pre-service training ($r_{pb}$ = -.171, p <0.010) are considered to have a negative significant correlation with teachers' digital literacy. Years of service, however, only exhibited a correlation with several features of digital competence, such as assessment (r = -.120, p <0.050) and digital resources (r = -.192, p <0.010). The results can be summed up by saying that teachers' DC is more favorable the younger they are. Additionally, teachers who have completed ICT pre-service training have greater DC.

Study shows that age is a substantial factor in computer use and can deter digital access and the capacity to use technology to participate in society. Older age has been linked to less likely to embrace new information technology among persons over 65. The analysis of the results had a favorable influence on the level of digital competence among the teachers in Olongapo City because most of them were more acquainted with digital technology due to their young age. Findings have been validated by the study by Zakharov et al. (2021), wherein they found that age has an impact on teachers' digital competence; it is more significant for teachers between the ages of 35 and 49, while the findings of Romero et al., (2020) disputed that aged between 20 and 50 years demonstrate the greatest digital competences. Research conducted by Fernandez-Cruz & Fernandez-Diaz (2016) found that older teachers aged 56–66 years with extensive teaching experience proved to have a much lower ICT competence than younger teachers with less experience. In addition, they also found that teachers aged between 20 and 25 have the best ICT competence profile. Young teachers fall into the "digital natives" category, are more likely to access, have a more substantial capacity for learning, and use digital resources. As a result, they may better develop their knowledge, abilities, and attitudes toward digital resources.

**Table 7.** Correlation results between personal and work-related profiles of the respondents and teacher's digital competence.

| Personal and Work-Related Profiles | Over-all Digital Competence |
|---|---|
| Sex | $r_{pb}$ = -.017 |
| The level of students handled | $r_{pb}$ = .039 |
| Employment Sector | $r_{pb}$ = -.013 |
| Pre-Service Training | $r_{pb}$ = -.171** |
| Training Attended | $r_{pb}$ = -.045 |
| In Service Training | $r_{pb}$ = -.060 |
| Age | r = -.157** |
| Years in Service | r = -.091 |
| Highest Education Attainment | $r_s$ = .079 |

**Test on the Significant Relationship between ICT Related Variables of Faculty Ownership and Utilization with Digital Literacy**

Digital literacy of teachers was seen as essential when the COVID-19 pandemic hit in early 2020. The globe suddenly shifted to long-distance and online learning, utilizing digital technology to continuously perform their teaching task while minimizing the risk of infection.

Table 8 presents the correlation between the availability and use of digital technology and teachers' digital literacy. Based on the findings, the availability of Zoom video conferencing as a digital tool was correlated with the teacher's digital literacy in terms of findings information ($r = .138$, $p < 0.050$). Furthermore, the utilization of this platform is also correlated with all the components of DL (digital practice $r = .153$, $p < 0.050$, finding information $r = .169$, $p < 0.010$, using information $r = .119$, $p < 0.050$ and creating information $r = .157$, $p < 0.010$).

Zoom video conferencing has been the go-to application during the height of the pandemic. It is the most often selected for academic meetings, as it has been recognized to have several unique features. The platform supported the development of digital literacy by encouraging the four 21st-century learning pillars of communication, collaboration, creativity, and critical analysis. Since most meetings and teacher training sessions were conducted via this platform, technology like Zoom has demonstrated that learning can still occur outside our classrooms' four walls. Zoom makes good sense for academic programs delivering educational content (Nash, 2020). Furthermore, it positively impacts our teachers and students since it may promote learning and growth while keeping everyone safe from the virus's onslaught.

A link between printer usage and a specific DL dimension has also been found. The use of printers by teachers significantly correlates with their engagement in digital practice ($r = .127$, $p<0.050$) and finding information ($r = .131$, $p< 0.050$). Becoming familiar with digital technology is the first step in developing fundamental digital literacy. Digital literacy and computer skills are interwoven. A crucial component of computer literacy is working knowledge of basic computer hardware. Therefore, the longer one is exposed to it, the more it will eventually influence the development of digital literacy. Computer literacy preceded digital literacy (Jang, 2020).

**Table 8.** Correlation results between ownership and utilization of ict by faculty and teacher's digital literacy.

| ICT Infrastructure | Digital Practices | Finding Information | Using Information | Creating Information | Over-all |
|---|---|---|---|---|---|
| **Faculty Ownership** | | | | | |
| Desktop | $r_{pb} = -.077$ | $r_{pb} = -.075$ | $r_{pb} = -.062$ | $r_{pb} = -.046$ | $r_{pb} = -.067$ |
| Laptop | $r_{pb} = -.031$ | $r_{pb} = -.008$ | $r_{pb} = -.059$ | $r_{pb} = -.054$ | $r_{pb} = -.041$ |
| Tablet | $r_{pb} = .028$ | $r_{pb} = .000$ | $r_{pb} = -.018$ | $r_{pb} = -.01$ | $r_{pb} = -.001$ |
| Smartphone | $r_{pb} = .030$ | $r_{pb} = .071$ | $r_{pb} = .032$ | $r_{pb} = .033$ | $r_{pb} = .043$ |
| Printer | $r_{pb} = .081$ | $r_{pb} = .089$ | $r_{pb} = .038$ | $r_{pb} = .001$ | $r_{pb} = .052$ |
| Internet | $r_{pb} = .010$ | $r_{pb} = .016$ | $r_{pb} = -.025$ | $r_{pb} = -.029$ | $r_{pb} = -.009$ |
| Microsoft Software | $r_{pb} = .072$ | $r_{pb} = .092$ | $r_{pb} = .052$ | $r_{pb} = .044$ | $r_{pb} = .067$ |
| ZOOM Videocon | $r_{pb} = .098$ | $r_{pb} = .138^{*}$ | $r_{pb} = .048$ | $r_{pb} = .069$ | $r_{pb} = .091$ |
| Microsoft Teams | $r_{pb} = .035$ | $r_{pb} = .029$ | $r_{pb} = .081$ | $r_{pb} = .065$ | $r_{pb} = .056$ |
| **Faculty Utilization** | | | | | |
| Desktop | $r_{pb} = .097$ | $r_{pb} = .110$ | $r_{pb} = .102$ | $r_{pb} = .087$ | $r_{pb} = .103$ |
| Laptop | $r_{pb} = -.046$ | $r_{pb} = -.076$ | $r_{pb} = -.023$ | $r_{pb} = .006$ | $r_{pb} = -.034$ |

| ICT Infrastructure | Digital Practices | Finding Information | Using Information | Creating Information | Over-all |
|---|---|---|---|---|---|
| Tablet | $r_{pb}$ = .047 | $r_{pb}$ = .022 | $r_{pb}$ = -.001 | $r_{pb}$ = .000 | $r_{pb}$ = .017 |
| Smartphone | $r_{pb}$ = .031 | $r_{pb}$ = .078 | $r_{pb}$ = .032 | $r_{pb}$ = .030 | $r_{pb}$ = .044 |
| Printer | $r_{pb}$ = .127* | $r_{pb}$ = .131* | $r_{pb}$ = .078 | $r_{pb}$ = .058 | $r_{pb}$ = .101 |
| Internet | $r_{pb}$ = .020 | $r_{pb}$ = .030 | $r_{pb}$ = -.021 | $r_{pb}$ = -.027 | $r_{pb}$ = -.001 |
| Microsoft Software | $r_{pb}$ = -.117 | $r_{pb}$ = -.114 | $r_{pb}$ = -.084 | $r_{pb}$ = -.053 | $r_{pb}$ = -.094 |
| ZOOM Videocon | $r_{pb}$ = .153* | $r_{pb}$ = .169** | $r_{pb}$ = .119* | $r_{pb}$ = .157** | $r_{pb}$ = .157** |
| Microsoft Teams | $r_{pb}$ = .000 | $r_{pb}$ = -.022 | $r_{pb}$ = .021 | $r_{pb}$ = .006 | $r_{pb}$ = .001 |

**Test on the Significant Relationship between ICT Related Variables of Faculty Ownership and Utilization with Digital Competence**

Among the ICT resources owned and utilized by the participants, none of the available ICT correlated to the overall DC score of the respondents. Only Microsoft software ownership and utilization have shown a correlation with the sub-dimension of DC. It is different from the DL, which has more ICT resources related to it. DC is more than just a concept of technology-related skills. It is a broader and more profound concept, and I cannot describe it alone with the access and use of digital technology. However, literature still ascertains that the DC is grounded in basic skills in ICT, including its use, access, and exchange of information. This study has proven that the availability and use of some ICT resources are significantly correlated with DC.

**Table 9.** Correlation results between ownership and utilization of ICT by faculty and digital competence.

| ICT Resources | Over-all DC Score | |
|---|---|---|
| | Faculty Ownership | Faculty Utilization |
| **Desktop** | $r_{pb}$ = -.045 | $r_{pb}$ = .062 |
| **Laptop** | $r_{pb}$ = -.032 | $r_{pb}$ = -.036 |
| **Tablet** | $r_{pb}$ = -.084 | $r_{pb}$ = -.076 |
| **Smartphone** | $r_{pb}$ = -.037 | $r_{pb}$ = -.038 |
| **Printer** | $r_{pb}$ = .060 | $r_{pb}$ = .097 |
| **Internet** | $r_{pb}$ = -.038 | $r_{pb}$ = -.046 |
| **Microsoft Software** | $r_{pb}$ = .004 | $r_{pb}$ = -.086 |
| **ZOOM Videocon** | $r_{pb}$ = .002 | $r_{pb}$ = .026 |
| **Microsoft Teams** | $r_{pb}$ = -.041 | $r_{pb}$ = -.075 |

**Test on the Significant Relationship between ICT Related Variables of School Ownership and Utilization with Digital Literacy**

Based on the data presented in Table 10, it was determined that there was no meaningful association between the availability and use of school ICT infrastructure and resources and DL. The limits and work-from-home setting were still in place when this study was completed, which was at the height of the pandemic. It is assumed that the Philippines has been under lockdown for over two years and has one of the world's longest lockdowns and emergencies due to COVID-19 (Atienza, 2022). As a result, teachers were forced to use the limited ICT resources that they individually used since the schools' ICT infrastructure and resources needed to be more utilized.

**Table 10.** Correlation results between availability and utilization of school ict infrastructure and teacher's digital literacy.

| ICT Infrastructure | Digital Practices | Finding Information | Using Information | Creating Information | Over-all |
|---|---|---|---|---|---|
| **Availability in the School** | | | | | |
| School Desktop | $r_{pb}$ = -.048 | $r_{pb}$ = -.098 | $r_{pb}$ = -.046 | $r_{pb}$ = -.043 | $r_{pb}$ = -.061 |
| School Com. Lab | $r_{pb}$ = .055 | $r_{pb}$ = .012 | $r_{pb}$ = .053 | $r_{pb}$ = .067 | $r_{pb}$ = .050 |
| School Stable Internet | $r_{pb}$ = .000 | $r_{pb}$ = -.065 | $r_{pb}$ = -.018 | $r_{pb}$ = -.016 | $r_{pb}$ = -.025 |
| School LMS | $r_{pb}$ = -.025 | $r_{pb}$ = -.071 | $r_{pb}$ = -.034 | $r_{pb}$ = .025 | $r_{pb}$ = -.025 |
| **Faculty Utilization** | | | | | |
| School Desktop | $r_{pb}$ = -.048 | $r_{pb}$ = -.098 | $r_{pb}$ = -.046 | $r_{pb}$ = -.043 | $r_{pb}$ = -.061 |
| School Computer Lab | $r_{pb}$ = .055 | $r_{pb}$ = .012 | $r_{pb}$ = .053 | $r_{pb}$ = .067 | $r_{pb}$ = .050 |
| School Stable Internet | $r_{pb}$ = .000 | $r_{pb}$ = -.065 | $r_{pb}$ = -.018 | $r_{pb}$ =-.016 | $r_{pb}$ =-.025 |
| School LMS | $r_{pb}$ = -.025 | $r_{pb}$ = -.071 | $r_{pb}$ = -.034 | $r_{pb}$ = .025 | $r_{pb}$ = -.025 |

**Test on the Significant Relationship between ICT Related Variables of School Ownership and Utilization with Digital Competence**

Responses were gathered from various public and private schools in Olongapo, revealing a meaningful result for the availability and use of school ICT infrastructure and resources. From the data in Table 11, it can be appreciated that the availability of a Learning Management System (LMS) (r=-.142, p<0.050) and its utilization (r=-.145, p<0.050) significantly correlates with the overall digital competence of teachers. Moreover, data showed that internet availability is associated with several elements of DC, namely professional engagement (r=-.130, p<0.050), digital resources (r=-.120, p<0.050), teaching and learning (r=-.137, p<0.050), assessment (r=-.133, p<0.050) and empowering learners (r=-.125, p<0.050) respectively but not to its overall score. Furthermore, internet utilization correlated to the overall DC score(r=-.121 p<0.050). Lastly, utilizing a computer laboratory significantly relates to the overall DC (r=-.137 p<0.050) and its sub-elements except facilitating learning.

Even though this finding suggests a significant correlation, it expresses an opposite relationship. Although ICT resources are available at school, their utilization could be more significant in some ways. For example, although computer desktops and laboratories are available, teachers cannot use them because most schools were closed during the lockdown due to restrictions posed by the pandemic. Though LMS is available, online software used to create, deliver, track, and report educational outcomes has only recently been widely used. Teachers may need help to incorporate it into their teaching and learning strategies as they need more competency. Poor utilization of these ICT resources hinders professional development (Guzman et al., 2017). In a technology-rich classroom setting, teachers' classroom management abilities and digital competence come together (Moltudal et al., 2019), meaning availability and access play a crucial role in DC.

**Table 11.** Correlation results between availability and utilization of school ICT infrastructure and teacher's digital competence.

| ICT Infrastructure | Over-all DC Score | |
|---|---|---|
| | Availability | Utilization |
| **School Desktop** | $r_{pb}$ = -.037 | $r_{pb}$ = -.063 |
| **School Computer Lab** | $r_{pb}$ = -.070 | $r_{pb}$ = -.137* |
| **School Stable Internet** | $r_{pb}$ = -.118 | $r_{pb}$ = -.121* |
| **School LMS** | $r_{pb}$ = -.142* | $r_{pb}$ = -.145* |

**Test on the Significant Relationship between Attitude towards ICT and Digital Literacy**

Since the COVID-19 pandemic hit most of the globe, the Philippines, like most other nations, has been compelled to change how their country is run into a "new norm," particularly in education. Attitude toward ICT characterizes how the respondents respond toward using ICT concerning their role as teachers. Table 12 showed a correlation between respondents' general attitudes and their level of digital literacy (r =.270, p < 0.010). Additionally, there is strong evidence that perceived usefulness and perceived control are directly correlated with all the sub-elements of DL, including its overall DL (r =.515, p < 0.01, r =.312, p < 0.010).

In the earlier presentation of data, it was discovered that the teachers in Olongapo City have a favorable attitude toward using computers, which validated Nueva (2019), who described that the attitude of Filipino instructors toward technology is very positive. Instructors there had a highly positive attitude toward ICT (Paciente, 2022). The study indicated that having a positive attitude toward using ICT resources may help acquire digital literacy. Even though attitudes may be rigid, some interventions can be utilized to encourage a shift in attitude toward digital literacy. A strong correlation exists between attitudes about ICT and computer proficiency, and computer competence rises with computer proficiency. Perceived usefulness, behavior, and perceived control were the three factors that contributed the most to computer attitude. However, the affective attitude was the most significant contributor. Indeed, it was amply demonstrated by the literature above that the growth of digital literacy correlates with computer attitude.

**Table 12.** Correlation results between attitude towards ICT and teacher's digital literacy.

| Attitude / Literacy | Affective | Perceived Usefulness | Perceived Control | Behavioral Intention | Over-all |
|---|---|---|---|---|---|
| Digital Practices | r = .038 | r = .521** | r = .308** | r = .001 | r = .248** |
| Finding Information | r = .066 | r = .512** | r = -.297* | r = .022 | r = .251** |
| Using Information | r = .087 | r = 496** | r = .295** | r = .003 | r = .263** |
| Creating Information | r = .102 | r = .441** | r = .289** | r = .017 | r = .265** |
| Over-all | r = .079 | r = .515** | r = .312** | r = .002 | r = .270** |

**Test on the Significant Relationship between Attitude toward ICT and Digital Competence**

The findings presented in Table 13 substantiated the conclusions of the preceding table wherein the overall attitude (r=-.130) also correlates with the general digital competence of teachers. Moreover, the elements of attitude, such as affective, perceived usefulness, and behavioral intentions, respectively (r= -.266, p <.001, r= 0.372, p<.000, r= -.130, p

<.005) correlate to the overall digital competence including all of its dimensions respectively.

It is remarkable to see that overall attitude and a number of its dimensions significantly correlate with digital competence. In contrast, other research only finds a few or limited associations between attitude and competency. According to Kallas & Pedaste (2022), only behavioral intention to use digital devices can predict the development of digital skills and knowledge. Teachers perceived usefulness and information ethics could predict teachers' competence (Wu et al., 2022), yet this present study proved that other attitudinal elements are also significantly associated with digital competence.

Nonetheless, it is essential to note that attitude is an important aspect of digital competence, and just like the taxonomy of learning outcomes, the affective domain receives the same recognition. Birgin et al. (2020), educators' attitudes toward computer technology and their perceived computer competence are connected.

**Table 13.** Correlation results between attitudes towards the use of ICT and digital competence.

| Attitude / Competence | Affective | Perceived Usefulness | Perceived Control | Behavioral Intention | Over-all |
|---|---|---|---|---|---|
| Prof Engagement | r = -.329** | r = .274** | r = -.203** | r = -.333** | r = -.234** |
| Digital Resources | r = -.202** | r = .313** | r = -.088 | r = -.212** | r = -.098 |
| Teaching and Learning | r = -.226** | r = .325** | r = -.093 | r = -.300** | r = -.132* |
| Assessment | r = -.184** | r = .346** | r = -.042 | r = -.200** | r = -.063 |
| Empowering Learners | r = -.169** | r = .260** | r = -.019 | r = -.209** | r = -.073 |
| Facilitating Learner's Digital Competence | r = -.207** | r = .350** | r = -.010 | r = -.212** | r = -.064 |
| Overall | r = -.266** | r = .372** | r = -.076 | r = -.296** | r = -.130* |

**Results for the Prediction of Personal and Work-related Profiles, ICT Related Variables, and Attitudes Towards the Use of ICT and the Teacher's Digital Literacy**

Table 14 presented that a three-stage hierarchical regression was conducted to investigate the ability of the variables that earlier correlated with DL. Personal and work-related variables (sex, employment sector, pre-service training, age, and length of service) were entered as model one, ICT-related variables (zoom ownership and utilization) were entered as model two, and lastly, attitude towards the use of ICT as model three to determine the influence to digital literacy.

The hierarchical multiple regression revealed that in Model 1, personal and work-related profiles contributed significantly to the regression model ($F_{(4,269)}$ =5.575, p=.000), which accounted for 7.700% of the variation in digital literacy, which was significant. After the entry of the ICT-related variable in Model 2, the regression model explained an additional 4.2% of the variation in DL, and this change in $R^2$ shows to be significant as well, $F_{(7,266)}$ =5.119, p=.006). Finally, adding attitude to the regression model explained an additional 3.6% of the variation in DL, and this change in $R^2$ was significant, $F_{(8,265)}$ =6.064, p= .001). Statistically speaking, the $R^2$ increased by including more predictor variables in a regression model, which means that the more variables included, the higher the prediction to the DL.

**Table 14.** Model summary and ANOVA of hierarchical regression analysis of independent variables and digital literacy.

| Model Summary | | | | | | | ANOVA[a] | | |
|---|---|---|---|---|---|---|---|---|---|
| **Model** | **R** | **R Square** | **Adjusted R Square** | **R Square Change** | **F Change** | **Sig. F Change** | **F** | **df** | **Sig** |
| 1 | .277[a] | .077 | .063 | .077 | 5.575 | .000 | 5.575 | 269 | .000 |
| 2 | .345[b] | .119 | .096 | .042 | 4.243 | .006 | 5.119 | 266 | .000 |
| 3 | .393[c] | .155 | .129 | .036 | 11.294 | .001 | 6.064 | 265 | .000 |

**a. Predictors: (Constant), age, sex, educational institution, length of service**
**b. Predictors: (Constant), age, sex, educational institution, length of service, owned Zoom, have you taken, oftenusesoom**
**c. Predictors: (Constant), age, sex, educational institution, length of service, owned Zoom, have you taken, often use Zoom, attitude**

As depicted in Table 15, it could be observed that personal and work-related variables, which include age (β = -0.019, Std. error = 0.007, t = -2.597, p=0.010) and pre-service training (β = -0.245, Std. error = 0.092, t = -2.673, p=0.008) were negative predictors of teachers' DL, meaning the younger the teachers, the more advanced their DL is. The same is true with the influence of pre-service training in computers. Those who have received training before professional teaching have higher DL. The attitude toward using ICT was proven to be a positive predictor (β = 0.290, Std. error = 0.086, t = 3.361, p=0.001) of teachers' DL, which means a favorable attitude towards using ICT has a more significant impact on digital literacy. In summary, younger teachers with pre-service ICT training and a positive attitude toward using ICT in the classroom are associated with greater levels of digital literacy.

**Table 15.** Results of the hierarchal regression predicting the influence of IV on digital literacy.

| | **Predictors** | **B** | **Std. Error** | **t** | **Sig.** |
|---|---|---|---|---|---|
| 1 | (Constant) | 4.760 | .230 | 20.708 | .000 |
| | Length of Service | .006 | .009 | .682 | .496 |
| | Sex | -.143 | .092 | -1.556 | .121 |
| | Educational Institution | -.053 | .097 | -.547 | .585 |
| | **Age** | **-.019** | **.007** | **-2.597** | **.010** |
| 2 | (Constant) | 4.788 | .498 | 9.610 | .000 |
| | Length of service | .012 | .009 | 1.342 | .181 |
| | Sex | -.137 | .090 | -1.516 | .131 |
| | Educational Institution | -.045 | .095 | -.473 | .637 |
| | Age | -.021 | .007 | -2.944 | .004 |
| | Zoom Ownership | .026 | .206 | .125 | .901 |
| | **Pre-service Training** | **-.245** | **.092** | **-2.673** | **.008** |
| | Zoom Utilization | .077 | .051 | 1.516 | .131 |
| 3 | (Constant) | 3.674 | .591 | 6.222 | .000 |
| | Length of Service | .011 | .009 | 1.168 | .244 |
| | Sex | -.070 | .091 | -.767 | .444 |
| | Educational Institution | -.010 | .094 | -.102 | .918 |
| | Age | -.019 | .007 | -2.759 | .006 |
| | Zoom Ownership | -.006 | .203 | -.029 | .977 |
| | Pre-Service Training | -.237 | .090 | -2.637 | .009 |
| | Zoom Utilization | .057 | .050 | 1.135 | .257 |
| | **Attitude in Using ICT** | **.290** | **.086** | **3.361** | **.001** |

**Results for the Prediction of Personal and Work-related Profiles, ICT Related Variables, and Attitudes towards the Use of ICT and the Teacher's Digital Competence**

As shown in Table 16, a three-stage hierarchical regression was also conducted to investigate the ability of the variables that correlated to DC. It includes personal and work-related variables (sex, employment sector, pre-service training, age, and length of service) entered as model one, ICT-related variable (zoom ownership and utilization) entered as model two, and lastly, attitude towards the use of ICT as model three to determine the influence to digital competence.

The hierarchical multiple regression revealed that in Model 1, personal and work-related profiles contributed significantly to the regression model ($F_{(1,272)}$ =7.356, p=.007), which accounted for 2.600% of the variation in DC, which was significant. After entering the ICT-related variable in Model 2, the regression model explained an additional 4.800% of the variation in DC, and the changes in $R^2$ were found to be significant, $F_{(6,267)}$ =3.564, p=0.019. Finally, adding attitude to the regression model explained an additional 2.5% of the variation in DC, and this change in $R^2$ was also significant, $F_{(7,266)}$ =4.181, p= .007). Statistically speaking, the $R^2$ increased by including more predictor variables in a regression model, which means that the more variables included, the higher the prediction to the DC.

**Table 16.** Model summary and ANOVA of hierarchical regression analysis of independent variables and digital competence.

| Model Summary | | | | | | | ANOVA[a] | | |
|---|---|---|---|---|---|---|---|---|---|
| **Model** | **R** | **R Square** | **Adjusted R Square** | **R Square Change** | **F Change** | **Sig. F Change** | **F** | **df** | **Sig** |
| 1 | .162[a] | .026 | .023 | .026 | 7.356 | .007 | 7.356 | 272 | .007[b] |
| 2 | .272[b] | .074 | .053 | .048 | 2.757 | .019 | 3.564 | 267 | .002[c] |
| 3 | .315[c] | .099 | .075 | .025 | 7.375 | .007 | 4.181 | 266 | .000[d] |

**a. Predictors: (Constant), age**
**b. Predictors: (Constant), age, frequent faculty use comp lab, have you taken, faculty LMS, faculty freq use internet, faculty freq use LMS**
**c. Predictors: (Constant), age, faculty frequent use comp lab, have you taken, faculty LMS, faculty freq use the internet, faculty freq use LMS, attitude**

As depicted in Table 17, it could be observed that personal and work-related variables, which include age (β = -.010, Std. error = .004, t = -2.712, p=0.007) and pre-service training (β = -.184, Std. error = .085, t = -2.151, p=0.032) were negative predictors of teachers' DC, meaning the younger the teachers, the more advanced their DC is. The same is true with the influence of pre-service training in computers. Those who have received training before professional teaching have higher DC. The attitude toward using ICT also resulted in a pessimistic prediction (β = -.208, Std. error = 0.076 t = -2.716, p=0.007) of teachers' DC, which means a favorable attitude towards using ICT does not guarantee digital competence. In summary, younger teachers and those with pre-service ICT training are associated with greater levels of digital competence.

**Table 17.** Results of the hierarchical regression predicting the influence of IV on digital competence.

| | Predictors | B | Std. Error | t | Sig. |
|---|---|---|---|---|---|
| 1 | (Constant) | 3.112 | .126 | 24.708 | .000 |
| | Age | -.010 | .004 | -2.712 | .007 |
| 2 | (Constant) | 3.661 | .223 | 16.417 | .000 |
| | Age | -.009 | .004 | -2.345 | .020 |
| | Pre-service Training | -.184 | .085 | -2.151 | .032 |
| | Utilization of Computer Lab. | -.054 | .037 | -1.471 | .143 |
| | Availability of School LMS | -.214 | .185 | -1.158 | .248 |
| | Utilization of School Internet | -.011 | .029 | -.394 | .694 |
| | Utilization of School LMS | .014 | .047 | .296 | .767 |
| 3 | (Constant) | 4.414 | .354 | 12.462 | .000 |
| | Age | -.010 | .004 | -2.798 | .006 |
| | Pre-service Training | -.196 | .085 | -2.315 | .021 |
| | Utilization of Computer Lab. | -.055 | .036 | -1.513 | .131 |
| | Availability of School LMS | -.160 | .184 | -.868 | .386 |
| | Utilization of School Internet | -.004 | .029 | -.148 | .883 |
| | Utilization of School LMS | .002 | .047 | .044 | .965 |
| | Attitude Toward the Use of ICT | -.208 | .076 | -2.716 | .007 |

***Discussion***

The pandemic's effect still lingers in our society today and in the educational system. Our educational system cannot afford to get caught flat-footed again by the pandemic and scramble to respond. The challenges experienced during the height of the COVID-19 pandemic can be taken as a wake-up call among our schools, teachers, students, and other stakeholders to prepare for any unforeseen scenario that might take a grip in many areas of our public, including our education sector. The pandemic drove the timely conduct of this study, and it aims to shed light and understand the digital literacy and competence among teachers in Olongapo City and recommend a concrete plan or program that will enhance the DL and DC of teachers. Several variables, such as personal and work-related profiles, ownership and utilization of ICT, and attitudes towards using ICT, were tested to determine its relationship and influence on the teachers' DL and DC.

The outcomes of this study are dominated by age, pre-service ICT training, and attitude toward ICT use, which has significantly impacted the degree of DL and DC among our teachers. When you consider the age of the teachers who have grown up with digital technology, the findings, as mentioned earlier, are more of a strength than a weakness. Younger teachers can bring a tech-positive viewpoint to teaching and learning by integrating digital transformation into education. Other educators who fall into the category of so-called digital immigrants—those who have had to acclimate to the new language of technology can benefit from younger breeds of teachers' digital savviness by learning, embracing technology, and developing their digital literacy and competence (Alakrash & Razak, 2021; Audrin & Audrin, 2022; Pratolo & Solikhati, 2020; Statti & Torres, 2020).

Collaboration between different sets of generation teachers can enhance learning (Romanes et al., 2018), skills, and competency development since millennial teachers can bring different perspectives on using digital technology to support or challenge our generational teachers to adapt to the challenges of digital technology in education. The

interplay of attitude and training is also essential in developing DL and DC. Digital literacy and competence are prerequisite skills to fully and actively join modern-day information societies and economies. The degree to which a teacher thinks using technology would improve their ability to do a job dramatically contributes to their DL and DC, which is perceived usefulness. Emphasis on teachers' attitudes should receive specific consideration because it is essential to their digital development. It is vital to highlight that these actions should be initiated early on while the teachers are still in the pre-service period so that their positive affective reaction to the use of technology in the classroom can inspire positive action toward their commitment to incorporating digital tools in teaching (McGrath et al., 2019). Educational institutions and accredited practice facilities should recognize the importance of preparation because pre-service teachers' feelings about using digital technology may improve as they are exposed to strategies for enhancing their digital skills during their teacher education. Implementing planning and continuous development procedures will give teachers from various generations access to information about new technologies used in a digitalized learning environment (Akour & Alenezi, 2022; Chan, 2023; Kazakova, 2020; Koh & Kan, 2021).

Furthermore, teachers' perceptions of DL and DC in educational practice are higher if they find technology essential (Artacho, 2018). COVID-19 has furthered the use of digital education (Mann et al., 2020). Teachers' earlier professional development experiences majorly impact their pedagogical skills when combined with information technology skills, likely affecting their innovative teaching ideas and active learning strategies (Minea-Pic, 2020). Administrators and educators should view this as a learning opportunity and support further advancing teachers' DL and DC. It may enable our teachers to approach new tools from a critical pedagogical perspective and apply them as part of digital pedagogy.

## CONCLUSION

**Fundamental Findings:** It came to light that teachers with less than ten years of experience have higher levels of digital literacy. Pre-service education, having access to ICT resources, and a favorable attitude about using ICT were all strongly associated with DL and DC. The research's essential contribution is its findings affirming the value of DL and DC, which can be utilized to approach new technologies critically and use them as a part of digital pedagogy. **Implications:** The results of this study may be employed as a reference to prepare and equip our teachers with the knowledge, skills, and attitudes to holistically develop their digital literacy and competence. Most of our teachers are still caught off guard and still learning to get used to the abrupt switch from in-person to online classes in response to the COVID-19 pandemic, despite the School Division of Olongapo City's increasing access to digital technology and being generally compliant in implementing online teaching and learning. **Limitation:** The study was conducted within a particular locality, covering only senior and junior high school teachers. There is limited participation of teachers due to the restrictions of the pandemic. Variables under attitude can be further explored as it only dealt with four domains. **Future Research:** Regarding DL, DC, and post-pandemic pedagogy practices, more study needs to be done with a broader and more varied group of respondents, whether teachers or students.

## REFERENCES


Akour, M., & Alenezi, M. (2022). Higher education future in the era of digital transformation mohammad akour and mamdouh alenezi. *Education Sciences*, *12*(784), 1-13. https://doi.org/10.3390/educsci12110784

Alakrash, H. M., & Razak, N. A. (2021). Technology-based language learning: Investigation of digital technology and digital literacy. *Sustainability (Switzerland), 13*(21), 1-17. https://doi.org/10.3390/su132112304

Artacho, E. G. (2021). Teachers' perceptions of digital competence at the lifelong learning stage. *Heliyon*, *7*(7), 1-8. https://doi.org/10.1016/j.heliyon.2021.e07513

Atienza, M. E. (2022). *The philippines under Lockdown* (1st ed.). Taylor and Francis.

Audrin, C., & Audrin, B. (2022). Key factors in digital literacy in learning and education: A systematic literature review using text mining. *Education and Information Technologies, 27*(6), 7395–7419. https://doi.org/10.1007/s10639-021-10832-5

Batac, K. I. T., Baquiran, J. A., & Agaton, C. B. (2021). Qualitative content analysis of teachers' perceptions and experiences in using blended learning during the COVID-19 pandemic. *International Journal of Learning, Teaching and Educational Research, 20*(6), 225–243. https://doi.org/10.26803/IJLTER.20.6.12

Belay, D. (2020). COVID-19, distance learning and educational inequality in rural ethiopia. *Pedagogical Research, 5*(4), 1-11.

Birgin, O., Uzun, K., & Akar, S. G. M. (2020). Investigation of turkish mathematics teachers' proficiency perceptions in using information and communication technologies in teaching. *Education Information Technology Journal, 25*, 487–507. https://doi.org/10.1007/s10639-019-09977-1

Chan, C. K. Y. (2023). A comprehensive AI policy education framework for university teaching and learning. *International Journal of Educational Technology in Higher Education, 20*(38), 1-25. https://doi.org/10.1186/s41239-023-00408-3

Chen, B., & Xu, B. (2015). A novel method for measuring landscape heterogeneity changes. *IEEE Geoscience and Remote Sensing Letters, 12*(3), 567–571. https://doi.org/10.1109/LGRS.2014.2351575

D. Agayon, A. J., R. Agayon, A. K., & T. Pentang, J. (2022). Teachers in the new normal: Challenges and coping mechanisms in secondary schools. *Journal of Humanities and Education Development, 4*(1), 67–75. https://doi.org/10.22161/jhed.4.1.8

El-Firdoussi, S., Lachgar, M., Kabaili, H., Rochdi, A., Goujdami, D., & El-Firdoussi, L. (2020). Assessing distance learning in higher education during the COVID-19 pandemic. *Education Research International*, 1-13. https://doi.org/10.1155/2020/8890633

El-Hamamsy, L., Chessel-Lazzarotto, F., Bruno, B., Roy, D., Cahlikova, T., Chevalier, M., Parriaux, G., Pellet, J. P., Lanarès, J., Zufferey, J. D., & Mondada, F. (2021). A computer science and robotics integration model for primary school: Evaluation of a large-scale in-service K-4 teacher-training program. *Education and Information Technologies, 26*, 2445–2475. https://doi.org/10.1007/s10639-020-10355-5

Fernandez-Cruz, F. J., & Fernandez-Diaz, M. J. (2016). Teachers' generation Z and their digital skills. *Comunicar Media Education Research Journal, 46*, 97–105. http://dx.doi.org/10.3916/C46-2016-10

Guzman-Simon F, Garcia-Jimenez E, Lopez-Cob I. (2017). Undergraduate students' perspectives on digital competence and academic literacy in a spanish university. *Computers in Human Behavior, 74*, 196–204. http://dx.doi.org/10.1016/j.chb.2017.04.040

Highland, K. D., & Fedtke, J. (2023). Rethinking the essay: Student perceptions of collaborative digital multimodal composition in the college classroom. *Higher Education Pedagogies, 8*(1), 1-22. https://doi.org/10.1080/23752696.2023.2216194

Jang, M., Aavakare, M., Kim, S., & Nikou, S. (2020). The effects of digital literacy and information literacy on the intention to use digital technologies for learning - A

comparative study in Korea and Finland. *International Telecommunications Society (ITS), 45*(7), 1-12. https://doi.org/10.1016/j.telpol.2021.102154

Javier, B. F. (2020). Practices of filipino public high school teachers on digital teaching and learning technologies during the COVID-19 pandemic: Basis for learning action cell sessions. *International Journal of Computing Sciences Research*, 1-16. https://doi.org/10.25147/ijcsr.2017.001.1.67

Kallas, K., & Pedaste, M. (2022). How to improve the digital competence for e-learning? Applied Science, *12*, 1-12. https://doi.org/10.3390/app12136582

Kazakova, E. I. (2020). Digital transformation of pedagogical education. *Yaroslavl Pedagogical Bulletin, 112*(1), 8–14. https://doi.org/10.20323/1813-145x-2020-1-112-8-14

Kim, S., Raza, M., & Seidman, E. (2019). Improving 21st-century teaching skills: The key to effective 21st-century learners. *Research in Comparative and International Education, 14*(1), 99–117. https://doi.org/10.1177/1745499919829214

Koh, J. H. L., & Kan, R. Y. P. (2021). Students' use of learning management systems and desired e-learning experiences: Are they ready for next generation digital learning environments? *Higher Education Research and Development, 40*(5), 995–1010. https://doi.org/10.1080/07294360.2020.1799949

Luke, B., & Kevin, M. (2022). Blending asynchronous and synchronous digital technologies and instructional approaches to facilitate remote learning. *Journal of Computers in Education, 9*(1), 51–70. https://doi.org/10.1007/s40692-021-00195-8

Mann, A., Schwabe, M., Fraser, P., Fülöp, G., & Ansah, G. A. (2020). *How the COVID-19 pandemic is changing education: a perspective from saudi arabia*. OECD Publishing.

McGrath, K., Moosa, S., Bergen, V. P.., & Bhana, D. (2019). The plight of the male teacher: An interdisciplinary and multileveled theoretical framework for researching a shortage of male teachers. *The Journal of Men's Studies, 28*, 1-16. http://dx.doi.org/10.1177/1060826519873860

Minea-Pic, A. (2020). *Innovating teachers' professional learning through digital technologies*. OECD Publishing.

Moltudal, S., Krumsvik, R., Jones, L., Eikeland, J., & Johnson, B. (2019). The relationship between teachers' perceived classroom management abilities and their professional digital competence. *Designs for Learning, 11*(1), 80-98. https://doi.org/10.16993/dfl.128

Nash, C. (2020). Report on digital literacy in academic meetings during the 2020 COVID-19 lockdown. *Challenges, 11*(2), 20-29. http://dx.doi.org/10.3390/challe11020020

Nueva, M. G. (2019). Filipino teachers' attitude towards technology — Its determinants and association with technology integration practice. *Education,* 1-15.

Onu, P., Pradhan, A., & Mbohwa, C. (2023). Potential to use metaverse for future teaching and learning. *Education and Information Technologies*, 1–32. https://doi.org/10.1007/s10639-023-12167-9

Paciente, J. (2022). Information and communication technology (ICT) knowledge, skills, and attitude: Basis for DEPED support system, psychology and education. *Multidisciplinary Journal, 3*(2), 125-137. https://doi.org/10.5281/zenodo.6865072

Pettersson, F. (2018). On the issues of digital competence in educational contexts – a review of literature. *Education Information Technology Journal, 23*, 1005–1021. https://doi.org/10.1007/s10639-017-9649-3

Pratolo, B. W., & Solikhati, H. A. (2020). Investigating teachers' attitude toward digital literacy in EFL classroom. *Journal of Education and Learning (EduLearn), 15*(1), 97–103. https://doi.org/10.11591/edulearn.v15i1.15747

Rizal, R., Rusdiana, D., Setiawan, W., Surahman, E. & Irwan, M. R. (2021). Digital literacy and cognitive abilities of preservice physics teacher in physics for school course using LMS3: How are the both correlated?. *Journal of Physics: Conference Series, 2098,* 1-9. http://dx.doi.org/10.1088/1742-6596/2098/1/012011

Romanes, R., Joy, M. A., & Veniegas, S. (2018). Differences among generational groups of teachers in a public school district in their practice of 21st century teaching-learning skills. *Asian Conference on Education and International Development 2018*, 1-10.

Romero, L. M., Ramírez-Montoya, M. S., & Valenzuela, J. R. (2020). Incidence of digital competences in the completion rates of MOOCs: Case study on Energy Sustainability courses. *IEEE Transactions on Education*, 1-7. https://doi.org/10.1109/TE.2020.2969487

Selwyn, N. (1997). Students' attitudes toward computers: Validation of a computer attitude scale for 16–19 education. *Computers & Education, 28*(1), 35-41. https://doi.org/10.1016/S0360-1315(96)00035-8

Statti, A., & Torres, K. M. (2020). Digital literacy: The need for technology integration and its impact on learning and engagement in community school environments. *Peabody Journal of Education, 95*(1), 90–100. https://doi.org/10.1080/0161956X.2019.1702426

Wu, D., Zhou, C., Li, Y., & Chen, M. (2022). Factors associated with teachers' competence to develop students' information literacy: A multilevel approach. *Computer Education, 176*, 1-19. https://doi.org/10.1016/j.compedu.2021.104360

Zakharov, K., Komarova, A., Baranova, T., Gulk, E. (2022). *Information literacy and digital competence of teachers in the age of digital transformation*. Lecture Notes in Networks and Systems, 247. Springer, Cham.

*__Dr. Jhessie Lawaan Abella__
Central Luzon State University
Distance Open Transnational University, Science City of Munoz, Nueva Ecija, Philippines
Learning and Development Manager, Al KHafji National Hospital, Kingdom of Saudi Arabia
Email: jlabella@dotclsu.edu.ph

**Dr. Elmer Dela Rosa**
Central Luzon State University
Distance Open Transnational University, Science City of Munoz, Nueva Ecija, Philippines
Email: eddelarosa@dotclsu.edu.ph