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(RESEARCH ARTICLE)

Technology competency map of the teachers in the new normal

Ma. Ronavie M. Ternida *

National Teachers College, Graduate School of Teacher Education, Manila, Metro Manila, Philippines.

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Abstract

Background: Technology can help the constructivist learning process by making abstract concepts and facts more grounded in personal experiences and the values of learners and also by allowing the learning experience to be differentiated for individual learners (e.g., through personalized developmentally-appropriate software).

Aim: The paper would like to find out the technology skills of students amidst pandemic.

Methods: The study used descriptive research design. Descriptive design is suitable wherever the subjects vary among themselves and one is interested to know the extent to which different conditions and situations are obtained among these subjects. The method of gathering data is a survey questionnaire which is a product of a thorough reading of related literature and studies. After the construction, the questionnaire was validated by the experts.

Conclusion: The highest rating among the indicators of technology skills were the items “Take digital pictures and download them to my computer.” and “Upload video, PowerPoint and other outputs for presentation or sharing.” All categories – age, length of service, and educational attainment have significant differences in their mean responses, thus, these groupings have influenced the ratings of teacher-respondents on their technology skills.

Keywords: Technology; Skills; Software; Mapping

1. Introduction

(This part presents in an APA format and IMRaD style of writing which includes the reason why the study is undertaken, purpose of the research and the research questions together with the tested hypothesis/es).

Business, education, entertainment, and interpersonal communications are all significantly impacted by technology. Technology makes it possible for people to connect in ways that were unheard of fifty years ago, making it perhaps the most effective tool for advancing the global community. (Bowman & Bowman, 2018; Granello, 2019; Sussman, 2019; Thomas, 2018). In brief, the Internet, which was once thought a passing fad has become an integral part of daily life and communication for millions of individuals around the world.

Rapid advancements in technology and the speed at which consumers embraced the Internet has created challenges for both consumers and providers. Being able to interact with others around the globe instantly with minimal limits has long been considered a benefit of the web (Heinlen, Welfel, Richmond, & Rak, 2019). Increased accessibility has facilitated a rapid increase in the volume and variety of products and services offered on-line.

Delivery of education is also changing as a result of technological advancement. Technology-assisted word-processing, record keeping, information dissemination, and communication related tasks are common practice. Scholars have

* Corresponding author: Ma. Ronavie M. Ternida

embraced utilizing the web to work collaboratively with colleagues from around the world, to conduct research, and to publish (Rowand, 2019; Smerdon & Cronen, 2019; Thomas, M., 2018). Many educators are utilizing PowerPoint and multimedia programs to enhance the delivery of material in physical and virtual classrooms.

In addition, the Internet provides educational institutions an opportunity to offer courses to students regardless of geographical location and to solve the eternal challenge of adequate physical space (i.e., classrooms, offices, and parking) (Altekruse & Brew, 2019; Jencius, 2018; Leary, 2019; Lee, 2019). Professionals from various disciplines meet continuing education requirements via on-line educational offerings. As a result, individuals, private companies, corporations, and academic institutions have reduced their travel budgets in favor of virtual education.

With the widespread outbreak of the coronavirus disease 2019 (COVID-19) pandemic in March 2020, schools around the world have been forced to shift from classroom-based methods of instruction to some form of remote learning, or none at all. Remote learning therefore has become a necessity rather than an option, as described by Doghonadze, Aliyev, Halawachy, Knodel, and Adedoyin (2020): "The whole world had to switch over for an indefinite period to distance learning because the alternative to it was stopping any education, which, of course, is unacceptable" (p. 4). The requirement to shift to remote learning—at scale and with little to no time to plan—changes how one might typically think of "e-Learning readiness" or "technological readiness." What skills, infrastructure, and resources are required on the part of teachers, students, families, and education officials for such a monumental shift? What existing models can we look at to answer this question, and to better prepare teachers for moments like this in the future? The shift from traditional teaching methods to remote learning during school closures and stay-at-home orders is clearly a complex process requiring communication and cooperation among policymakers, administrators, teachers, parents, and others. Information and communications technology (ICT) necessarily plays an important role in facilitating communication as well as, potentially, instructional delivery, but this may be very different than the purposes that most school-based ICT in education initiatives were designed for. The nature of the COVID-19 pandemic and the need for social distancing or even strict isolation means technology-supported communication may be the only possibility for learning delivery, unlike alternative solutions during school closures resulting from other types of emergencies (e.g., conflicts or natural disasters.).

Education systems integrate technology in the curriculum for many reasons. Pouezevara, Dinçer, Kipp, and Sariişik (2020) noted that large-scale, central government purchase of school-based technology, such as one-to-one tablet initiatives, are motivated by either societal, political, economic, or educational transformation. In the areas of societal and economic transformation, ICT in education makes an important contribution because computer literacy is considered an important lifelong, or "21st Century," skill that will support transition to the workplace (Kozma, 2019). For this reason, many school-based ICT initiatives exist mainly to impart knowledge and skills about computers. In terms of educational transformation, some ICT in education programs are driven by hopes that personalization of learning, embedded interactivity and multimedia delivery can improve the quality of education by learning with technology, not just about it (Osterwiel, et al., 2018). Some will argue, particularly for secondary level or tertiary education, that technology-enabled remote learning is a cost-effective, efficient alternative because it can reach learners anytime and anywhere (Lee, Yoon & Lee 2019) and that the learning experience is improved through "connectivism," or shared learning among diverse individuals (Siemens, 2019). Based on the most recent policy statements from the Department of Education (DepEd), including the August 2019 comprehensive policy guidelines on Kindergarten through Grade 12 implementation, the situation in the Philippines could be characterized as primarily driven by the former goal—making education more relevant to 21st century skills and anticipated importance of technology to the labor market (Dunuan, 2020).

Although the field of technology in education may feel pressure to integrate technology in schools in order to transform education by "learning with technology", it turn out that during COVID-19 school closures in the Philippines, the previous efforts to develop digital literacy and competency communicating using technology may serve teachers and learners more than anything else.

The case studies on OECD schools deal with potential changes in education, and that lead to the introduction of technological competence (González, 2018). The teacher is a determining factor in the transmission of technological competence and must be updated constantly, the student becomes the center of the teaching-learning process, and it must receive the full support of the teacher. The smart classroom is another factor in this process (Lozano-Diaz, 2019; Jaramillo et al., 2019). All these elements can be feasible to achieve academic excellence in the education of our country. According to the OECD (Organization for Economic Cooperation and Development), responsible for conducting the evaluation every three years to the national education system, internationally, by the PISA (Programme for International Student Assessment , LLECE (Laboratory for Assessment of the Quality of Education) and the test EXCALE (Assessment of the National Institute for the Evaluation of Education for students between 15 and 16 years), our country is among the lowest in education is concerned (Naresh, 2019). It is critical professional preparation, updating the knowledge and skills of each teacher, to communicate what they know, because of the emergence of the powers in the international context in which the student becomes the center of teaching and learning in the classroom (Tornimbeni et al., 2018). In addition, technology is a determining factor in their education. Therefore, education must ensure student learning, through a constant process of updating by the teacher to address the changes in education. The approach must express three criteria problem statement either:

- The relationship between two or more variables,
- Be stated clearly and unambiguously as question,
- The problem must meet possibility of being subjected to an empirical test (wills and garcia-cabrera, 2019).

Are the technological competencies affect/improve the academic performance of a student population? The technical competence: teachers, Internet, smart classrooms, improve student academic performance through the use thereof by the teachers in class, learning to pass and also that students are responsible to use these skills in relation the learning process (Karsienti and Lira, 2019). Thus, the importance of the proper use of technological competence, by the teacher and the student in the classroom, improve education of new professionals in society (Cuevas et al., 2019). Also, the use of these in the classroom opens up new possibilities for development of skills that generate new knowledge in education, skills and retrain teachers and students have (Mirador University, 2019). As technologies in general and media in particular have broken into homes, is necessary for students to become more technological competent which this study aims to focus, technology skill mapping of students amidst the pandemic.

The 1st ICT skills acquired by these students helped them move to the new skills. In many academic institutions, Zoom became the main communication tool and became within days an integral part of the institutional culture (Artigue (2019). Reimers and Schleicher (2020) mention the large "disparity in access to technology, connectivity and skills to engage with technology faced by students from different socioeconomic groups." For our students it was also necessary to use the internet at home. This was no small matter because of their culture. Adding the teachers to the population under study makes these disparities bigger. If, generally, some distance training had been organized for the teachers enabling them to learn the new technologies by using them, nothing had been offered to students. They had to acquire new skills almost alone and to re-invent their learning environment and their communication channels between other students and between students and teachers. Actually, this second process has been a clear example of the mutual influence of teachers on students and of students on teachers. Because of previous usage and mastering of the technology, or because of the security drawbacks of the communication software chosen by the institution, some lecturers chose a different communication technology. At the beginning, this made the switching process from standard academic learning to distance academic learning harder for many students with technology-supported learning.

Technology-Supported Learning (TSL) is described as the incorporation of technology into learning environments that can enhance knowledge, skills and attitudes (Wu et al., 2020). Technology Supported Learning is not merely the adoption of software and applications to manage the learning environment effectively, but it is a well-structured tool that addresses the educational aims and objectives of enhancing the student's acquisition of worthwhile educational objectives by introducing technological devices (Corte, 2019; Zheng et al., 2019). Literature shows that there are broadly two modes of delivery for the Technology Supported learning environment (Synchronous and Asynchronous modes).

In the Synchronous mode, a face–to–face environment that entails the simultaneous presence of the instructor and the learner(s) is created. The mode of delivery can take place either via online learning, i.e. use of video conferencing, live chat and instant messaging or in a face–to–face environment, which allow real time interaction for the learners in synchronous online teaching. The environment allows students/instructors to ask questions, share applications, conduct live presentations and surveys, manage group dynamics, share digital whiteboards and also conduct online assessments in real time.

However, the 'Asynchronous' mode of delivery allows a convenient environment to the learner, which includes (but not limited to) online material such as; audio and video clips, communication through discussion board and email. With asynchronous mode the learners can work on their own pace and time of the day. Though the instructor input is very different from the synchronous environment such as shorter visits to discussion boards or forums, it allows more valuable and structured feedback to the learners as compared to a single, long session. Thus, a 'blended' approach can bring together the advantages of synchronous and asynchronous teaching, into a single experience. On the other hand, a number of studies show that learning through either mode of delivery can only be effective when aligned with the understanding of learning pedagogy and how their use can be utilized to support the different stages of the learning process. The rest of this section will therefore discuss the pedagogy of learning and the important role that it plays in supporting students' learning within the engineering discipline when coupled with the use of Technology Supported Learning tool.

When assessing the impact of technology on the attitudes of students with different abilities, the dependent variable would be a measure of attitude, while the independent treatment variable would be a measure of ability, and the independent control variables would include student characteristics other than ability. Clearly, rigorous research must integrate measures of student characteristics, whether they are used as dependent or independent variables. Assessing Computer Literacy Computer literacy is a broadly defined construct that may transcend all five of the student characteristics. This complicates the development of a unified measure that would have broad application to a variety of issues. Consequently, individual researchers have operationalized the construct with measures that were appropriate for their more narrowly defined research issues. For example:

- Computer Attitude Scale (CAS)- developed to measure positive and negative attitudes towards computers (Loyd and Gressard, 2016)
- Computer Anxiety Rating Scale (CARS)- designed to measure the degree to which interaction with computers (actual or anticipated) would affect individual performance (Heinssen, Glass, and Knight, 2016)
- Computer Self-Efficacy Scale (CSES) - developed to measure individual's perceptions of capabilities regarding specific computer-related knowledge and skills (Murphy et al, 2016).

These scales are mentioned because 1) they suggest the multidimensional nature of computer literacy and 2) their psychometric properties have been established as acceptable (Harrison and Rainer, 2017; Loyd and Gressard, 2016; Nickell and Pinto, 2016). Also, it is worth noting that some studies found statistically significant differences in scores based on gender and age: men (and young people) have more positive attitudes (Nickell and Pinto, 2016), higher self-efficacy beliefs (Murphy et al, 2016), and less computer anxiety (Liu et al, 2017). In contrast, Heinssen et al (2016) found no gender-based differences in computer anxiety, when the subject pool was younger and more homogeneous than that used by Liu et al. Thus, the evidence suggests that these measures may be correlated with student characteristics such as age and gender. These measures have not been widely used as covariates in outcomes assessment. This is explained, in part, by their issue-specific nature, which diminishes their generalizability. In addition, the technology has evolved faster than some components of the scales: Some questions refer to mainframe computing rather than distributed computing. The measures also are criticized for focusing on computer literacy when the emphasis should be on computing literacy– computer use that enriches one's professional and personal life (Amini, 2017).

The present study is anchored on two prominent theories, the Connectivism and Constructivism Theory. Connectivism holds that the process and goals of learning in a highly networked and connected world is different than learning in the predigital world, because learners are now persistently connected to information sources and other resources through their electronic devices, such as smartphones or laptops. From the connectivist perspective, learning need not be isolated to the mind, but becoming a learned and capable citizen in a digital society requires learners to become connected with one another in such a way that they can make use of the network as an extension of their own mind and body. Thus, from a connectivist perspective, the goal of education is to more fully and efficiently connect learners with one another and with information resources in a manner that is persistent and in which learners can make ongoing use of the network to solve problems. From this perspective, technology can be used to improve learning experiences by more fully connecting students with one another and information resources in a persistent manner.

Constructivism holds that learning is constructed by learners on top of previous experience, attitudes, and beliefs. This means that for learning to occur, new learning experiences must take into consideration these human factors and assist the individual in assimilating new knowledge to their existing knowledge constructs. Thus, if you are teaching students about fractions, you must teach them using language that they will understand and connect their learning to experiences in their own lives that will have meaning for them. Technology can help the constructivist learning process by making abstract concepts and facts more grounded in personal experiences and the values of learners and also by allowing the learning experience to be differentiated for individual learners (e.g., through personalized developmentally-appropriate software).

The paper would like to find out the technology skills of teachers amidst pandemic. Specifically, it sought to answer the following questions: (1.) What is the profile of the teacher-respondents in terms of age, sex, educational attainment and length of service? (2.) What is the assessment of the teacher-respondents on their technological skills? (3.) Is there a significant difference in the assessment of the respondents on their technological skills when they are grouped according to their profile? And (4.) Based from the results of the study, what skills map of teachers in the new normal can be proposed?

Furthermore, this study hypothesized that there is no significant difference in the assessment of the respondents on their technological skills when they are grouped according to their profile. The technological skills were described based on the assessment of the respondents. The data were gathered through a survey, unstructured interview and documentary analysis. Then, the data were treated statistically using percentage, weighted mean and ANOVA. The findings of the aforementioned study were helpful in developing skills map of teachers in the new normal.

In view thereof, the above theory and concepts served as basis for the researchers to conduct this study. The reviewed literature and studies are all very viable and they helped the researcher conceptualized the study and established the relationship of variables. Figure 1 explains further the relationship of the different variables discussed in the study.

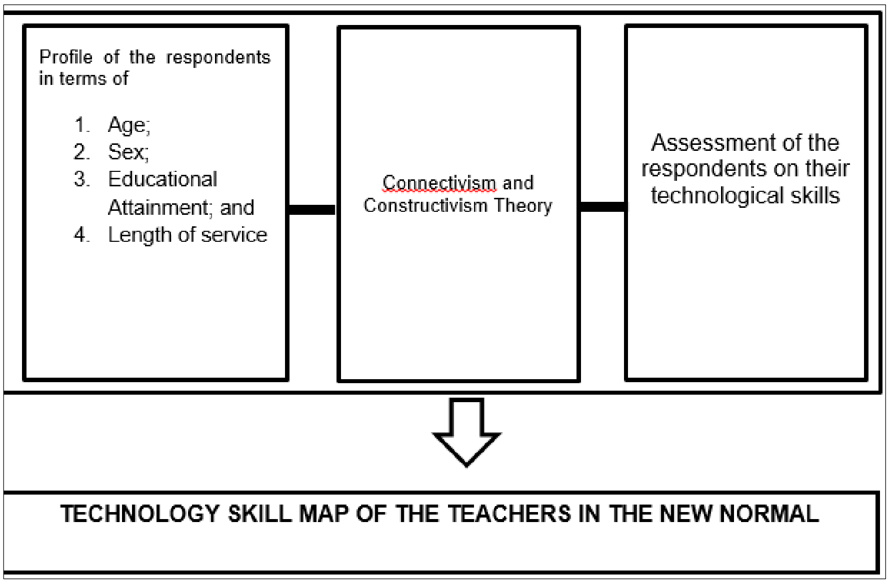

Figure 1 Relationship of variables

As shown in the figure, the researcher first determined the profile of the teacher-respondents in terms of age, sex, educational attainment and length of service.

- Then, the determined the assessment of the respondents on their technological skills.
- This was the basis in developing skills map of teachers in the new normal.

The researcher believes that this study is beneficial to the following:

Students will enhance their basic computer skills necessary during distance learning. The teachers will be informed on how to make technology an integral part of the classroom setting for the development of learners'' technological skills. Through the results of this study, principals can train teachers on new tech skills and integrate them into their instruction. DepEd officials can design programs for teachers to enable them to make competent use of technology particularly this time of pandemic and beyond. Furthermore, findings of the study will provide guide to the future researchers and serve as reference to any study similar to what is being investigated by the study at hand.

Meanwhile, for better understanding, the researcher has provided both the conceptual and operational definition of the following terms

- **Mapping**. In this study, this means identifying the competencies or skills of learners on the use of technology for learning.
- **New Normal**. This mean a current situation, social custom, etc., that is different from what has been experienced or done before but is expected to become usual or typical. In this study, this refers to the new normal in education.
- **Pandemic**. This refers to the worldwide spread of a new disease, such as a new influenza virus or the coronavirus, COVID-19
- **Technology Skills**. In this study, these are the abilities of students to perform computer functions and tasks.

2. Material and methods

(This part of the paper includes the when, where and how was the study done, materials being used, and who were the respondents/participants of the study).

The researcher used descriptive research design. Descriptive design is suitable wherever the subjects vary among themselves and one is interested to know the extent to which different conditions and situations are obtained among these subjects. The word survey signifies the gathering of data regarding the present conditions. A survey is useful in: (1) providing the value of facts; and (2) focusing attention on the most important things to be reported.

Specifically, the type of descriptive aside from the generic descriptive design is status which is problem solving and seeks to answer questions to real facts relating to existing conditions. This is a technique of quantitative description which determines the prevailing conditions in a group of cases chosen for the study.

Descriptive status is a problem solving which seeks to answer questions to real facts relating to existing conditions. This is a technique of quantitative description which determines the prevailing conditions in a group of cases chosen for the study.

The method of gathering data is a survey questionnaire which is a product of a thorough reading of related literature and studies. After the construction, the questionnaire was validated by the experts and were piloted to respondents who were not included in the survey and the researcher's colleagues and she asked the help of her former professors in the graduate school in the revision of the survey. Moreover, the last step in the validation was proposal defense where the comments and suggestions of the panel were included in the revision.

The respondents of the study were teachers of Aniban Central School a public school in Aniban II, Bacoor City Cavite. The locale was chosen to address the gap in computer literacy among the teachers during the implementation of Face to Face Classes. Teachers will need timely professional development and training opportunities to learn not just how to teach effectively, but also how to assist learners learning in actual, who may not have used computers or technologies before.

The respondents were randomly selected. After the gathering of data and asking permission from the different offices, the gathered data were subjected to statistical treatment of data.

3. Results and discussion

The findings of this study are presented under the following major headings: profile, mean scores, and comparison of mean scores.

Table 1 Number of Teacher-respondents Grouped according to Age and Length of Service

	Length of Service (years)						
Age	**Less than 5**	**5 to 10**	**11 to 15**	**16 to 20**	**21 to 25**	**More than 25**	**TOTAL**
26 to 30	11	10	0	0	0	0	21
31 to 35	0	6	5	0	0	0	11
36 to 40	0	3	9	7	0	0	19
41 to 45	0	0	2	1	3	0	6
more than 45	0	0	0	8	12	3	23
TOTAL	11	19	16	16	15	3	80

Table 1 shows the number of teacher-respondents grouped according to age and length of service. In the age bracket "26 to 30", there was 11 respondents who has been in service for less than 5 years. In the age bracket "31 to 35", most of the respondents have been in service for 5 to 10 years. In the age bracket "36 to 40", there were 9 respondents who have been in service for 11 to 15 years, In the age bracket "41 to 45" there were 3 respondents who have been in service for about 21 to 25 years. In the age bracket of "more than 45", the length of service that had the highest frequency is 21 to 25 in service.

Table 2 Number of teacher-respondents grouped according to age and educational attainment

	Educational attainment			
Age	**Bachelor's degree**	**with MA units**	**Master's degree**	**TOTAL**
26 to 30	9	9	3	21
31 to 35	7	3	1	11
36 to 40	8	9	2	19
41 to 45	4	2	0	6
older than 45	18	4	1	23
TOTAL	46	27	7	80

Table 2 shows the number of teacher-respondents grouped according to age and educational attainment. In the age bracket "26 to 30", there was 9 respondents with Bachelor's degree, 9 respondents with MA units and 3 with Master's degree. In the age bracket "31 to 35", there were 7 respondents who have bachelor's degree, 3 with Ma units and 1 with Master's degree. In the age bracket "36 to 40", there were 8 respondents with Bachelor's degree, 9 with MA units and 2 with Master's degree. In the age bracket "41 to 45", there were 4 respondents with Bachelor's degree and 2 respondents with MA units. For the respondents who are older than 45, there were 18 with bachelor's degree, 4 with MA units, and 1 with master's degree.

Table 3 Mean of technology skills ratings of teacher-respondents

Technology Skills	**Mean**	**Interpretation**
Create a functioning web page with Microsoft Word.	2.29	Basic
Map a network drive to my web folder (or team web folder, if applicable)	1.94	Basic
Connect and use the Smartboard	2.12	Basic
Connect and use an LCD projector with my laptop	2.76	Proficient
Connect and use the CPS (Classroom Performance System) software	2.00	Basic
Create lessons or assessments in the CPS (Classroom Performance System) software	2.03	Basic
Take digital pictures and download them to my computer	2.85	Proficient
Take digital video and download it to my computer	2.79	Proficient
Analyze data and create graphs in Microsoft Excel	2.62	Proficient
Save files so they can be opened in different software versions (i.e. Word 97 vs. Word 2019)	2.56	Proficient
Track changes and use commenting features for peer editing.	2.38	Basic
Use advanced formatting skills to align to established citation styles and use page layout features when appropriate.	2.18	Basic
Create presentations using a variety of applications for diverse audiences and purposes.	2.38	Basic
Use appropriate transitions and animations to enhance points and add interest.	2.32	Basic
Use appropriate technology tools (e.g., dictionary, thesaurus, grammar checker, calculator/graphing) to maximize the accuracy of work.	2.62	Proficient
Make strategic use of digital media, video, podcast, text, etc., to enhance understanding.	2.29	Basic

Use and modify databases and spreadsheets to analyze data and propose solutions.	2.26	Basic
Use source analysis strategies to determine the credibility of search results (e.g. existence of cross references, domain name examination (.org, .edu., .com, etc.), date of last update, etc.).	2.12	Basic
Use Web browsing to access information (e.g., enter a URL, access links, create bookmarks/favorites, print Web pages).	2.56	Proficient
Upload video, powerpoint and other outputs for presentation or sharing	2.85	Proficient
Manage virtual classes using various platforms	2.59	Proficient
Manage virtual engagements like meetings or workshop with several interactive apps.	2.59	Proficient

Table 3 summarizes the mean of technology skills ratings of teacher-respondents. Items 2.7 and 2.20 were rated the highest among the given technology skills (mean = 2.85, Proficient) and item 2.2 was rated the lowest (mean = 1.94, Basic).

Table 4 Mean of Technology Skills Ratings of Teacher-respondents grouped according to Age

	Items										
Age	**2.1**	**2.2**	**2.3**	**2.4**	**2.5**	**2.6**	**2.7**	**2.8**	**2.9**	**2.10**	**2.11**
26 to 30	1.00	1.00	1.00	3.00	1.00	1.00	4.00	4.00	4.00	3.00	2.00
31 to 35	3.00	2.67	2.33	2.83	2.17	2.17	3.00	3.00	3.17	3.17	3.00
36 to 40	2.57	2.29	2.71	3.29	2.29	2.43	3.14	3.00	3.29	3.00	2.71
41 to 45	2.20	1.60	1.60	2.80	2.00	2.00	2.80	2.80	2.00	2.20	2.00
older than 45	2.00	1.67	2.00	2.47	1.87	1.87	2.60	2.53	2.20	2.20	2.13
	Items										
Age	**2.12**	**2.13**	**2.14**	**2.15**	**2.16**	**2.17**	**2.18**	**2.19**	**2.20**	**2.21**	**2.22**
26 to 30	1.00	2.00	3.00	3.00	3.00	3.00	2.00	3.00	4.00	3.00	4.00
31 to 35	2.67	2.67	2.67	3.00	2.50	2.67	3.00	3.00	3.17	3.17	3.00
36 to 40	2.71	3.00	3.00	3.14	2.71	2.86	2.57	3.14	3.29	3.14	3.14
41 to 45	1.80	2.20	1.80	2.40	2.00	1.60	1.60	2.40	2.80	2.20	2.20
older than 45	1.93	2.07	2.00	2.27	2.07	2.00	1.73	2.13	2.47	2.20	2.20

Table 4 summarizes the mean of technology skills ratings of teacher-respondents grouped according to age. In the age bracket “26 to 30”, the respondent rated items 2.7, 2.8, 2.9, 2.20, and 2.22 the highest (mean = 4.00) and rated items 2.1, 2.2, 2.3, 2.5, 2.6, and 2.12 the lowest (mean = 1.00). In the age bracket “31 to 35”, items 2.9, 2.10, 2.20, and 2.21 were rated the highest (mean = 3.17); items 2.5 and 2.6 were rated the lowest (mean = 2.17). In the age bracket “36 to 40”, items 2.4, 2.9, and 2.20 were rated the highest (mean = 3.29); items 2.2 and 2.5 were rated the lowest (mean = 2.17). In the age bracket “41 to 45”, items 2.4, 2.7, 2.8, and 2.20 were rated the highest (mean = 2.80); items 2.2, 2.3, 2.17, and 2.18 were rated the lowest (mean = 1.60). The respondents, who are older than 45 years old, rated item 2.7 the highest (mean = 2.60) and item 2.2 the lowest (mean = 1.67).

Table 5 Comparison of mean of technology skills ratings of teacher-respondents grouped according to age

	Sum of Squares	**df**	**Mean Square**	**F**	**p**
Age	5.98	9	0.6641	17.4	< .001
Residuals	7.25	190	0.0382		

*ANOVA

Table 5 presents the results of the analysis of variance (ANOVA) that was conducted to compare the mean of technology skills ratings of teacher-respondents grouped according to age: $F(9,190) = 17.4$ with $p < .001$.

Table 6. Post Hoc Analysis of Paired Age Groups with Significant Difference

Age Groups			Mean Difference	SE	df	T	ptukey
31 to 35	-	41 to 45	0.6832	0.177	105	3.855	0.002
31 to 35	-	older than 45	0.7009	0.177	105	3.955	0.001
36 to 40	-	41 to 45	0.7464	0.177	105	4.212	< .001
36 to 40	-	older than 45	0.7641	0.177	105	4.312	< .001

Table 6 shows that there is a significant difference between the ratings of the respondents from the age brackets “31 to 35” and “41 to 45” ($p_{tukey} = 0.002$), or age brackets “31 to 35” and “older than 45” ($p_{tukey} = 0.001$), or age brackets “36 to 40” and “41 to 45” ($p_{tukey} < .001$), or age brackets “36 to 40” and “older than 45” ($p_{tukey} < .001$).

Table 7 Mean of Technology Skills Ratings of Teacher-respondents grouped according to Length of Service

	Items										
Length of Service	**2.1**	**2.2**	**2.3**	**2.4**	**2.5**	**2.6**	**2.7**	**2.8**	**2.9**	**2.10**	**2.11**
Less than 5	1.00	1.00	1.00	3.00	1.00	1.00	4.00	4.00	4.00	3.00	2.00
5 to 10	2.67	2.33	2.00	3.00	2.11	2.11	3.22	3.22	3.11	3.00	2.67
11 to 15	2.67	2.33	3.00	3.33	2.67	2.83	3.00	3.00	3.33	3.17	3.17
16 to 20	1.80	1.20	2.20	2.80	1.80	1.80	2.60	2.40	2.00	2.20	1.80
21 to 25	2.00	1.63	1.63	2.25	1.63	1.63	2.50	2.50	2.00	2.00	2.00
More than 25	2.40	2.20	2.20	2.40	2.00	2.00	2.60	2.40	2.20	2.20	2.20
	Items										
Length of Service	**2.12**	**2.13**	**2.14**	**2.15**	**2.16**	**2.17**	**2.18**	**2.19**	**2.20**	**2.21**	**2.22**
Less than 5	1.00	2.00	3.00	3.00	3.00	3.00	2.00	3.00	4.00	3.00	4.00
5 to 10	2.44	2.67	2.78	3.00	2.56	2.33	2.44	3.00	3.33	3.00	3.00
11 to 15	3.00	3.00	2.83	3.17	2.67	3.00	2.83	3.33	3.33	3.00	3.00
16 to 20	1.80	2.20	1.80	2.40	1.80	1.80	1.80	2.20	2.60	2.60	2.40
21 to 25	1.63	2.00	1.75	2.25	2.00	2.00	1.75	1.88	2.38	1.88	2.00
More than 25	2.20	2.00	2.20	2.00	2.20	2.00	1.60	2.20	2.20	2.40	2.20

Table 7 summarizes the mean of technology skills ratings of teacher-respondents grouped according to length of service. The respondent, who has been in service for less than 5 years, rated items 2.7, 2.8, 2.9, 2.20, and 2.22 the highest (mean = 4.00) and rated items 2.1, 2.2, 2.3, 2.5, 2.6, and 2.12 the lowest (mean = 1.00). The respondents, who have been in service for about 5 to 10 years, rated item 2.20 the highest (mean = 3.33) and rated item 2.3 the lowest (mean = 2.00). The respondents, who have been in service for about 11 to 15 years, rated items 2.4, 2.9, 2.19, and 2.20 the highest (mean = 3.33) and rated item 2.2 the lowest (mean = 2.33). The respondents, who have been in service for about 16 to 20 years, rated item 2.4 the highest (mean = 2.80) and rated item 2.2 the lowest (mean = 1.20). The respondents, who have been in service for about 21 to 25 years, rated items 2.7 and 2.8 the highest (mean = 2.50) and rated items 2.2, 2.3, 2.5, 2.6, and 2.12 the lowest (mean = 1.63). The respondents, who have been in service for more than 25 years, rated item 2.7 the highest (mean = 2.60) and rated item 2,18 the lowest (mean = 1.60).

Table 8 Comparison of Mean of Technology Skills Ratings of Teacher-respondents grouped according to Length of Service

	Sum of Squares	Df	Mean Square	F	p
Length of Service	17.6	5	3.512	11.7	< .001
Residuals	37.7	126	0.299		

*ANOVA

Table 8 presents the results of the ANOVA that was conducted to compare the mean of technology skills ratings of teacher-respondents grouped according to length of service: $F(5,126) = 11.7$ with $p < .001$..

Table 9. Post Hoc Analysis of Paired Length of Service Groups with Significant Difference

Length of Service Groups			Mean Difference	SE	df	T	p_{tukey}
Less than 5	-	21 to 25	0.5777	0.165	126	3.502	0.008
6 to 10	-	16 to 20	0.6359	0.165	126	3.855	0.002
6 to 10	-	21 to 25	0.7591	0.165	126	4.601	< .001
6 to 10	-	More than 25	0.545	0.165	126	3.303	0.015
11 to 15	-	16 to 20	0.8936	0.165	126	5.417	< .001
11 to 15		21 to 25	1.0168	0.165	126	6.163	< .001
11 to 15		More than 25	0.8027	0.165	126	4.866	< .001

Table 9 shows that there is a significant difference between the ratings of the respondents who are in service for "less than 5 years" and "21 to 25 years" ($p_{tukey} = 0.008$), or "6 to 10 years" and "16 to 20 years" ($p_{tukey} = 0.002$), or "6 to 10 years" and "21 to 25 years" ($p_{tukey} < .001$), or "6 to 10 years" and "more than 25 years" ($p_{tukey} = 0.015$), or "11 to 15 years" and "16 to 20 years" ($p_{tukey} < .001$), or "11 to 15 years" and "21 to 25 years" ($p_{tukey} < .001$), or 11 to 15 years" and "more than 25 years" ($p_{tukey} < .001$).

Table 10. Mean of Technology Skills Ratings of Teacher-respondents grouped according to Educational Attainment

	Items										
Educational Attainment	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10	2.11
Bachelor's degree	2.12	1.71	1.94	2.59	2.00	2.06	2.88	2.82	2.59	2.41	2.29
with MA units	2.55	2.18	2.27	2.91	1.91	1.91	2.82	2.73	2.64	2.55	2.36
master's degree	2.33	2.17	2.33	3.00	2.17	2.17	2.83	2.83	2.67	3.00	2.67

	Items										
Educational Attainment	2.12	2.13	2.14	2.15	2.16	2.17	2.18	2.19	2.20	2.21	2.22
Bachelor's degree	2.00	2.24	2.12	2.53	2.06	2.06	2.00	2.47	2.82	2.47	2.47
with MA units	2.18	2.45	2.45	2.64	2.55	2.55	2.27	2.45	2.82	2.64	2.64
master's degree	2.67	2.67	2.67	2.83	2.50	2.33	2.17	3.00	3.00	2.83	2.83

Table 10 summarizes the mean of technology skills ratings of teacher-respondents grouped according to educational attainment. The respondents, with bachelor's degree, rated item 2.7 the highest (mean = 2.88) and rated item 2.2 the lowest (mean = 1.71). The respondents, with MA units, rated item 2.4 the highest (mean = 2.91) and rated item 2.5 the lowest (mean = 1.91). The respondents, with master's degree, rated items 2.4, 2.19, and 2.20 the highest (mean = 3.00) and rated items 2.2, 2.5, 2.6, and 2.18 the lowest (mean = 2.17).

Table 11 Comparison of Mean of Technology Skills Ratings of Teacher-respondents grouped according to Educational Attainment*

	Sum of Squares	Df	Mean Square	F	p
Educational Attainment	1.12	2	0.5615	6.31	0.003
Residuals	5.61	63	0.0890		

*ANOVAPost Hoc Analysis

Table 12 Comparison of Mean of Technology Skills Ratings of Teacher-respondents grouped according to Educational Attainment

Educational Attainment			Mean Difference	SE	df	T	ptukey
Bachelor's degree	-	With MA units	-0.174	0.09	63	-1.93	0.139
Bachelor's degree	-	Master's Degree	-0.319	0.09	63	-3.55	0.002
With MA units	-	Master's Degree	-0.145	0.09	63	-1.62	0.246

Table 12 presents the results of the ANOVA that was conducted to compare the mean of technology skills ratings of teacher-respondents grouped according to educational attainment: F (2,63) = 6.31 with p = 0.003. It was found that there was a significant difference between the ratings of the respondents with "bachelor's degree" and "master's degree" (p_{tukey} = 0.002).

4. Conclusion

This study was undertaken to identify the Technology Competency map of teachers in the new normal in Aniban Central School. It utilized a descriptive research design. The participants were 80 teachers of Aniban Central School, whose ages range 26 to 45 or older. Statistical treatments used were percentage, mean, ANOVA, and post hoc analysis using Tukey HSD Test. The *p* values were computed using Jamovi statistical software.

Based on the findings of this study, the following conclusions were drawn:

- The highest rating among the indicators of technology skills were the items "Take digital pictures and download them to my computer." and "Upload video, PowerPoint and other outputs for presentation or sharing."
- All categories – age, length of service, and educational attainment have significant differences in their mean responses, thus, these groupings have influenced the ratings of teacher-respondents on their technology skills.

4.1. Summary of Findings

Among the major findings of the study were the following:

4.1.1. Age

An analysis of variance (ANOVA) was performed to compare the mean of technology skills ratings of teacher-respondents grouped according to age. The findings showed that the difference in the mean responses according to the respondents' age brackets was statistically significant as the p-value is less than 0.001. A post hoc treatment was established to determine the pairs of age brackets that got a statistically significant difference. It was revealed that there is a statistically significant difference between the ratings of the respondents from the age brackets "31 to 35" and "41 to 45", or "31 to 35" and "older than 45", "36 to 40" and "41 to 45", "36 to 40" and "older than 45".

4.1.2. Length of Service

An analysis of variance (ANOVA) was performed to compare the mean of technology skills ratings of teacher-respondents grouped according to length of service. The findings showed that the difference in the mean responses according to the respondents' length of service was statistically significant as the p-value is less than 0.001. A post hoc treatment was established to determine the pairs of groups that got a statistically significant difference. It was revealed that there is a significant difference between the ratings of the respondents who are in service for "less than 5 years" and "21 to 25 years", or "6 to 10 years" and "16 to 20 years", or "6 to 10 years" and "21 to 25 years", or "6 to 10 years" and "more than 25 years", or "11 to 15 years" and "16 to 20 years", or "11 to 15 years" and "21 to 25 years", or 11 to 15 years" and "more than 25 years".

4.1.3. Educational Attainment

An analysis of variance (ANOVA) was performed to compare the mean of technology skills ratings of teacher-respondents grouped according to their educational attainment. The findings showed that the difference in the mean responses according to the respondents' educational attainment was statistically significant as the p-value is 0.003. A post hoc treatment was established to determine the pairs of groups that got a statistically significant difference. It was revealed that there is a statistically significant difference between the ratings of the respondents with "bachelor's degree" and "master's degree".

Recommendation

In the light of the findings and conclusion derived from the study, the proponent recommended that a future researcher should use a different design to determine the reasons why an item in the instrument received a higher mean than the other items.

Compliance with ethical standards

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Informed consent

Informed consent was obtained from all participants involved in the study.

References

[1] Amini, M. (2017). Assessing computing literacy of business students in a regional university: Prospects for the 90s. Journal of Information Systems Education, 5, 23-30. 4.

[2] Artigue, M. (2019). Learning mathematics in a CAS environment: the genesis of a reflection about instrumentation and the dialectics between technical and conceptual work, International Journal of Computers in Mathematical Learning, 7(3), 245–274.

[3] Bowman, R. L., & Bowman, V. E. (2018). Live on the electronic frontier: The application of technology to group work. Journal for Specialists in Group Work, 23, 428-445.

[4] Corte, E. (2019). Technology-supported Learning Environments. International Encyclopedia of the Social & Behavioral Sciences, 23, 15527–15532. https://doi.org/10.1016/B0-08-043076-7/01625-9

[5] Cuevas, L.G., C.D.M.R. Guillen and Rocha, V.E. (2019). The research skills as cognitive bridges for meaningful learning. Reason and word. No. 77, August-October 2019.

[6] Doghonadze, N., Aliyev, A., Halawachy, H., Knodel, L., & Adedoyin, A. (2020). The degree of readiness to total distance learning in the face of COVID-19—Teachers' view (Case of Azerbaijan, Georgia, Iraq, Nigeria, UK and Ukraine). Journal of Education in Black Sea Region, 5(2), 2–41. doi: 10.31578/jebs.v5i2.197

[7] Dunuan, L. F. (2020). Education policy and strategy for scaling Ed Tech in Philippine schools. Brief prepared for USAID under the All Children Reading-Philippines Project, AID-OAA-TO-16- 00017. Research Triangle Park, NC: RTI. Retrieved from https://shared.rti.org/content/education-policy-and-strategy-scaling-edtech-philippineschools#

[8] González, J.A. (2018). Technology and social perception. Assess the competition. Studies on contemporary cultures. Colima, Mexico: University of Colima.

[9] Granello, P. F. (2019). Historical context: The relationship of computer technologies and counseling. In J. W. Bloom & G. R. Walz (Eds.), Cybercounseling and cyberlearning: Strategies and resources for the millennium (pp.3-15). Alexandria, VA: American Counseling Association.

[10] Harrison, A., & Rainer, K. (2017). An examination of the factor structures and concurrent validities for the computer attitude scale, the computer anxiety rating scale, and the computer self-efficacy scale. Educational and Psychological Measurement, 44, 501-505. 22.

[11] Heinlen, K. T., Welfel, E. R., Richmond, E. N., & Rak, C. F. (2019). The scope of web counseling: A survey of services and compliance with NBCC standards for the ethical practice of web counseling. Journal of Counseling and Development 81(1), 61-69.

[12] Heinssen, R., Glass, C., & Knight, L. (2016). Assessing computer anxiety: Development and validation of the computer anxiety rating scale. Computers in Human Behavior, 3, 49-59. 23.

[13] Jaramillo, P., P. Castañeda and Pepper, M. (2019). What to do with technology in the classroom. Inventory uses of ICT for learning and teaching. Education and educators. Colombia: Sabana University. pp: 161.162.

[14] Jencius, M. (2018). Technology-enhanced instruction: Developing your digital vision. Retrieved from http://cybercounsel.uncg.edu/articals/jencius_Cyber_aca.html

[15] Karsienti, T. and Lira, M.L. (2019). Are you ready for prospective teachers to integrate ICT in the school? The case of teachers in Quebec. Canada: University of Montreal.

[16] Kozma, R. B. (2019). ICT, education transformation, and economic development: An analysis of the US National Educational Technology Plan. E-Learning and Digital Media 8(2), 106–120. doi:10.2304/elea.2019.8.2.106.

[17] Leary, P. S. (2019). Technology and the continuing education of professional counselors. In J. W. Bloom & G. R. Walz (Eds.), Cyber counseling and cyberlearning: Strategies and resources for the millennium (pp.291-302). Alexandria, VA: American Counseling Association.

[18] Lee, C. C. (2019). Cyber counseling and empowerment: Bridging the digital divide. In J. W. Bloom & G. R. Walz (Eds.), Cyber counseling and cyberlearning: Strategies and resources for the millennium (pp.85-94).

[19] Lee, B.-C., Yoon, J.-O., & Lee, I. (2019). Learners' acceptance of e-learning in South Korea: Theories and results. Computers & Education, 53(4), 1320–1329.

[20] Liu, M., Reed, M., & Phillips, P. (2017). Teacher education students and computers: Gender, major, prior computer experience, occurrence, and anxiety. Journal of Research on Computing in Education, 24(4), 457-467. 27.

[21] Loyd, B., & Gressard, C. (2016). Reliability and factorial validity of computer attitude scales. Educational and Psychological Measurement, 44, 501-505. 28.

[22] Lozano-Diaz, A. (2019). The intelligent classroom: Towards a new educational paradigm?, Almería, Spain: University of Almería.

[23] Mirador University. (2019). Habilidades tecnológicas de profesores y estudiantes (2018-2019). Programa Universidad. Mirador Universitario, UNAM, México. Retrieved from http://mirador.cuaed.unam.mx.

[24] Murphy, C. A., Coover, D., & Owen, S. V. (2016). Development and validation of the computer self-efficacy scale. Educational and Psychological Measurement, 49, 893-899. 32.

[25] Naresh, M. (2019). Market research. An applied approach. 4th Edn., Pearson Education Mexico, SA de CV. pp:115-168.

[26] Nickell, G. S., and Pinto, J. N. (2016). The computer attitude scale. Computers in Human Behavior, 2, 301- 306. 33.

[27] Pouezevara, S., Dincer, A., Kipp, S., & Sarnsik, Y. (2020). Turkey’s FATIH project: a plan to conquer the digital divide or a technological leap of faith. Istanbul, Turkey: Education Reform Initiative.

[28] Reimers, F., & Schleicher, A. (2020). A framework to guide an education response to the COVID-19 Pandemic of 2020. Organization for Economic Cooperation and Development. Retrieved from https://globaled.gse.harvard.edu/files/geii/files/framework_guide_v2.pdf

[29] Rowand, C. (2019). Teacher use of computers and the Internet in public schools. National Center for Education Statistics. Retrieved from http://nces.ed.gov/pubsinfo.asp?pubid=2000090).

[30] Siemens, G. (2019). Connectivism: A learning theory for the digital age. International Journal of Instructional Technology & Distance Learning. Retrieved from http://www.itdl.org/Journal/Jan_05/article01.html

[31] Smerdon, B, & Cronen, S. (2019). Teachers’ tools for the 21st century: A report on teachers’ use of technology. National Center or Educational Statistics. Retrieved from http://nces.ed.gov/pubsinfo.asp?pubid=2000102.

[32] Sussman, R. J. (2019). Counseling over the Internet: Benefits and challenges in the use of new technologies. Retrieved from http://cybercounsel.uncg.edu/book/manuscripts/internetcounseling.html

[33] Thomas, M. B. (2018). Presidential address: Advocating for meaningful linkages to our global future. Counselor Education & Supervision, 38(3), 131-141.

[34] Thomas, S. J. (2018). Designing surveys that work! Thousand Oaks, CA: Corwin.

[35] Tornimbeni, S., C. Gonzalez, M. Salvetti and Barreto, M. (2018). Attitude toward research with psychology students. Proceedings of the First Conference of the School of Psychology. National University of Cordoba. Argentina.

[36] Zheng, L., Zhang, X., & Gyasi, J. F. (2019). A literature review of features and trends of technology-supported collaborative learning in informal learning settings from 2007 to 2018. Journal of Computers in Education, 6, 529–561. https://doi.org/10.1007/s40692-019-00148-2