DIGITAL COMPETENCE OF THE KINDERGARTEN TEACHERS OF PUBLIC ELEMENTARY SCHOOLS IN THE SCHOOLS DIVISION OF THE CITY OF MANILA

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Abstract

This study sought to determine the extent of digital competence of the kindergarten teachers of public elementary schools in the Schools Division of the City of Manila during the School Year 2025-2026 through a descriptive-correlational-developmental research design. The data used in this study came from the 137 kindergarten teachers and ten school heads which were subjected to frequency count, percentage, weighted mean, the chi-square test of independence, and the t-test. Results showed that: majority of the kindergarten teachers have no post-graduate degrees, have been teaching for more than ten years already, and have attended not more than three trainings/seminars related with digital competence; in general, kindergarten teachers perceived that their digital competence is to a great extent as evidenced by the computed overall weighted mean of 3.77 while the school heads that the digital competence of the kindergarten teachers is only to a moderate extent as evidenced by the computed overall weighted mean of 2.95; there is a significant relationship between the highest educational attainment, the length of teaching experience, and the number of relevant trainings attended of the kindergarten teachers and the extent of their digital competence; and, there is a significant difference between the perceptions of the kindergarten teachers and their school heads on the extent of digital competence of the kindergarten teachers. Given the findings, the following conclusions were drawn: a typical kindergarten teacher of a public elementary school in the Schools Division of the City of Manila has no post-graduate degree, has been teaching for more than ten years, and has attended not more than three trainings or seminars related with digital competence for the past five years; the kindergarten teachers of public elementary schools in the Schools Division of the City of Manila perceived that their digital competence is to a great extent while the school heads perceived that the digital competence of the kindergarten teachers is only to a moderate extent; the extent of digital competence of the kindergarten teachers is influenced by their educational attainment, length of teaching experience, and the number of relevant trainings/seminars they attended; and, the perceptions of the kindergarten teachers and the school heads on the extent of digital competence of the kindergarten teachers are significantly different with each other.

Introduction

In the contemporary era, a swift shift from electronic to digital media has significantly changed the way information is accessed and processed. Information acquisition now commonly utilizes diverse media formats, emphasizing the importance of being able to use digital platforms efficiently and responsibly. As all digital media continue to rely on human interaction, virtual spaces remain dependent on people just as individuals are becoming increasingly integrated into these digital technologies (Cabero-Almenara, Romero-Tena, & Palacios-Rodríguez, 2020).

ISSN 3028-2586 (Print) · ISSN 3155-6876 (Online) · erfresearch.com

Digital technologies are shaped by human influence, and their successful utilization depends on an individual's knowledge and competencies. In today's consumer-oriented society, media consumption continues to grow as media increasingly shapes and monitors social life. The emergence of new media has expanded the traditional understanding of media into an interconnected community where audiences are active, interactive, and participatory rather than merely passive consumers. Nevertheless, both traditional and multimedia forms of communication continue to strongly affect societal beliefs, behaviors, and values. Furthermore, patterns of media consumption are continuously changing as digital and communication technologies - often developed or customized by users - become more accessible and easier to use (Çebi & Reisoglu, 2020).

Meanwhile, human perception of the world has experienced significant changes, including the growing adoption of sustainability as a way of life. This transformation aligns with the worldwide utilization of digital technologies to promote innovative strategies that address challenges and support sustainability in ecological, economic, social, and educational dimensions. Digital technologies play a vital role in responding to global issues and crises. Hence, the integration of digital solutions across different sectors is necessary to maximize the potential of digitization in addressing these challenges and crises (Claro et al., 2024).

Furthermore, the extensive use of digital tools has significantly increased interest in digital technologies. As information continues to play an essential role in both society and individual lives, the ways people access and manage information have also changed. This development has given rise to a new type of competence that involves effectively utilizing digital technologies while identifying reliable information within digital platforms. According to Elsayary (2023), competence in the modern age has evolved beyond the basic abilities of reading and writing toward understanding and interpreting conveyed information. It also encompasses the multilingual characteristics of digital content. This broadened set of abilities is known as digital competence.

Gabarda-Méndez, Marín-Suelves, Vidal-Esteve, and Ramón-Llin (2023) described digital competence as the ability to understand and use information obtained from different sources and formats, especially those accessed through computers and the internet. It involves adjusting one's abilities to a constantly evolving environment and extends beyond simple operational or technical skills. In essence, digital competence is not merely about typing on a keyboard but about generating and communicating ideas effectively. It also includes the ability to interpret the subtle meanings of language alongside complex images and sounds. Furthermore, Gabarda-Méndez, Marín-Suelves, Vidal-Esteve, and Ramón-Llin (2023) emphasized that digitally competent individuals can move efficiently across various environments, presenting knowledge in ways that are easier for audiences to understand while ensuring that communication remains appropriate for each context.

Meanwhile, Kubrushko et al. (2020) described digital competence as the confident, critical, and responsible utilization of digital technologies for education, employment, and active participation in society. It includes a blend of knowledge, skills, and attitudes within five essential areas: information and data literacy, communication and collaboration, digital content creation, safety, and problem-solving.

Digital competence enables individuals to tailor the information they communicate according to the needs and expectations of their audience (López-Belmonte, Moreno-Guerrero, Pozo-Sánchez, & López-Nuñez, 2020). Morales, Rivoir, Lázaro-Cantabrana, and Gisbert-Cervena (2020)

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explained that it consists of four fundamental competencies: gathering information, evaluating the quality of content, performing internet searches, and navigating hypertext effectively.

According to Nóbile and Porlán (2022), digital competence is characterized by the ability to perform effective digital activities in work, education, leisure, and other aspects of everyday life. It contributes to improving an individual's quality of life and has a broader scope than ICT literacy, as it emphasizes not only the acquisition of information and techniques but also their practical application. Moreover, it includes attitudes, personal attributes, planning abilities, self-awareness as a digitally literate person, and the ability to reflect on one's own development in digital literacy. Essentially, digital competence refers to the awareness, mindset, and skills required to effectively use digital tools and resources in locating, accessing, managing, integrating, evaluating, analyzing, and synthesizing digital content, as well as in generating new information.

Without question, digital technologies have become widespread and now influence almost every aspect of human life, making it necessary to respond effectively to the rapid technological developments of the modern era. As technology continues to advance, digital competence has become integrated into nearly all areas of everyday living. The integration of digital competence in education provides numerous advantages. According to Reisoglu (2022), the digitization of different forms of media, together with the improved capabilities of computers and high-speed broadband internet, has promoted greater collaboration among learners. Since teachers serve as the primary facilitators in developing digital competence, they play a vital role in this process. Therefore, it is essential for teachers to develop strong digital competence.

In the Philippines, the Department of Education has introduced various initiatives aimed at improving the digital competence of educators. In 2020, through its partnership with Facebook's Digital Tayo, the department launched the Digital Literacy Online Training Series to provide teachers with essential digital skills (TeachersClick, 2020). Subsequently, it also implemented "Project Be Techie in School (B.T.S.) 2.0: A Balik Eskwela Digital Literacy Starter Pack," a program intended to further develop digital literacy among teachers and students by providing training on the latest productivity tools needed in digital learning environments (Malipot, 2021).

Despite these initiatives, the researcher observed that many teachers continue to exhibit limited digital competence. Hence, this study aimed to assess the extent of digital competence of kindergarten teachers in the Schools Division of the City of Manila with the primary goal of developing a tailored in-service training program that addresses their specific needs in digital competence.

METHODOLOGY

Research Design

This study employed the quantitative-descriptive method of research. It described the kindergarten teachers of public elementary schools in the Schools Division of the City of Manila in terms of highest educational attainment, length of teaching experience, and number of relevant seminars/trainings attended as well as determined the extent of their digital competence. The study also utilized the correlational research design for it determined if there is a significant relationship between the profile variables of the kindergarten teachers and the extent of their digital competence and if there is a significant difference between the perceptions of the kindergarten teachers and their school heads on the extent of digital competence of the kindergarten teachers.

ISSN 3028-2586 (Print) · ISSN 3155-6876 (Online) · erfresearch.com

Moreover, the developmental method of research was also used for the study came up with a proposed in-service training program for the kindergarten teachers of public elementary schools in the Schools Division of the City of Manila to enhance their digital competence.

Sources of Data

Research Setting. This study was conducted in ten public elementary schools in the Schools Division of the City of Manila during the School Year 2025-2026.

Sampling. The respondents of the present investigation were all the 137 kindergarten teachers and 10 school heads of the 10 public elementary schools in the Schools Division of the City of Manila. Accordingly, no sampling was done. The distribution of the kindergarten teachers per public elementary school is presented in Table 1.

Research Participants. As mentioned, all the 137 kindergarten teachers and 10 school heads of the 10 public elementary schools in the Schools Division of the City of Manila were made as respondents of the study. The kindergarten teachers provided their profile in terms of highest educational attainment, length of teaching experience, and number of relevant seminars/trainings attended as well as the extent of their digital competence. Meanwhile, the school heads provided data relative to the extent of digital competence of the kindergarten teachers.

Research Instrument

Instrumentation. The data utilized in this study were gathered through two survey-questionnaire – one for the kindergarten teachers and one for the school heads.

The survey-questionnaire for the kindergarten teachers had two parts. The first part focused on the profile of the kindergarten teachers in terms of highest educational attainment, length of teaching experience, and number of relevant seminars/trainings attended. And, the second part looked into the extent of digital competence of the kindergarten teachers. On the other hand, the survey-questionnaire for the school heads only concentrated on the extent of digital competence of the kindergarten teachers.

Trustworthiness. The items in the first part of the survey-questionnaire which is about the profile of the kindergarten teachers is common in researches. Hence, no validation is required.

With respect to the second part of the survey-questionnaire which is about the extent of digital competence of the kindergarten teachers, the items were based from the survey-questionnaire of Terrado (2025) in her study entitled "Digital Competence of the English Teachers in Bayambang I District." The items in this survey-questionnaire were validated by the researcher and, hence, are considered valid and reliable.

Ethical Considerations. So as not to violate the data privacy of the kindergarten teachers and the school heads, permission to conduct the study was first secured from the City Schools Division Superintendent of the City of Manila. Thereafter, informed consent was taken from the kindergarten teachers and school heads.

Moreover, the researcher treated the data gathered with utmost confidentially and were used only for the purpose of answering the research questions of the study in accordance with the Data Privacy Act of the Philippines. Likewise, authors of researches, articles, and other scholar works used in this study were cited, properly acknowledged, and documented.

Data Management and Analysis

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To determine the profile of the kindergarten teachers of public elementary schools in the Schools Division of the City of Manila, the data gathered were subjected to frequency count and percentage employing the formula:

$$P = \frac{f}{N} \times 100$$

where:

P = the computed percentage
f = the observed frequency
N = total number of subject cases

To determine the extent of digital competence of the kindergarten teachers, the weighted mean was used employing the formula:

$$WM = \frac{\sum wX}{\sum w}$$

where:

WM = weighted mean
$\sum$ = summation
W = weighing factor
X = frequency.

Moreover, the weighted means computed were interpreted using this scale of interpretation:

very limited extent	=	1.00 – 1.49
limited extent	=	1.50 – 2.49
moderate extent	=	2.50 – 3.49
great extent	=	3.50 – 4.49
very great extent	=	4.50 – 5.00.

To determine if there is a significant relationship between the profile variables of the kindergarten teachers and the extent of their digital competence, the chi-square test of independence was used.

Lastly, to determine if there is a significant difference between the perceptions of the kindergarten teachers and the school heads on the extent of digital competence of the kindergarten teachers, the t-test was utilized.

RESULTS AND DISCUSSION

The Profile of the Intermediate Teachers

This chapter presents the data gathered and their analysis and interpretation to answer the sub-problems raised in the study.

The Profile of the Kindergarten Teachers

ISSN 3028-2586 (Print) · ISSN 3155-6876 (Online) · erfresearch.com

This section presents the profile of the Kindergarten teachers of public elementary schools in the Schools Division of the City of Manila to answer the first sub-problem of the study.

On Highest Educational Attainment

With respect to the educational attainment, the kindergarten teachers were given five choices, namely, bachelor's degree, completed academic requirements in the master's degree, master's degree, completed academic requirements in the doctorate degree, and doctorate degree. Table 2 indicates the results.

TABLE 2
Distribution of the Kindergarten Teachers in terms of Highest Educational Attainment

Educational Attainment	Frequency	Percentage
Bachelor's Degree	75	55%
Completed academic requirements in the Master's Degree	37	27%
Master's Degree	23	17%
Completed academic requirements in the Doctorate Degree	2	1%
Doctorate Degree	0	0%
Total	137	100%

As presented by Table 2, 75 or 55% of the kindergarten teachers are bachelor's degree holders, 37 or 27% have completed the academic requirements for the master's degree, 23 or 17% are master's degree holders, and two or 1% have completed the academic requirements for the doctorate degree. It can be noted that majority of the kindergarten teachers of public elementary schools in the Schools Division of the City of Manila have no post-graduate degree.

On Length of Teaching Experience

In relation to the length of teaching experience, the kindergarten teachers were provided with five choices to choose from, viz., five years and below, six to ten years, 11 to 15 years, 16 to 20 years, and more than 20 years. Table 3 shows the results.

TABLE 3
Distribution of the Kindergarten Teachers in terms of Length of Teaching Experience

Length of Experience	Frequency	Percentage
1 to 5 years	17	12%
6 to 10 years	39	29%
11 to 15 years	46	34%
16 to 20 years	28	20%
More than 20 years	7	5%
Total	137	100%

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As disclosed by Table 3, 17 or 12% of the kindergarten teachers have been teaching for one to five years, 39 or 29% have been teaching for six to ten years already, 46 or 34% have been teaching for 11 to 15 years already, 28 or 20% have been teaching for 16 to 20 years already, and seven or 5% have been teaching for more than 20 years already. It can be noted here that majority of the kindergarten teachers of public elementary schools in the Schools Division of the City of Manila have been teaching for more than ten years already.

On Number of Trainings/Seminars Attended

In relation to the number of trainings/seminars related with digital competence attended for the past five years, the kindergarten teachers were given three choices, to wit: have not attended any training/seminar on digital competence for the past five years, have attended not more than three trainings/seminars on digital competence for the past five years, and have attended more than three trainings/seminars on digital competence for the past five years. Table 4 presents the results.

Table 4
Distribution of the Kindergarten Teachers in terms of Number of Relevant Trainings Attended

Number of Trainings or Seminars Attended	Frequency	Percentage
Have not attended any relevant training	0	0%
Have attended not more than three relevant trainings	104	76%
Have attended more than three relevant trainings	33	24%
Total	137	100%

As disclosed by Table 4, 104 or 76% of the kindergarten teachers have attended not more than three trainings/seminars related to digital competence for the past five years and 33 or 24% have attended more than three trainings/seminars. It can be noted that majority of the kindergarten teachers of the public elementary schools in the Schools Division of the City of Manila have attended not more than three trainings/seminars related with digital competence for the past five years. This implies that a training or seminar on the same will greatly benefit them.

Extent of Digital Competence of the Kindergarten Teachers of Public Elementary Schools

This section provides answers to the second sub-problem of the study, which is about the extent of digital competence of the kindergarten teachers of public elementary schools in the Schools Division of the City of Manila.

To provide answers to the sub-problem, the kindergarten teachers were asked to rate the extent of their digital competence. In the same way, the school heads were asked to rate the extent of digital competence of the kindergarten teachers.

On Professional Engagement

The kindergarten teachers and the school heads assessed the extent of digital competence along professional engagement of the kindergarten teachers.

Assessment of the Kindergarten Teachers. The assessment of the kindergarten teachers on the extent of their digital competence along professional engagement is presented in Table 5.

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TABLE 5
The Extent of Digital Competence along Professional Engagement of the Kindergarten Teachers as Perceived by Themselves

Assessment Items	Responses					WM	DE
Professional Engagement	VL	LE	ME	GE	VG		
1. Using various digital channels to communicate with parents and peers (such as emails, blogs, school's website, WhatsApp, etc.).							
a. I use basic digital communication channels (e.g. email or instant messaging system).	0	0	55	57	25	3.78	GE
b. I can identify different digital solutions to communicate effectively.	0	0	39	70	28	3.92	GE
c. I combine different communication channels (e.g. email, instant messaging or the organization's website).	0	0	38	80	19	3.86	GE
d. I analyze and evaluate communication channels to choose the ones I consider most effective for my communicative purpose.	0	0	62	56	19	3.69	GE
e. I reflect, plan and adapt my communication strategies according to needs.	0	0	69	49	19	3.64	GE
f. I confidently plan and adapt my digital communication strategy using a variety of digital technologies to meet my communication needs in the context of my stakeholders.	0	0	63	45	29	3.75	GE
2. Using digital technologies to work with peers (teachers) at and out of school.							
a. My colleagues and I share information in shared units or via email.	0	0	55	53	29	3.81	GE
b. In addition to email and shared units, I exchange materials and ideas with my peers in networked collaborative environments (e.g. via video conferencing or through virtual learning environments and other online tools).	0	0	51	57	29	3.84	GE

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c. I exchange ideas, experiences and materials with colleagues both within and outside my institution (e.g. in an online professional network)	0	0	72	36	29	3.69	GE
d. I experiment with innovative tools for online collaboration with colleagues inside and outside my institution.	0	0	58	60	19	3.72	GE
e. I co-create materials with other academics in an online network.	0	0	53	65	19	3.75	GE
f. I co-create, re-use and share materials with other academics and students in an online network.	0	0	55	57	25	3.78	GE
3. Actively working on developing digital teaching skills.							
a. I improve my digital competence for teaching through reflection and experimentation.	0	0	39	70	28	3.92	GE
b. I use different resources to develop my digital competence for teaching.	0	0	38	80	19	3.86	GE
c. I use the peer network to inspire me in my application of different digital teaching practices.	0	0	45	63	29	3.88	GE
d. I validate my digital teaching practices by discussing with my peers how best to use technologies to innovate and improve my teaching practice.	0	0	41	67	29	3.91	GE
e. I take advantage of my peer network to get ideas and validation of my practices, as well as to attend different digital competence development courses, online or face-to-face, to improve and certify my teaching practices.	0	0	59	49	29	3.78	GE
f. I lead teaching innovation using digital technologies in my institution.	0	0	60	48	29	3.77	GE
4. Participating in remote training opportunities (such as training courses, workshops, virtual conferences, and courses through open platforms such as MOOCs).							
a. I have participated in online training.	0	0	59	59	19	3.71	GE
b. I have tried different online training courses when the opportunity has arisen.	0	0	48	70	19	3.79	GE
c. I participate in different types of online training that can help me improve my	0	0	53	65	19	3.75	

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teaching skills.							GE
d. I design and deliver online training for my colleagues in my institution.	0	0	50	63	24	3.81	GE
e. I am professionally accredited in the use of different technologies for teaching and learning.	0	0	46	66	25	3.85	GE
					AWM	3.70	GE

Legend:

WM	=	weighted mean		
DE	=	descriptive equivalent		
AWM	=	area weighted mean		

Scale:

VL	=	very limited extent	=	1.00 – 1.49
LE	=	limited extent	=	1.50 – 2.49
ME	=	moderate extent	=	2.50 – 3.49
GE	=	great extent	=	3.50 – 4.49
VG	=	very great extent	=	4.50 – 5.00

As shown in Table 5, along using various digital channels to communicate with parents and peers (such as emails, blogs, school's website, WhatsApp, etc.), when questioned as to the extent to which they use basic digital communication channels (e.g. email or instant messaging system), 55 of the kindergarten teachers said "moderate extent," 57 said "great extent," and 25 said "very great extent." The weighted mean computed here is 3.78 which is leading to "great extent" in the scale.

When asked as to the extent to which they identify different digital solutions to communicate effectively, 39 of the kindergarten teachers replied "moderate extent," 70 replied "great extent," and 28 replied "very great extent." The weighted mean computed in this item is 3.92 which is leading to "great extent" in the scale.

When inquired as to the extent to which they combine different communication channels (e.g. email, instant messaging or the organization's website), 38 of the kindergarten teachers responded "moderate extent," 80 responded "great extent," and 19 responded "very great extent." Here, the weighted mean computed is 3.86 which is indicative of "great extent" in the scale.

When queried as to the extent to which they analyze and evaluate communication channels to choose the ones they consider most effective for their communicative purpose, 62 of the kindergarten teachers responded "moderate extent," 56 responded "great extent," and 19 responded "very great extent." The weighted mean computed in this item is 3.69 which is pointing to "great extent" in the scale of interpretation.

When questioned as to the extent to which they reflect, plan and adapt their communication strategies according to needs, 69 of the kindergarten teachers checked "moderate extent," 49 checked "great extent," and 19 checked "very great extent." Here, the weighted mean computed is 3.64 which is "great extent" in the scale.

When asked as to the extent to which they confidently plan and adapt their digital communication strategy using a variety of digital technologies to meet their communication needs in the context of their stakeholders, 63 of the kindergarten teachers mentioned "moderate extent," 45 mentioned "great extent," and 29 mentioned "very great extent." In this item, the weighted mean computed is 3.75 which is pointing to "great extent" in the scale.

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Along using digital technologies to work with peers (teachers) at and out of school, when questioned as to the extent to which they and their colleagues share information in shared units or via email, 55 of the kindergarten teachers claimed “moderate extent,” 53 claimed “great extent,” and 29 claimed “very great extent.” The weighted mean computed here is 3.81 which is pointing to “great extent” in the scale.

When asked as to the extent to which they exchange materials and ideas with their peers in networked collaborative environments (e.g. via video conferencing or through virtual learning environments and other online tools) in addition to email and shared units, 51 of the kindergarten teachers replied “moderate extent,” 57 replied “great extent,” and 29 replied “very great extent.” The weighted mean computed in this item is 3.84 which is leading to “great extent” in the scale.

When asked as to the extent to which they exchange ideas, experiences and materials with colleagues both within and outside their institution (e.g. in an online professional network), 72 of the kindergarten teachers replied “moderate extent,” 36 replied “great extent,” and 29 replied “very great extent.” The weighted mean computed in this item is 3.69 which is leading to “great extent” in the scale.

When asked as to the extent to which they experiment with innovative tools for online collaboration with colleagues inside and outside their institution, 58 of the kindergarten teachers replied “moderate extent,” 60 replied “great extent,” and 19 replied “very great extent.” The weighted mean computed in this item is 3.72 which is leading to “great extent” in the scale.

When inquired as to the extent to which they co-create materials with other academics in an online network, 53 of the kindergarten teachers responded “moderate extent,” 65 responded “great extent,” and 19 responded “very great extent.” Here, the weighted mean computed is 3.75 which is indicative of “great extent” in the scale.

When queried as to the extent to which they co-create, re-use and share materials with other academics and students in an online network, 55 of the kindergarten teachers responded “moderate extent,” 57 responded “great extent”, and 25 responded “very great extent.” The weighted mean computed in this item is 3.78 which is pointing to “great extent” in the scale of interpretation.

Along actively working on developing digital teaching skills, when questioned as to the extent to which they improve their digital competence for teaching through reflection and experimentation, 39 of the kindergarten teachers checked “moderate extent,” 70 checked “great extent,” and 28 checked “very great extent.” Here, the weighted mean computed is 3.92 which is “great extent” in the scale.

When asked as to the extent to which they use different resources to develop their digital competence for teaching, 38 of the kindergarten teachers mentioned “moderate extent,” 80 mentioned “great extent,” and 19 mentioned “very great extent.” In this item, the weighted mean computed is 3.86 which is pointing to “great extent” in the scale.

When questioned as to the extent to which they use the peer network to inspire them in their application of different digital teaching practices, 45 of the kindergarten teachers claimed “moderate extent,” 63 claimed “great extent,” and 29 claimed “very great extent.” The weighted mean computed here is 3.88 which is pointing to “great extent” in the scale.

When asked as to the extent to which they validate their digital teaching practices by discussing with their peers how best to use technologies to innovate and improve their teaching practice, 41 of the kindergarten teachers replied “moderate extent,” 67 replied “great extent,” and 29 replied “very great extent.” The weighted mean computed in this item is 3.91 which is leading to “great extent” in the scale.

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When asked as to the extent to which they take advantage of their peer network to get ideas and validation of their practices as well as to attend different digital competence development courses, online or face-to-face, to improve and certify their teaching practice, 59 of the kindergarten teachers replied "moderate extent," 49 replied "great extent," and 29 replied "very great extent." The weighted mean computed in this item is 3.78 which is leading to "great extent" in the scale.

When asked as to the extent to which they lead teaching innovation using digital technologies in their institution, 60 of the kindergarten teachers mentioned "moderate extent," 48 mentioned "great extent," and 29 mentioned "very great extent." In this item, the weighted mean computed is 3.77 which is pointing to "great extent" in the scale.

Along participating in remote training opportunities (such as training courses, workshops, virtual conferences, and courses through open platforms such as MOOCs), when questioned as to the extent to which they have participated in online training, 59 of the kindergarten teachers claimed "moderate extent," 59 also claimed "great extent," and 19 claimed "very great extent." The weighted mean computed here is 3.71 which is pointing to "great extent" in the scale.

When asked as to the extent to which they have tried different online training courses when the opportunity has arisen, 48 of the kindergarten teachers replied "moderate extent," 70 replied "great extent," and 19 replied "very great extent". The weighted mean computed in this item is 3.79 which is leading to "great extent" in the scale.

When asked as to the extent to which they have participated in different types of online training that can help them improve their teaching skills, 53 of the kindergarten teachers replied "moderate extent," 65 replied "great extent," and 19 replied "very great extent." The weighted mean computed in this item is 3.75 which is leading to "great extent" in the scale.

When asked as to the extent to which they design and deliver online training for their colleagues in their institution, 50 of the kindergarten teachers replied "moderate extent," 63 replied "great extent," and 24 replied "very great extent." The weighted mean computed in this item is 3.81 which is leading to "great extent" in the scale.

And, when inquired as to the extent to which they are professionally accredited in the use of different technologies for teaching and learning, 46 of the kindergarten teachers responded "moderate extent," 66 responded "great extent," and 25 replied "very great extent." Here, the weighted mean computed is 3.85 which is indicative of "great extent" in the scale.

Meanwhile, the computed area weighted mean is 3.70. This implies that the kindergarten teachers perceived that their digital competence along professional engagement is to a great extent.

Assessment of the School Heads. The assessment of the school heads on the extent of digital competence along professional engagement of the kindergarten teachers is presented in Table 6.

As shown in Table 6, along using various digital channels to communicate with parents and peers (such as emails, blogs, school's website, WhatsApp, etc.), when questioned as to the extent to which their kindergarten teachers use basic digital communication channels (e.g. email or instant messaging system), two of the school heads said "limited extent," seven said "moderate extent," and one said "great extent." The weighted mean computed here is 2.90 which is leading to "moderate extent" in the scale.

TABLE 6

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The Extent of Digital Competence along Professional Engagement of the Kindergarten Teachers as Perceived by the School Heads

Assessment Items	Responses					WM	DE
Professional Engagement	VL	LE	ME	GE	VG		
1. Using various digital channels to communicate with parents and peers (such as emails, blogs, school's website, WhatsApp, etc.). My kindergarten teachers:							
a. Use basic digital communication channels (e.g. email or instant messaging system).	0	2	7	1	0	2.90	ME
b. Identify different digital solutions to communicate effectively.	0	1	8	1	0	3.00	ME
c. Combine different communication channels (e.g. email, instant messaging or the organization's website).	0	1	8	1	0	3.00	ME
d. Analyze and evaluate communication channels to choose the ones they consider most effective for their communicative purpose.	0	3	6	1	0	2.80	ME
e. Reflect, plan and adapt their communication strategies according to needs.	0	2	7	1	0	2.90	ME
f. Confidently plan and adapt their digital communication strategy using a variety of digital technologies to meet their communication needs in the context of their stakeholders.	0	2	7	1	0	2.90	ME
2. Using digital technologies to work with peers (teachers) at and out of school. My kindergarten teachers:							
a. And their colleagues share information in shared units or via email.	0	2	6	2	0	3.00	ME
b. Exchange materials and ideas with their peers in networked collaborative environments (e.g. via video conferencing or through virtual learning environments and other online tools) In addition to email and shared units.	0	2	6	2	0	3.00	ME
c. Exchange ideas, experiences and materials with colleagues both within and outside their institution (e.g. in an online professional network)	0	2	7	1	0	2.90	ME
d. Experiment with innovative tools for online collaboration with colleagues inside	0	2	7	1	0	2.90	

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and outside their institution.							ME
e. Co-create materials with other academics in an online network.	0	2	7	1	0	2.90	ME
f. Co-create, re-use and share materials with other academics and students in an online network.	0	3	6	1	0	2.80	ME
3. Actively working on developing digital teaching skills. My kindergarten teachers:							
a. Improve their digital competence for teaching through reflection and experimentation.	0	3	6	1	0	2.80	ME
b. Use different resources to develop their digital competence for teaching.	0	3	6	1	0	2.80	ME
c. Use the peer network to inspire them in their application of different digital teaching practices.	0	1	8	1	0	3.00	ME
d. Validate their digital teaching practices by discussing with their peers how best to use technologies to innovate and improve their teaching practice.	0	1	8	1	0	3.00	ME
e. Take advantage of their peer network to get ideas and validation of their practices, as well as to attend different digital competence development courses, online or face-to-face, to improve and certify their teaching practices.	0	1	9	0	0	2.90	ME
f. Lead teaching innovation using digital technologies in their institution.	0	1	9	0	0	2.90	ME
4. Participating in remote training opportunities (such as training courses, workshops, virtual conferences, and courses through open platforms such as MOOCs). My kindergarten teachers:							
a. Have participated in online training.	0	1	8	1	0	3.00	ME
b. Have tried different online training courses when the opportunity has arisen.	0	2	8	0	0	2.80	ME
c. Participate in different types of online training that can help them improve their teaching skills.	0	1	8	1	0	3.00	ME
d. Design and deliver online training for their colleagues in their institution.	0	1	8	1	0	3.00	ME
e. Are professionally accredited in the use of different technologies for teaching and	0	2	6	2	0	3.00	

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learning.							ME
					AWM	2.92	ME

Legend:

WM	=	weighted mean
DE	=	descriptive equivalent
AWM	=	area weighted mean

Scale:

VL	=	very limited extent	=	1.00 – 1.49
LE	=	limited extent	=	1.50 – 2.49
ME	=	moderate extent	=	2.50 – 3.49
GE	=	great extent	=	3.50 – 4.49
VG	=	very great extent	=	4.50 – 5.00

When asked as to the extent to which their kindergarten teachers identify different digital solutions to communicate effectively, one of the school heads replied “limited extent,” eight replied “moderate extent,” and one replied “great extent.” The weighted mean computed in this item is 3.00 which is leading to “moderate extent” in the scale.

When inquired as to the extent to which their kindergarten teachers combine different communication channels (e.g. email, instant messaging or the organization’s website), one of the school heads responded “limited extent,” eight responded “moderate extent,” and one responded “great extent.” Here, the weighted mean computed is 3.00 which is indicative of “moderate extent” in the scale.

When queried as to the extent to which their kindergarten teachers analyze and evaluate communication channels to choose the ones they consider most effective for their communicative purpose, three of the school heads responded “limited extent,” six responded “moderate extent,” and one responded “great extent.” The weighted mean computed in this item is 2.80 which is pointing to “moderate extent” in the scale of interpretation.

When questioned as to the extent to which their kindergarten teachers reflect, plan and adapt their communication strategies according to needs, two of the school heads checked “limited extent,” seven checked “moderate extent,” and one checked “great extent.” Here, the weighted mean computed is 2.90 which is “moderate extent” in the scale.

When asked as to the extent to which their kindergarten teachers confidently plan and adapt their digital communication strategy using a variety of digital technologies to meet their communication needs in the context of their stakeholders, two of the school heads mentioned “limited extent,” seven mentioned “moderate extent,” and one mentioned “great extent.” In this item, the weighted mean computed is 2.90 which is pointing to “moderate extent” in the scale.

Along using digital technologies to work with peers (teachers) at and out of school, when questioned as to the extent to which their kindergarten teachers and their colleagues share information in shared units or via email, two of the school heads claimed “limited extent,” six claimed “moderate extent,” and two claimed “great extent.” The weighted mean computed here is 3.00 which is pointing to “moderate extent” in the scale.

When asked as to the extent to which their kindergarten teachers exchange materials and ideas with their peers in networked collaborative environments (e.g. via video conferencing or through virtual learning environments and other online tools) in addition to email and shared units, two of the school heads replied “limited extent,” six replied “moderate extent,” and two replied

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"great extent." The weighted mean computed in this item is 3.00 which is leading to "moderate extent" in the scale.

When asked as to the extent to which their kindergarten teachers exchange ideas, experiences and materials with colleagues both within and outside their institution (e.g. in an online professional network), two of the school heads replied "limited extent," seven replied "moderate extent," and one replied "great extent." The weighted mean computed in this item is 2.90 which is leading to "moderate extent" in the scale.

When asked as to the extent to which their kindergarten teachers experiment with innovative tools for online collaboration with colleagues inside and outside their institution, two of the school heads replied "limited extent," seven replied "immoderate extent," and one replied "great extent.". The weighted mean computed in this item is 2.90 which is leading to "moderate extent" in the scale.

When inquired as to the extent to which their kindergarten teachers co-create materials with other academics in an online network, two of the school heads responded "limited extent," seven responded "moderate extent," and one responded "great extent." Here, the weighted mean computed is 2.90 which is indicative of "moderate extent" in the scale.

When queried as to the extent to which their kindergarten teachers co-create, re-use and share materials with other academics and students in an online network, three of the school heads responded "limited extent," six responded "moderate extent," and one responded "great extent.". The weighted mean computed in this item is 2.80 which is pointing to "moderate extent" in the scale of interpretation.

Along actively working on developing digital teaching skills, when questioned as to the extent to which their kindergarten teachers improve their digital competence for teaching through reflection and experimentation, three of the school heads checked "limited extent," six checked "moderate extent," and one checked "great extent." Here, the weighted mean computed is 2.80 which is "moderate extent" in the scale.

When asked as to the extent to which their kindergarten teachers use different resources to develop their digital competence for teaching, three of the school heads mentioned "limited extent," six mentioned "moderate extent," and one mentioned "great extent." In this item, the weighted mean computed is 2.80 which is pointing to "moderate extent" in the scale.

When questioned as to the extent to which their kindergarten teachers use the peer network to inspire them in their application of different digital teaching practices, one of the school heads claimed "limited extent," eight claimed "moderate extent," and one claimed "great expert.". The weighted mean computed here is 3.00 which is pointing to "moderate extent" in the scale.

When asked as to the extent to which their kindergarten teachers validate their digital teaching practices by discussing with their peers how best to use technologies to innovate and improve their teaching practice, one of the school heads replied "limited extent," eight replied "moderate extent," and one replied "great extent." The weighted mean computed in this item is 3.00 which is leading to "moderate extent" in the scale.

When asked as to the extent to which their kindergarten teachers take advantage of their peer network to get ideas and validation of their practices as well as to attend different digital competence development courses, online or face-to-face, to improve and certify their teaching practice, one of the school heads replied "limited extent" and nine replied "moderate extent." The weighted mean computed in this item is 2.90 which is leading to "moderate extent" in the scale.

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When asked as to the extent to which their kindergarten teachers lead teaching innovation using digital technologies in their institution, one of the school heads mentioned "limited extent" and nine mentioned "moderate extent." In this item, the weighted mean computed is 2.90 which is pointing to "moderate extent" in the scale.

Along participating in remote training opportunities (such as training courses, workshops, virtual conferences, and courses through open platforms such as MOOCs), when questioned as to the extent to which their kindergarten teachers have participated in online training, one of the school heads claimed "limited extent," eight claimed "moderate extent," and one claimed "great extent." The weighted mean computed here is 3.00 which is pointing to "moderate extent" in the scale.

When asked as to the extent to which their kindergarten teachers have tried different online training courses when the opportunity has arisen, two of the school heads replied "limited extent" and eight replied "moderate extent." The weighted mean computed in this item is 2.80 which is leading to "moderate extent" in the scale.

When asked as to the extent to which their kindergarten teachers have participated in different types of online training that can help them improve their teaching skills, one of the school heads replied "limited extent," eight replied "moderate extent," and one replied "great extent." The weighted mean computed in this item is 3.00 which is leading to "moderate extent" in the scale.

When asked as to the extent to which their kindergarten teachers design and deliver online training for their colleagues in their institution, one of the school heads replied "limited extent," eight replied "moderate extent," and one replied "great extent." The weighted mean computed in this item is 3.00 which is leading to "moderate extent" in the scale.

And, when inquired as to the extent to which their kindergarten teachers are professionally accredited in the use of different technologies for teaching and learning, two of the school heads responded "limited extent," six responded "moderate extent," and two responded "great extent." Here, the weighted mean computed is 3.00 which is indicative of "moderate extent" in the scale.

Meanwhile, the computed area weighted mean is 2.92. This implies that the school heads perceived that the digital competence along professional engagement of the kindergarten teachers is only to a moderate extent.

On Digital Resources

The kindergarten teachers and the school heads assessed the extent of digital competence along digital resources of the kindergarten teachers.

Assessment of the Kindergarten Teachers. The assessment of the kindergarten teachers on the extent of their digital competence along digital resources is presented in Table 7.

As shown in Table 7, along using different websites and search strategies to find and select different digital resources, when questioned as to the extent to which they use the Internet to find useful resources for teaching, 45 of the kindergarten teachers said "moderate extent," 67 said "great extent," and 25 said "very great extent." The weighted mean computed here is 3.85 which is leading to "great extent" in the scale.

TABLE 7
The Extent of Digital Competence along Digital Resources of the Kindergarten Teachers as Perceived by Themselves

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Assessment Items	Responses					WM	DE
Digital Resources	VL	LE	ME	GE	VG		
1. Using different websites and search strategies to find and select different digital resources							
a. I can use the Internet to find useful resources for teaching.	0	0	45	67	25	3.85	GE
b. I use search engines and educational resource platforms to find relevant resources.	0	0	57	55	25	3.77	GE
c. I evaluate and select resources according to their suitability for my learners.	0	0	59	52	26	3.76	GE
d. In addition to checking the suitability of resources to meet the needs of my learners, I compare them against other relevant criteria (e.g. reliability, quality, fit, design, interactivity, etc.).	0	0	60	51	26	3.75	GE
e. I compare resources by applying different criteria and collaborate with peers in sharing appropriate resources and search strategies.	0	0	64	54	19	3.67	GE
f. I do not only search for and select different digital resources, but also take the lead in promoting their use in my institution.	0	0	72	36	29	3.69	GE
2. Creating one's own digital resources and modify existing ones to suit one's needs.							
a. I search the Internet and use different kinds of educational resources.	0	0	38	80	19	3.86	GE
b. I create digital presentations and I know how to do much more than that.	0	0	62	56	19	3.69	GE
c. I test and validate different types of resources.	0	0	55	57	25	3.78	GE
d. I create different types of digital resources.	0	0	39	70	28	3.92	GE
e. I create and adapt digital resources and share them with others using content distribution platforms.	0	0	63	45	29	3.75	GE
f. I adapt, use, share and even create more complex interactive resources such as videos, online multiple-choice tests, virtual reality applications, etc.	0	0	55	53	29	3.81	GE
3. Effectively protecting personal data, such as exams, grades or personal data.							

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a. I protect personal data by combining hard-to-guess passwords with frequent password changes and software updates.	0	0	51	57	29	3.84	GE
b. I review my personal data protection practices from time to time, checking their effectiveness and replacing them when necessary.	0	0	72	36	29	3.69	GE
c. I protect digital data and apply the general data protection regulation) when dealing with identifiable subjects, such as data related to my students	0	0	38	80	19	3.86	GE
					AWM	3.78	GE

Legend:

WM	=	weighted mean
DE	=	descriptive equivalent
AWM	=	area weighted mean

Scale:

VL	=	very limited extent	=	1.00 – 1.49
LE	=	limited extent	=	1.50 – 2.49
ME	=	moderate extent	=	2.50 – 3.49
GE	=	great extent	=	3.50 – 4.49
VG	=	very great extent	=	4.50 – 5.00

When asked as to the extent to which they use search engines and educational resource platforms to find relevant resources, 57 of the kindergarten teachers replied “moderate extent,” 55 replied “great extent,” and 25 replied “very great extent.” The weighted mean computed in this item is 3.77 which is leading to “great extent” in the scale.

When inquired as to the extent to which they evaluate and select resources according to their suitability for their learners, 59 of the kindergarten teachers responded “moderate extent,” 52 responded “great extent,” and 26 responded “very great extent.” Here, the weighted mean computed is 3.76 which is indicative of “great extent” in the scale.

When queried as to the extent to which they compare them against other relevant criteria (e.g. reliability, quality, fit, design, interactivity, etc.) in addition to checking the suitability of resources to meet the needs of their learners, 60 of the kindergarten teachers responded “moderate extent,” 51 responded “great extent,” and 26 responded “very great extent.” The weighted mean computed in this item is 3.75 which is pointing to “great extent” in the scale of interpretation.

When questioned as to the extent to which they compare resources by applying different criteria and collaborate with peers in sharing appropriate resources and search strategies, 64 of the kindergarten teachers checked “moderate extent,” 54 checked “great extent,” and 19 checked “very great extent.” Here, the weighted mean computed is 3.67 which is “great extent” in the scale.

When asked as to the extent to which they do not only search for and select different digital resources, but also take the lead in promoting their use in their institution, 72 of the kindergarten teachers mentioned “moderate extent,” 36 mentioned “great extent,” and 29 mentioned “very great extent.” In this item, the weighted mean computed is 3.69 which is pointing to “great extent” in the scale.

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Along creating one's own digital resources and modify existing ones to suit one's needs, when questioned as to the extent to which they search the Internet and use different kinds of educational resources, 38 of the kindergarten teachers claimed "moderate extent," 80 claimed "great extent," and 19 claimed "very great extent." The weighted mean computed here is 3.86 which is pointing to "great extent" in the scale.

When asked as to the extent to which they create digital presentations and they know how to do much more than that, 62 of the kindergarten teachers replied "moderate extent," 56 replied "great extent," and 19 replied "very great extent." The weighted mean computed in this item is 3.69 which is leading to "great extent" in the scale.

When asked as to the extent to which they test and validate different types of resources, 55 of the kindergarten teachers replied "moderate extent" 57 replied "great extent," and 25 replied "very great extent." The weighted mean computed in this item is 3.78 which is leading to "great extent" in the scale.

When asked as to the extent to which they create different types of digital resources, 39 of the kindergarten teachers replied "moderate extent," 70 replied "great extent," and 28 replied "very great extent." The weighted mean computed in this item is 3.92 which is leading to "great extent" in the scale.

When inquired as to the extent to which they create and adapt digital resources and share them with others using content distribution platforms, 63 of the kindergarten teachers responded "moderate extent," 45 responded "great extent," and 29 responded "very great extent." Here, the weighted mean computed is 3.75 which is indicative of "great extent" in the scale.

When queried as to the extent to which they adapt, use, share and even create more complex interactive resources such as videos, online multiple-choice tests, virtual reality applications, and others, 55 of the kindergarten teachers responded "moderate extent," 53 responded "great extent," and 29 responded "very great extent." The weighted mean computed in this item is 3.81 which is pointing to "great extent" in the scale of interpretation.

Along effectively protecting personal data, such as exams, grades or personal data, when questioned as to the extent to which they protect personal data by combining hard-to-guess passwords with frequent password changes and software updates, 51 of the kindergarten teachers checked "moderate extent," 57 checked "great extent," and 29 checked "very great extent." Here, the weighted mean computed is 3.84 which is "great extent" in the scale.

When asked as to the extent to which they review their personal data protection practices from time to time, checking their effectiveness and replacing them when necessary, 72 of the kindergarten teachers mentioned "moderate extent," 36 mentioned "great extent," and 29 mentioned "very great extent." In this item, the weighted mean computed is 3.69 which is pointing to "great extent" in the scale.

And, when inquired as to the extent to which they protect digital data and apply the general data protection regulation) when dealing with identifiable subjects, such as data related to their students, 38 of the kindergarten teachers responded "moderate extent," 80 responded "great extent," and 19 replied "very great extent." Here, the weighted mean computed is 3.86 which is indicative of "great extent" in the scale.

Meanwhile, the computed area weighted mean is 3.78. This implies that the kindergarten teachers perceived that their digital competence along digital resources is to a great extent.

Assessment of the School Heads. The assessment of the school heads on the extent of digital competence along digital resources of the kindergarten teachers is presented in Table 8.

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As shown in Table 8, along using different websites and search strategies to find and select different digital resources, when questioned as to the extent to which their kindergarten teachers use the Internet to find useful resources for teaching, two of the school heads said “limited extent,” six said “moderate extent,” and two said “great extent.” The weighted mean computed here is 3.00 which is leading to “moderate extent” in the scale.

When asked as to the extent to which their kindergarten teachers use search engines and educational resource platforms to find relevant resources, three of the school heads replied “limited extent,” six replied “moderate extent,” and one replied “great extent.” The weighted mean computed in this item is 2.80 which is leading to “moderate extent” in the scale.

TABLE 8
The Extent of Digital Competence along Digital Resources of the Kindergarten Teachers as Perceived by the School Heads

Assessment Items	Responses					WM	DE
Digital Resources	VL	LE	ME	GE	VG		
1. Using different websites and search strategies to find and select different digital resources. My kindergarten teachers:							
a. Use the Internet to find useful resources for teaching.	0	2	6	2	0	3.00	ME
b. Use search engines and educational resource platforms to find relevant resources.	0	3	6	1	0	2.80	ME
c. Evaluate and select resources according to their suitability for their learners.	0	3	6	1	0	2.80	ME
d. In addition to checking the suitability of resources to meet the needs of their learners, can compare them against other relevant criteria (e.g. reliability, quality, fit, design, interactivity, etc.).	0	1	8	1	0	3.00	ME
e. Compare resources by applying different criteria and collaborate with peers in sharing appropriate resources and search strategies.	0	1	8	1	0	3.00	ME
f. Do not only search for and select different digital resources, but also take the lead in promoting their use in their institution.	0	1	8	1	0	3.00	ME
2. Creating one’s own digital resources and modify existing ones to suit one’s needs. My kindergarten teachers:							
a. Search the Internet and use different kinds of educational resources.	0	1	8	1	0	3.00	ME
b. Create digital presentations and know	0	2	7	1	0	2.90	

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how to do much more than that.							ME
c. Test and validate different types of resources.	0	2	7	1	0	2.90	ME
d. Create different types of digital resources.	0	2	6	2	0	3.00	ME
e. Create and adapt digital resources and share them with others using content distribution platforms.	0	2	6	2	0	3.00	ME
f. Adapt, use, share and even create more complex interactive resources such as videos, online multiple-choice tests, virtual reality applications, etc.	0	1	8	1	0	3.00	ME
3. Effectively protecting personal data, such as exams, grades or personal data. My kindergarten teachers:							
a. Protect personal data by combining hard-to-guess passwords with frequent password changes and software updates.	0	1	8	1	0	3.00	ME
b. Review their personal data protection practices from time to time, checking their effectiveness and replacing them when necessary.	0	2	6	2	0	3.00	ME
c. Protect digital data and apply the general data protection regulation) when dealing with identifiable subjects, such as data related to their students	0	2	6	2	0	3.00	ME
					AWM	2.96	ME

Legend:

WM	=	weighted mean
DE	=	descriptive equivalent
AWM	=	area weighted mean

Scale:

VL	=	very limited extent	=	1.00 – 1.49
LE	=	limited extent	=	1.50 – 2.49
ME	=	moderate extent	=	2.50 – 3.49
GE	=	great extent	=	3.50 – 4.49
VG	=	very great extent	=	4.50 – 5.00

When inquired as to the extent to which their kindergarten teachers evaluate and select resources according to their suitability for their learners, three of the school heads responded “limited extent,” six responded “moderate extent,” and one responded “great extent.” Here, the weighted mean computed is 2.80 which is indicative of “moderate extent” in the scale.

When queried as to the extent to which their kindergarten teachers compare them against other relevant criteria (e.g. reliability, quality, fit, design, interactivity, etc.) in addition to checking the suitability of resources to meet the needs of their learners, one of the school heads responded

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"limited extent," eight responded "moderate extent," and one responded "great extent." The weighted mean computed in this item is 3.00 which is pointing to "moderate extent" in the scale of interpretation.

When questioned as to the extent to which their kindergarten teachers compare resources by applying different criteria and collaborate with peers in sharing appropriate resources and search strategies, one of the school heads checked "limited extent," eight checked "moderate extent," and one checked "great extent." Here, the weighted mean computed is 3.00 which is "moderate extent" in the scale.

When asked as to the extent to which their kindergarten teachers do not only search for and select different digital resources, but also take the lead in promoting their use in their institution, one of the school heads mentioned "limited extent," eight mentioned "moderate extent," and one mentioned "great extent." In this item, the weighted mean computed is 3.00 which is pointing to "moderate extent" in the scale.

Along creating one's own digital resources and modify existing ones to suit one's needs, when questioned as to the extent to which their kindergarten teachers search the Internet and use different kinds of educational resources, one of the school heads claimed "limited extent," eight claimed "moderate extent," and one claimed "great extent." The weighted mean computed here is 3.00 which is pointing to "moderate extent" in the scale.

When asked as to the extent to which their kindergarten teachers create digital presentations and they know how to do much more than that, two of the school heads replied "limited extent," seven replied "moderate extent," and one replied "great extent." The weighted mean computed in this item is 2.90 which is leading to "moderate extent" in the scale.

When asked as to the extent to which their kindergarten teachers test and validate different types of resources, two of the school heads replied "limited extent", seven replied "moderate extent," and one replied "great extent. The weighted mean computed in this item is 2.90 which is leading to "moderate extent" in the scale.

When asked as to the extent to which their kindergarten teachers create different types of digital resources, two of the school heads replied "limited extent," six replied "moderate extent," and two replied "great extent." The weighted mean computed in this item is 3.00 which is leading to "moderate extent" in the scale.

When inquired as to the extent to which their kindergarten teachers create and adapt digital resources and share them with others using content distribution platforms, two of the school heads responded "limited extent," six responded "moderate extent," and two responded "great extent." Here, the weighted mean computed is 3.00 which is indicative of "moderate extent" in the scale.

When queried as to the extent to which their kindergarten teachers adapt, use, share and even create more complex interactive resources such as videos, online multiple-choice tests, virtual reality applications, and others, one of the school heads responded "limited extent," eight responded "moderate extent," and one responded "great extent.: The weighted mean computed in this item is 3.00 which is pointing to "moderate extent" in the scale of interpretation.

Along effectively protecting personal data, such as exams, grades or personal data, when questioned as to the extent to which their kindergarten teachers protect personal data by combining hard-to-guess passwords with frequent password changes and software updates, one of the school heads checked "limited extent," eight checked "moderate extent," and one checked "great extent." Here, the weighted mean computed is 3.00 which is "moderate extent" in the scale.

When asked as to the extent to which their kindergarten teachers review their personal data protection practices from time to time, checking their effectiveness and replacing them when

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necessary, two of the school heads mentioned “limited extent,” six mentioned “moderate extent,” and two mentioned “great extent.” In this item, the weighted mean computed is 3.00 which is pointing to “moderate extent” in the scale.

Lastly, when inquired as to the extent to which their kindergarten teachers protect digital data and apply the general data protection regulation) when dealing with identifiable subjects, such as data related to their students, two of the school heads responded “limited extent,” six responded “moderate extent,” and two replied “great extent.” Here, the weighted mean computed is 3.000 which is indicative of “moderate extent” in the scale.

Meanwhile, the computed area weighted mean is 2.96. This implies that the school heads perceived that the digital competence along digital resources of the kindergarten teachers is is only to a moderate extent.

On Teaching and Learning

The kindergarten teachers and the school heads assessed the extent of digital competence along teaching and learning of the kindergarten teachers.

Assessment of the Kindergarten Teachers. The assessment of the kindergarten teachers on the extent of their digital competence level along teaching and learning is presented in Table 9.

As shown in Table 9, along carefully assessing how, when and why to use digital technologies in the classroom with students to ensure that they add value, when questioned as to the extent to which they make use of available equipment (e.g. digital whiteboards, projectors or virtual teaching environments when teaching online), 62 of the kindergarten teachers said “moderate extent,” 56 said “great extent,” and 19 said “very great extent.” The weighted mean computed here is 3.69 which is leading to “great extent” in the scale.

TABLE 9
The Extent of Digital Competence Level along Teaching and Learning of the Kindergarten Teachers as Perceived by Themselves

Assessment Items	Responses					WM	DE
Teaching and Learning	VL	LE	ME	GE	VG		
1. Carefully assessing how, when and why to use digital technologies in the classroom with students to ensure that they add value.							
a. I make use of available equipment (e.g. digital whiteboards, projectors or virtual teaching environments when teaching online).	0	0	62	56	19	3.69	GE
b. I use a wide variety of digital resources and tools in my classes.	0	0	55	57	25	3.78	GE
c. I try out different teaching methods according to the digital technologies I choose.	0	0	49	63	25	3.82	GE

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d. I select and try different teaching approaches to find the ones that work best for me.	0	0	45	67	25	3.85	GE
e. I develop my own portfolio of activities, technologies and teaching methods.	0	0	42	59	36	3.96	GE
f. I use digital tools to implement innovative teaching methodologies and share them with my networks, so that they can also benefit.	0	0	41	67	29	3.91	GE
2. Monitoring the activities and interactions of students in the online collaborative environments.							
a. I analyze and intervene in my learners' online activities (e.g. discussions) with motivating or corrective comments.	0	0	66	45	26	3.71	GE
b. I encourage learners to participate in online activities by asking questions.	0	0	47	68	22	3.82	GE
c. I redirect students' online activity when I see that it is not working or foresee problems.	0	0	71	37	29	3.69	GE
3. Students using digital technologies to acquire and reflect knowledge when they work in groups.							
a. I integrate digital technologies into collaborative learning activities.	0	0	59	59	19	3.71	GE
b. I identify opportunities and implement assignments for learners to work collaboratively by searching for information online or presenting their results in digital formats.	0	0	48	70	19	3.79	GE
c. I structure course activities that require learners to work collaboratively in groups, using the Internet to find information and presenting their results in digital formats.	0	0	53	65	19	3.75	GE
d. I design course assignments that require students to use online collaborative environments to exchange knowledge and discuss.	0	0	50	63	24	3.81	GE
e. I design course assignments that require students to use online collaborative environments to create and share knowledge.	0	0	63	45	29	3.75	GE
f. I design curricular activities that require	0	0	55	53	29	3.81	

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the use of digital technologies to enhance collaborative learning and the co-creation and sharing of knowledge							GE
4. Using digital technologies to enable my students to plan, document and monitor their own learning process.							
a. I use, for example, tests for self-assessment or a subject blog.	0	0	66	45	26	3.71	GE
b. I use various digital tools for students to plan, document or reflect on their learning.	0	0	47	68	22	3.82	GE
c. I integrate different digital tools for learners to plan, document or reflect on their progress.	0	0	55	57	25	3.78	GE
d. I am selective in my choice of the best digital tools to integrate into my teaching, after testing them with different learning tasks and groups of learners.	0	0	49	63	25	3.82	GE
e. I develop apps or digital games to engage students in their own learning.	0	0	45	67	25	3.85	GE
					AWM	3.79	GE

Legend:

WM	=	weighted mean
DE	=	descriptive equivalent
AWM	=	area weighted mean

Scale:

VL	=	very limited extent	=	1.00 – 1.49
LE	=	limited extent	=	1.50 – 2.49
ME	=	moderate extent	=	2.50 – 3.49
GE	=	great extent	=	3.50 – 4.49
VG	=	very great extent	=	4.50 – 5.00

When asked as to the extent to which they use a wide variety of digital resources and tools in their classes, 55 of the kindergarten teachers replied “moderate extent,” 57 replied “great extent,” and 25 replied “very great extent.” The weighted mean computed in this item is 3.78 which is leading to “great extent” in the scale.

When inquired as to the extent to which they try out different teaching methods according to the digital technologies they choose, 49 of the kindergarten teachers responded “moderate extent,” 63 responded “great extent,” and 25 responded “very great extent.” Here, the weighted mean computed is 3.82 which is indicative of “great extent” in the scale.

When asked as to the extent to which they select and try different teaching approaches to find the ones that work best for them, 45 of the kindergarten teachers replied “moderate extent,” 67 replied “great extent,” and 25 replied “very great extent.” The weighted mean computed in this item is 3.85 which is leading to “great extent” in the scale.

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When inquired as to the extent to which they develop their own portfolio of activities, technologies and teaching methods, 42 of the kindergarten teachers responded “moderate extent,” 59 responded “great extent,” and 36 responded “very great extent.” Here, the weighted mean computed is 3.96 which is indicative of “great extent” in the scale.

When queried as to the extent to which they use digital tools to implement innovative teaching methodologies and share them with their networks, so that they can also benefit, 41 of the kindergarten teachers responded “moderate extent,” 67 responded “great extent,” and 29 responded “very great extent.” The weighted mean computed in this item is 3.91 which is pointing to “great extent” in the scale of interpretation.

Along monitoring the activities and interactions of students in the online collaborative environments, when questioned as to the extent to which they analyze and intervene in their learners’ online activities (e.g. discussions) with motivating or corrective comments, 66 of the kindergarten teachers claimed “moderate extent,” 45 claimed “great extent,” and 26 claimed “very great extent.” The weighted mean computed here is 3.71 which is pointing to “great extent” in the scale.

When asked as to the extent to which they encourage learners to participate in online activities by asking questions, 47 of the kindergarten teachers replied “moderate extent,” 68 replied “great extent,” and 22 replied “very great extent.” The weighted mean computed in this item is 3.82 which is leading to “great extent” in the scale.

When asked as to the extent to which they redirect students’ online activity when they see that it is not working or foresee problems, 71 of the kindergarten teachers replied “moderate extent,” 37 replied “great extent,” and 29 replied “very great extent.” The weighted mean computed in this item is 3.69 which is leading to “great extent” in the scale.

Along students using digital technologies to acquire and reflect knowledge when they work in groups, when questioned as to the extent to which they integrate digital technologies into collaborative learning activities, 59 of the kindergarten teachers checked “moderate extent,” 59 checked “great extent,” and 19 checked “very great extent.” Here, the weighted mean computed is 3.71 which is “great extent” in the scale.

When asked as to the extent to which they identify opportunities and implement assignments for learners to work collaboratively by searching for information online or presenting their results in digital formats, 48 of the kindergarten teachers mentioned “moderate extent,” 70 mentioned “great extent,” and 19 mentioned “very great extent.” In this item, the weighted mean computed is 3.79 which is pointing to “great extent” in the scale.

When questioned as to the extent to which they structure course activities that require learners to work collaboratively in groups using the Internet to find information and presenting their results in digital formats, 53 of the kindergarten teachers claimed “moderate extent,” 65 claimed “great extent,” and 19 claimed “very great extent.” The weighted mean computed here is 3.75 which is pointing to “great extent” in the scale.

When asked as to the extent to which they design course assignments that require students to use online collaborative environments to exchange knowledge and discuss, 50 of the kindergarten teachers replied “moderate extent,” 63 replied “great extent,” and 24 replied “very great extent.” The weighted mean computed in this item is 3.81 which is leading to “great extent” in the scale.

When asked as to the extent to which they design course assignments that require students to use online collaborative environments to create and share knowledge, 63 of the kindergarten

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teachers replied “moderate extent,” 45 replied “great extent,” and 29 replied “very great extent.” The weighted mean computed in this item is 3.75 which is leading to “great extent” in the scale.

When asked as to the extent to which they design curricular activities that require the use of digital technologies to enhance collaborative learning and the co-creation and sharing of knowledge, 55 of the kindergarten teachers mentioned “moderate extent,” 53 mentioned “great extent,” and 29 mentioned “very great extent.” In this item, the weighted mean computed is 3.81 which is pointing to “great extent” in the scale.

Along using digital technologies to enable their students to plan, document and monitor their own learning process, when questioned as to the extent to which they use, for example, tests for self-assessment or a subject blog, 66 of the kindergarten teachers claimed “moderate extent,” 45 claimed “great extent,” and 26 claimed “very great extent.” The weighted mean computed here is 3.71 which is pointing to “great extent” in the scale.

When asked as to the extent to which they use various digital tools for students to plan, document or reflect on their learning, 47 of the kindergarten teachers replied “moderate extent,” 68 replied “great extent,” and 22 replied “very great extent.” The weighted mean computed in this item is 3.82 which is leading to “great extent” in the scale.

When asked as to the extent to which they integrate different digital tools for learners to plan, document or reflect on their progress, 55 of the kindergarten teachers replied “moderate extent,” 57 replied “great extent,” and 25 replied “very great extent.” The weighted mean computed in this item is 3.78 which is leading to “great extent” in the scale.

When asked as to the extent to which they are selective in their choice of the best digital tools to integrate into their teaching, after testing them with different learning tasks and groups of learners, 49 of the kindergarten teachers replied “moderate extent,” 63 replied “great extent,” and 25 replied “very great extent.” The weighted mean computed in this item is 3.82 which is leading to “great extent” in the scale.

And, when inquired as to the extent to which they develop apps or digital games to engage students in their own learning, 45 of the kindergarten teachers responded “moderate extent,” 67 responded “great extent,” and 25 replied “very great extent.” Here, the weighted mean computed is 3.85 which is indicative of “great extent” in the scale.

Meanwhile, the computed area weighted mean is 3.79. This implies that the kindergarten teachers perceived that their digital competence along teaching and learning is to a great extent.

Assessment of the School Heads. The assessment of the school heads on the extent of digital competence along teaching and learning of the kindergarten teachers is presented in Table 10.

As shown in Table 10, along carefully assessing how, when and why to use digital technologies in the classroom with students to ensure that they add value, when questioned as to the extent to which their kindergarten teachers make use of available equipment (e.g. digital whiteboards, projectors or virtual teaching environments when teaching online), two of the school heads said “limited extent,” seven said “moderate extent,” and one said “great extent.” The weighted mean computed here is 2.90 which is leading to “moderate extent” in the scale.

When asked as to the extent to which their kindergarten teachers use a wide variety of digital resources and tools in their classes, two of the school heads replied “limited extent,” seven replied “moderate extent,” and one replied “great extent.” The weighted mean computed in this item is 2.90 which is leading to “moderate extent” in the scale.

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TABLE 10
The Extent of Digital Competence Level along Teaching and Learning of the Kindergarten Teachers as Perceived by the School Heads

Assessment Items	Responses					WM	DE
Teaching and Learning	VL	LE	ME	GE	VG		
1. Carefully assessing how, when and why to use digital technologies in the classroom with students to ensure that they add value. My kindergarten teachers:							
a. Make use of available equipment (e.g. digital whiteboards, projectors or virtual teaching environments when teaching online).	0	2	7	1	0	2.90	ME
b. Use a wide variety of digital resources and tools in their classes.	0	2	7	1	0	2.90	ME
c. Try out different teaching methods according to the digital technologies they choose.	0	1	8	1	0	3.00	ME
d. Select and try different teaching approaches to find the ones that work best for them.	0	2	6	2	0	3.00	ME
e. Develop their own portfolio of activities, technologies and teaching methods.	0	2	7	1	0	2.90	ME
f. Use digital tools to implement innovative teaching methodologies and share them with their networks, so that they can also benefit.	0	2	7	1	0	2.90	ME
2. Monitoring the activities and interactions of students in the online collaborative environments. My kindergarten teachers:							
a. Analyze and intervene in their learners' online activities (e.g. discussions) with motivating or corrective comments.	0	1	8	1	0	3.00	ME
b. Encourage learners to participate in online activities by asking questions.	0	1	8	1	0	3.00	ME
c. Redirect students' online activity when they see that it is not working or foresee problems.	0	2	6	2	0	3.00	ME
3. Students using digital technologies to acquire and reflect knowledge when they work in groups. My kindergarten teachers:							
a. Integrate digital technologies into	0	2	6	2	0	3.00	

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collaborative learning activities.							ME
b. Identify opportunities and implement assignments for learners to work collaboratively by searching for information online or presenting their results in digital formats.	0	1	8	1	0	3.00	ME
c. Structure course activities that require learners to work collaboratively in groups, using the Internet to find information and presenting their results in digital formats.	0	1	8	1	0	3.00	ME
d. Design course assignments that require students to use online collaborative environments to exchange knowledge and discuss.	0	2	7	1	0	2.90	ME
e. Design course assignments that require students to use online collaborative environments to create and share knowledge.	0	2	7	1	0	2.90	ME
f. Design curricular activities that require the use of digital technologies to enhance collaborative learning and the co-creation and sharing of knowledge	0	2	7	1	0	2.90	ME
4. Using digital technologies to enable students to plan, document and monitor their own learning process. My kindergarten teachers:							
a. Use, for example, tests for self-assessment or a subject blog.	0	1	8	1	0	3.00	ME
b. Use various digital tools for students to plan, document or reflect on their learning.	0	1	8	1	0	3.00	ME
c. Integrate different digital tools for learners to plan, document or reflect on their progress.	0	2	6	2	0	3.00	ME
d. Are selective in their choice of the best digital tools to integrate into their teaching, after testing them with different learning tasks and groups of learners.	0	2	6	2	0	3.00	ME
e. Develop apps or digital games to engage students in their own learning.	0	2	7	1	0	2.90	ME
					AWM	2.96	ME

Legend:

WM = weighted mean
DE = descriptive equivalent
AWM = area weighted mean

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Scale:

VL	=	very limited extent	=	1.00 – 1.49
LE	=	limited extent	=	1.50 – 2.49
ME	=	moderate extent	=	2.50 – 3.49
GE	=	great extent	=	3.50 – 4.49
VG	=	very great extent	=	4.50 – 5.00

When inquired as to the extent to which their kindergarten teachers try out different teaching methods according to the digital technologies they choose, one of the school heads responded "limited extent," eight responded "moderate extent," and one responded "great extent." Here, the weighted mean computed is 3.00 which is indicative of "moderate extent" in the scale.

When asked as to the extent to which their kindergarten teachers select and try different teaching approaches to find the ones that work best for them, two of the school heads replied "limited extent," six replied "moderate extent," and two replied "great extent." The weighted mean computed in this item is 3.00 which is leading to "moderate extent" in the scale.

When inquired as to the extent to which their kindergarten teachers develop their own portfolio of activities, technologies and teaching methods, two of the school heads responded "limited extent," seven responded "moderate extent," and one responded "great extent." Here, the weighted mean computed is 2.90 which is indicative of "moderate extent" in the scale.

When queried as to the extent to which their kindergarten teachers use digital tools to implement innovative teaching methodologies and share them with their networks, so that they can also benefit, two of the school heads responded "limited extent," seven responded "moderate extent," and one responded "great extent." The weighted mean computed in this item is 2.90 which is pointing to "moderate extent" in the scale of interpretation.

Along monitoring the activities and interactions of students in the online collaborative environments, when questioned as to the extent to which their kindergarten teachers analyze and intervene in their learners' online activities (e.g. discussions) with motivating or corrective comments, one of the school heads claimed "limited extent," eight claimed "moderate extent," and one claimed "great extent." The weighted mean computed here is 3.00 which is pointing to "moderate extent" in the scale.

When asked as to the extent to which their kindergarten teachers encourage learners to participate in online activities by asking questions, one of the school heads replied "limited extent," eight replied "moderate extent," and one replied "great extent." The weighted mean computed in this item is 3.00 which is leading to "moderate extent" in the scale.

When asked as to the extent to which their kindergarten teachers redirect students' online activity when they see that it is not working or foresee problems, two of the school heads replied "limited extent," six replied "moderate extent," and two replied "great extent." The weighted mean computed in this item is 3.00 which is leading to "moderate extent" in the scale.

Along students using digital technologies to acquire and reflect knowledge when they work in groups, when questioned as to the extent to which their kindergarten teachers integrate digital technologies into collaborative learning activities, two of the school heads checked "limited extent," six checked "moderate extent," and two checked "great extent." Here, the weighted mean computed is 3.00 which is "moderate extent" in the scale.

When asked as to the extent to which their kindergarten teachers identify opportunities and implement assignments for learners to work collaboratively by searching for information online or presenting their results in digital formats, one of the school heads mentioned "limited extent,"

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eight mentioned “moderate extent,” and one mentioned “great extent”. In this item, the weighted mean computed is 3.00 which is pointing to “moderate extent” in the scale.

When questioned as to the extent to which their kindergarten teachers structure course activities that require learners to work collaboratively in groups using the Internet to find information and presenting their results in digital formats, one of the school heads claimed “limited extent,” eight claimed “moderate extent,” and one claimed “great extent.” The weighted mean computed here is 3.00 which is pointing to “moderate extent” in the scale.

When asked as to the extent to which their kindergarten teachers design course assignments that require students to use online collaborative environments to exchange knowledge and discuss, two of the school heads replied “limited extent,” seven replied “moderate extent,” and one replied “great extent.” The weighted mean computed in this item is 2.90 which is leading to “moderate extent” in the scale.

When asked as to the extent to which their kindergarten teachers design course assignments that require students to use online collaborative environments to create and share knowledge, two of the school heads replied “limited extent,” seven replied “moderate extent,” and one replied “great extent.” The weighted mean computed in this item is 2.90 which is leading to “moderate extent” in the scale.

When asked as to the extent to which their kindergarten teachers design curricular activities that require the use of digital technologies to enhance collaborative learning and the co-creation and sharing of knowledge, two of the school heads mentioned “limited extent,” seven mentioned “moderate extent,” and one mentioned “great extent.” In this item, the weighted mean computed is 2.90 which is pointing to “moderate extent” in the scale.

Along using digital technologies to enable their students to plan, document and monitor their own learning process, when questioned as to the extent to which their kindergarten teachers use, for example, tests for self-assessment or a subject blog, one of the school heads claimed “limited extent,” eight claimed “moderate extent,” and one claimed “great extent.” The weighted mean computed here is 3.00 which is pointing to “moderate extent” in the scale.

When asked as to the extent to which their kindergarten teachers use various digital tools for students to plan, document or reflect on their learning, one of the school heads replied “limited extent,” eight replied “moderate extent,” and one replied “great extent.” The weighted mean computed in this item is 3.00 which is leading to “moderate extent” in the scale.

When asked as to the extent to which their kindergarten teachers integrate different digital tools for learners to plan, document or reflect on their progress, two of the school heads replied “limited extent,” six replied “moderate extent,” and two replied “great extent.” The weighted mean computed in this item is 3.00 which is leading to “moderate extent” in the scale.

When asked as to the extent to which their kindergarten teachers are selective in their choice of the best digital tools to integrate into their teaching, after testing them with different learning tasks and groups of learners, two of the school heads replied “limited extent,” six replied “moderate extent,” and two replied “great extent.” The weighted mean computed in this item is 3.00 which is leading to “moderate extent” in the scale.

And, when inquired as to the extent to which their kindergarten teachers develop apps or digital games to engage students in their own learning, two of the school heads responded “limited extent,” seven responded “moderate extent,” and one responded “great extent.” Here, the weighted mean computed is 2.90 which is indicative of “moderate extent” in the scale.

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Meanwhile, the computed area weighted mean is 2.96. This implies that the school heads perceived that the digital competence along teaching and learning of the kindergarten teachers is only to a moderate extent.

On Evaluation and Feedback

The kindergarten teachers and the school heads assessed the extent of digital competence along evaluation and feedback of the kindergarten teachers.

Assessment of the Kindergarten Teachers. The assessment of the kindergarten teachers on the extent of their digital competence along evaluation and feedback is presented in Table 11.

As shown in Table 11, along using digital assessment tools to monitor student progress, when questioned as to the extent to which they use several digital tools to monitor learners' progress, 39 of the kindergarten teachers said "moderate extent," 70 said "great extent," and 28 said "very great extent." The weighted mean computed here is 3.92 which is leading to "great extent" in the scale.

When asked as to the extent to which they integrate the use of various digital tools to monitor learners' progress, 63 of the kindergarten teachers replied "moderate extent," 45 replied "great extent," and 29 replied "very great extent." The

TABLE 11
The Extent of Digital Competence along Evaluation and Feedback of the Kindergarten Teachers as Perceived by Themselves

Assessment Items	Responses					WM	DE
Evaluation and feedback	VL	LE	ME	GE	VG		
1. Using digital assessment tools to monitor student progress							
a. I use several digital tools to monitor learners' progress.	0	0	39	70	28	3.92	GE
b. I integrate the use of various digital tools to monitor learners' progress.	0	0	63	45	29	3.75	GE
c. I selectively choose the best digital tools and try them out for use with learners to assess and check progress.	0	0	55	53	29	3.81	GE
d. I develop my own apps and digital tools to track progress and/or conduct assessments.	0	0	49	63	25	3.82	GE
2. I analyze all available data to effectively identify students in need of additional support.							
a. I analyze academically relevant data, e.g. grades.	0	0	45	67	25	3.85	GE
b. I consider data on student activity and behavior to identify students who need additional support.	0	0	42	59	36	3.96	GE
c. I examine all available evidence to	0	0	41	67	29	3.91	

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identify students who need additional support, to include their emotions and individual circumstances.							GE
d. I analyze student data to intervene in a timely manner.	0	0	57	55	25	3.77	GE
e. I help students analyze their performance and other data to seek help when they feel they need it.	0	0	59	52	26	3.76	GE
f. I encourage students to not only analyze their performance data, but also to set their own learning goals.	0	0	60	51	26	3.75	GE
3. I use digital technologies to provide feedback to students.							
a. I evaluate the advantages of using digital methods to provide constructive feedback, e.g. automatic scores in online questionnaires, comments or "likes" in digital environment.	0	0	51	57	29	3.84	GE
b. I use different digital methods to provide feedback and improve my practices regarding non-digital feedback.	0	0	72	36	29	3.69	GE
c. I combine different digital approaches to provide feedback.	0	0	58	60	19	3.72	GE
d. I choose the best digital tools for feedback after testing them with different groups of learners.	0	0	51	57	29	3.84	GE
e. I develop my own apps or digital tools to provide feedback to learner	0	0	72	36	29	3.69	GE
					AWM	3.80	GE

Legend:

WM = weighted mean
DE = descriptive equivalent
AWM = area weighted mean

Scale:

VL	=	very limited extent	=	1.00 – 1.49
LE	=	limited extent	=	1.50 – 2.49
ME	=	moderate extent	=	2.50 – 3.49
GE	=	great extent	=	3.50 – 4.49
VG	=	very great extent	=	4.50 – 5.00

weighted mean computed in this item is 3.75 which is leading to "great extent" in the scale.

When inquired as to the extent to which they selectively choose the best digital tools and try them out for use with learners to assess and check progress, 55 of the kindergarten teachers responded "moderate extent," 53 responded "great extent," and 29 responded "very great extent." Here, the weighted mean computed is 3.81 which is indicative of "great extent" in the scale.

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When queried as to the extent to which they develop their own apps and digital tools to track progress and/or conduct assessments, 49 of the kindergarten teachers responded “moderate extent”, 63 responded “great extent,” and 25 responded “very great extent.” The weighted mean computed in this item is 3.82 which is pointing to “great extent” in the scale of interpretation.

Along analyzing all available data to effectively identify students in need of additional support, when questioned as to the extent to which they analyze academically relevant data, e.g. grades, 45 of the kindergarten teachers claimed “moderate extent,” 67 claimed “great extent,” and 25 claimed “very great extent.” The weighted mean computed here is 3.85 which is pointing to “great extent” in the scale.

When asked as to the extent to which they consider data on student activity and behavior to identify students who need additional support, 42 of the kindergarten teachers replied “moderate extent,” 59 replied “great extent,” and 36 replied “very great extent.” The weighted mean computed in this item is 3.96 which is leading to “great extent” in the scale.

When asked as to the extent to which they examine all available evidence to identify students who need additional support, to include their emotions and individual circumstances, 41 of the kindergarten teachers replied “moderate extent,” 67 replied “great extent,” and 29 replied “very great extent.” The weighted mean computed in this item is 3.91 which is leading to “great extent” in the scale.

When asked as to the extent to which they analyze student data to intervene in a timely manner, 57 of the kindergarten teachers replied “moderate extent,” 55 replied “great extent,” and 25 replied “very great extent.” The weighted mean computed in this item is 3.77 which is leading to “great extent” in the scale.

When inquired as to the extent to which they help students analyze their performance and other data to seek help when they feel they need it, 59 of the kindergarten teachers responded “moderate extent”, 52 responded “great extent,” and 26 responded “very great extent.” Here, the weighted mean computed is 3.76 which is indicative of “great extent” in the scale.

When queried as to the extent to which they encourage students to not only analyze their performance data, but also to set their own learning goals, 60 of the kindergarten teachers responded “moderate extent,” 51 responded “great extent,” and 26 responded “very great extent.” The weighted mean computed in this item is 3.75 which is pointing to “great extent” in the scale of interpretation.

Along using digital technologies to provide feedback to students, when questioned as to the extent to which they evaluate the advantages of using digital methods to provide constructive feedback, e.g. automatic scores in online questionnaires, comments or “likes” in digital environment, 51 of the kindergarten teachers checked “moderate extent,” 57 checked “great extent,” and 29 checked “very great extent.” Here, the weighted mean computed is 3.84 which is “great extent” in the scale.

When questioned as to the extent to which they use different digital methods to provide feedback and improve their practices regarding non-digital feedback, 72 of the kindergarten teachers claimed “moderate extent,” 36 claimed “great extent,” and 29 claimed “very great extent.” The weighted mean computed here is 3.69 which is pointing to “great extent” in the scale.

When asked as to the extent to which they combine different digital approaches to provide feedback, 58 of the kindergarten teachers replied “moderate extent,” 60 replied “great extent,” and 19 replied “very great extent.” The weighted mean computed in this item is 3.72 which is leading to “great extent” in the scale.

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When asked as to the extent to which they choose the best digital tools for feedback after testing them with different groups of learners, 51 of the kindergarten teachers replied "moderate extent," 57 replied "great extent," and 29 replied "very great extent." The weighted mean computed in this item is 3.84 which is leading to "great extent" in the scale.

Lastly, when inquired as to the extent to which they develop their own apps or digital tools to provide feedback to learner, 72 of the kindergarten teachers responded "moderate extent," 36 responded "great extent," and 29 replied "very great extent." Here, the weighted mean computed is 3.69 which is indicative of "great extent" in the scale.

Meanwhile, the computed area weighted mean is 3.80. This implies that the kindergarten teachers perceived that their digital competence along evaluation and feedback is to a great extent.

Assessment of the School Heads. The assessment of the school heads on the extent of digital competence along evaluation and feedback of the kindergarten teachers is presented in Table 12.

As shown in Table 12, along using digital assessment tools to monitor student progress, when questioned as to the extent to which their kindergarten teachers use several digital tools to monitor learners' progress, two of the school heads said "limited extent," seven said "moderate extent," and one said "great extent." The weighted mean computed here is 2.90 which is leading to "moderate extent" in the scale.

When asked as to the extent to which their kindergarten teachers integrate the use of various digital tools to monitor learners' progress, two of the school heads replied "limited extent," seven replied "moderate extent," and one replied "great extent." The weighted mean computed in this item is 2.90 which is leading to "moderate extent" in the scale.

When inquired as to the extent to which their kindergarten teachers selectively choose the best digital tools and try them out for use with learners to assess and check progress, two of the school heads responded "limited extent," six responded "moderate extent," and two responded "great extent." Here, the weighted mean computed is 3.00 which is indicative of "moderate extent" in the scale.

TABLE 12
The Extent of the Digital Competence along Evaluation and Feedback of the Kindergarten Teachers as Perceived by the School Heads

Assessment Items	Responses					WM	DE
Evaluation and feedback	VL	LE	ME	GE	VG		
1. Using digital assessment tools to monitor student progress. My kindergarten teachers:							
a. Use several digital tools to monitor learners' progress.	0	2	7	1	0	2.90	ME
b. Integrate the use of various digital tools to monitor learners' progress.	0	2	7	1	0	2.90	ME
c. Selectively choose the best digital tools and try them out for use with learners to assess and check progress.	0	2	6	2	0	3.00	ME

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c. Selectively choose the best digital tools and try them out for use with learners to assess and check progress.	0	2	6	2	0	3.00	ME
d. Develop their own apps and digital tools to track progress and/or conduct assessments.	0	2	6	2	0	3.00	ME
2. Analyzing all available data to effectively identify students in need of additional support. My kindergarten teachers:							
a. Analyze academically relevant data, e.g. grades.	0	1	8	1	0	3.00	ME
b. Consider data on student activity and behavior to identify students who need additional support.	0	1	8	1	0	3.00	ME
c. Examine all available evidence to identify students who need additional support, to include their emotions and individual circumstances.	0	2	7	1	0	2.90	ME
d. Analyze student data to intervene in a timely manner.	0	2	7	1	0	2.90	ME
e. Help students analyze their performance and other data to seek help when they feel they need it.	0	2	7	1	0	2.90	ME
f. Encourage students to not only analyze their performance data, but also to set their own learning goals.	0	2	6	2	0	3.00	ME
3. Using digital technologies to provide feedback to students. My kindergarten teachers:							
a. Evaluate the advantages of using digital methods to provide constructive feedback, e.g. automatic scores in online questionnaires, comments or “likes” in digital environment.	0	2	7	1	0	2.90	ME
b. Use different digital methods to provide feedback and improve their practices regarding non-digital feedback.	0	2	7	1	0	2.90	ME
c. Combine different digital approaches to provide feedback.	0	1	8	1	0	3.00	ME
d. Choose the best digital tools for feedback after testing them with different groups of learners.	0	1	8	1	0	3.00	ME
e. Develop their own apps or digital tools to provide feedback to learner	0	2	7	1	0	2.90	ME
					AWM	2.95	ME

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Legend:

WM	=	weighted mean		
DE	=	descriptive equivalent		
AWM	=	area weighted mean		

Scale:

VL	=	very limited extent	=	1.00 – 1.49
LE	=	limited extent	=	1.50 – 2.49
ME	=	moderate extent	=	2.50 – 3.49
GE	=	great extent	=	3.50 – 4.49
VG	=	very great extent	=	4.50 – 5.00

When queried as to the extent to which their kindergarten teachers develop their own apps and digital tools to track progress and/or conduct assessments, two of the school heads responded "limited extent," six responded "moderate extent," and two responded "great extent." The weighted mean computed in this item is 3.00 which is pointing to "moderate extent" in the scale of interpretation.

Along analyzing all available data to effectively identify students in need of additional support, when questioned as to the extent to which their kindergarten teachers analyze academically relevant data, e.g. grades, one of the school heads claimed "limited extent," eight claimed "moderate extent," and one claimed "great extent." The weighted mean computed here is 3.00 which is pointing to "moderate extent" in the scale.

When asked as to the extent to which their kindergarten teachers consider data on student activity and behavior to identify students who need additional support, one of the school heads replied "limited extent," eight replied "moderate extent," and one replied "great extent." The weighted mean computed in this item is 3.00 which is leading to "moderate extent" in the scale.

When asked as to the extent to which their kindergarten teachers examine all available evidence to identify students who need additional support, to include their emotions and individual circumstances, two of the school heads replied "limited extent," seven replied "moderate extent," and one replied "great extent." The weighted mean computed in this item is 2.90 which is leading to "moderate extent" in the scale.

When asked as to the extent to which their kindergarten teachers analyze student data to intervene in a timely manner, two of the school heads replied "limited extent," seven replied "moderate extent," and one replied "great extent." The weighted mean computed in this item is 2.90 which is leading to "moderate extent" in the scale.

When inquired as to the extent to which their kindergarten teachers help students analyze their performance and other data to seek help when they feel they need it, two of the school heads responded "limited extent," seven responded "moderate extent," and one responded "great extent." Here, the weighted mean computed is 2.90 which is indicative of "moderate extent" in the scale.

When queried as to the extent to which their kindergarten teachers encourage students to not only analyze their performance data, but also to set their own learning goals, two of the school heads responded "limited extent," six responded "moderate extent," and two responded "great extent." The weighted mean computed in this item is 3.00 which is pointing to "moderate extent" in the scale of interpretation.

Along using digital technologies to provide feedback to students, when questioned as to the extent to which their kindergarten teachers evaluate the advantages of using digital methods to provide constructive feedback, e.g. automatic scores in online questionnaires, comments or "likes"

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in digital environment, two of the school heads checked "limited extent," seven checked "moderate extent," and one checked "great extent.". Here, the weighted mean computed is 2.90 which is "moderate extent" in the scale.

When questioned as to the extent to which their kindergarten teachers use different digital methods to provide feedback and improve their practices regarding non-digital feedback, two of the school heads claimed "limited extent," seven claimed "moderate extent," and one claimed "great extent." The weighted mean computed here is 2.90 which is pointing to "moderate extent" in the scale.

When asked as to the extent to which their kindergarten teachers combine different digital approaches to provide feedback, one of the school heads replied "limited extent," eight replied "moderate extent," and one replied "great extent." The weighted mean computed in this item is 3.00 which is leading to "moderate extent" in the scale.

When asked as to the extent to which their kindergarten teachers choose the best digital tools for feedback after testing them with different groups of learners, one of the school heads replied "limited extent," eight replied "moderate extent," and one replied "great extent." The weighted mean computed in this item is 3.00 which is leading to "moderate extent" in the scale.

Lastly, when inquired as to the extent to which their kindergarten teachers develop their own apps or digital tools to provide feedback to learner, two of the school heads responded "limited extent," seven responded "moderate extent," and one responded "great extent." Here, the weighted mean computed is 2.90 which is indicative of "moderate extent" in the scale.

Meanwhile, the computed area weighted mean is 2.95. This implies that the school heads perceived that the digital competence along evaluation and feedback of the kindergarten teachers is only to a moderate extent.

A Summary

The extent of digital competence of the kindergarten teachers is presented in Table 13.

TABLE 13
The Extent of Digital Competence of the Kindergarten Teachers

	Assessment of the Kindergarten Teachers		Assessment of the School Heads	
Areas of Digital Competence	AWM	DE	AWM	DE
1. Professional Engagement	3.70	GE	2.92	ME
2. Digital Resources	3.78	GE	2.96	ME
3. Teaching and Learning	3.79	GE	2.96	ME
4. Evaluation and Feedback	3.80	GE	2.95	ME
OWM	3.77	GE	2.95	ME

Legend:
AWM = area weighted mean
DE = descriptive equivalent
OWM = overall weighted mean

Scale:

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VL	=	very limited extent	=	1.00 – 1.49
LE	=	limited extent	=	1.50 – 2.49
ME	=	moderate extent	=	2.50 – 3.49
GE	=	great extent	=	3.50 – 4.49
VG	=	very great extent	=	4.50 – 5.00

As can be noted in Table 13, the kindergarten teachers perceived that their digital competence is to a great extent as evidenced by the computed overall weighted mean of 3.77. Meanwhile, the school heads perceived that the digital competence of the kindergarten teachers is only to a moderate extent as evidenced by the computed overall weighted mean of 2.95.

Relationship between the Profile Variables of the Kindergarten Teachers and the Extent of Their Digital Competence

This section provides answers to the fourth sub-problem of the study which is about the significant relationship between the profile variables of the kindergarten teachers of public elementary schools and the extent of their digital competence.

To provide answers to the sub-problem, the researcher worked on the null hypothesis that there is no significant relationship between the profile variables of the kindergarten teachers and the extent of their digital competence. Thereafter, the researcher correlated the profile variables of the kindergarten teachers and the extent of their digital competence using the chi-square test of independence in the Microsoft Excel. Here, the researcher computed for the p value, the chi square value, and the contingency coefficient at .05 level of significance. Table 14 provides the results.

As shown by Table 14, when the highest educational attainment of the kindergarten teachers and the extent of their digital competence are correlated, the p value computed is 0.02. This figure is lower than the .05 level of significance. In the same way, the chi square value computed is 5.47. This figure is higher than the computed chi square critical value of 3.84. This means that there is a significant relationship between the two. As such, the null hypothesis is rejected. Conformably, it can be said that the extent of digital competence of the kindergarten teachers influenced by their educational attainment.

Table 14
Relationship between the Profile Variables of the Kindergarten Teachers and the Extent of Their Digital Competence

Profile Variable	P Value .05 LS	Chi Square Value	Chi Square Critical Value	R M
Educational Attainment	0.02	5.47	3.84	S
Length of Teaching Experience	0.02	5.84	3.84	S
Number of Relevant Trainings Attended	0.02	5.45	3.84	S

Legend:

RM	=	remarks
S	=	significant
NS	=	not significant

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Secondly, when the length of teaching experience of the kindergarten teachers and the extent of their digital competence are correlated, the p value computed is 0.02. This figure is lower than the .05 level of significance. Moreover, the computed chi square value is 5.84. This figure is higher than the computed chi square critical value of 3.84. This means that there is a significant relationship between the two. As such, the null hypothesis is rejected. Thus, it can be said that the extent of digital competence of the kindergarten teachers is influenced by their length of teaching experience.

Lastly, when the number of related trainings/seminars attended by the kindergarten teachers and the extent of their digital competence are correlated, the p value computed is 0.02. This figure is lower than the .05 level of significance. In the same way, the chi square value computed is 5.45. This figure is higher than the computed chi square critical value of 3.84. This means that there is a significant relationship between the two. As such, the null hypothesis is rejected. Conformably, it can be said that the extent of digital competence of the kindergarten teachers is influenced by the number of relevant trainings/seminars they attended.

Difference between the Perceptions of the Kindergarten Teachers and the School Heads on the Extent of Digital Competence of the Kindergarten Teachers

This part of the chapter discusses answers to the third sub-problem of the study which is about the significant difference between the perceptions of the kindergarten teachers and the school heads on the extent of digital competence of the kindergarten teachers.

To provide answers to the sub-problem, the researcher worked on the null hypothesis that there is no significant difference between the perceptions of the kindergarten teachers and their school heads on the extent of digital competence of the kindergarten teachers. Thereafter, the researcher compared the perceptions of the kindergarten teachers and their school heads on the extent of digital competence of the kindergarten teachers using the t-test. Here, the researcher computed the p value at .05 level of significance. Table 15 presents the results.

As shown in Table 15, when the perceptions of the kindergarten teachers and their school heads on the extent of digital competence of the kindergarten teachers are compared, the p value computed is 0.00. This figure is lower than the .05 level of significance. As such, the null hypothesis is rejected. There is a significant difference between the perceptions of the kindergarten teachers and their school heads on the extent of digital competence of the kindergarten teachers.

TABLE 15
Difference between the Perceptions of the Kindergarten Teachers and the School Heads

	Computed p Value	Level of Significance	RM
Extent of Digital Competence	0.00	.05	S

Legend:
RM = remarks
S = significant
NS = not significant

The Proposed In-Service Training Program on Digital Competence

ISSN 3028-2586 (Print) · ISSN 3155-6876 (Online) · erfresearch.com

This section provides answers to the last sub-problem of the study which is about the in-service training program on digital competence.

To provide answers to the sub-problem, the findings previously presented that majority of the kindergarten teachers of public elementary schools in the Schools Division of the City of Manila have attended not more than three trainings/seminars related with digital competence for the past five years, that the school heads perceived that the digital competence of the kindergarten teachers is only to a moderate extent, and that the extent of digital competence of the kindergarten teachers is influenced by the number of relevant trainings they attended.

What follows is the proposed in-service training program on digital competence for the kindergarten teachers.

AN IN-SERVICE TRAINING PROGRAM ON DIGITAL COMPETENCE FOR KINDERGARTEN TEACHERS OF PUBLIC ELEMENTARY SCHOOLS IN THE SCHOOLS DIVISION OF THE CITY OF MANILA

Program Title: An In-Service Training Program on Digital Competence for the Kindergarten Teachers of Public Elementary Schools in the Schools Division of the City of Manila

Prerequisite Program: None

Duration: This program shall run for four sessions with one day for each session

Management Level of the Program: This program is a division-based program for the Schools Division of the City of Manila

Delivery Mode: Depending on the specific activity, but preferably interactive-collaborative activities (one with mentoring, coaching, professional learning session, peer discussion, workshop, and others) and will focus on enhancing the extent of digital competence of the kindergarten teachers.

Target Personnel: Kindergarten teachers of public elementary school in the Schools Division of the City of Manila

Budget Requirement: The cost of the program shall come from the local fund.

Rationale:

Advancements in technology and the rapid growth of information have transformed the nature of learning. As societies shape their future directions, they prioritize goals such as becoming information-oriented communities, engaging in scientific endeavors, and developing technology. Achieving these objectives requires the enhancement of various skills, particularly competence.

ISSN 3028-2586 (Print) · ISSN 3155-6876 (Online) · erfresearch.com

Competence pertains to an individual's capacity to manage life effectively, including the ability to read and write sufficiently for communication within society and to perform basic mathematical operations. It encompasses the skills to identify, comprehend, interpret, create, communicate, and calculate using printed and written materials across different contexts. Moreover, it represents a continuous learning process that enables individuals to accomplish their goals, enhance their knowledge and potential, and actively participate in both the community and society as a whole.

At the same time, the emergence of a new generation and the swift advancement of technology have transformed society and redefined the concept of competence. Today's generation must develop digital skills to function effectively and productively in an increasingly dynamic and multifaceted digital environment. As a result, the concept of digital competence has emerged.

Digital competence involves the ability to access information through digital technologies, organize data, analyze and interpret information, evaluate and transfer knowledge, and read and compose digital texts during the information production process. It goes beyond merely operating software or digital devices, as it encompasses complex cognitive, psychomotor, and affective skills necessary for effective functioning in digital environments. Moreover, digital competence includes the capacity to understand and utilize the influence of visuals and sounds, adapt them into digital formats, transform them into new forms, and publish them digitally. In this regard, activities such as sharing photos, writing posts, and reading content on social networking platforms are considered examples of digital competence.

Moreover, digital competence is vital in promoting the confident and critical use of information and communication technology in areas such as work, leisure, learning, and communication. In this context, it encompasses the technological knowledge and skills required for individuals to live productively, pursue continuous personal growth through lifelong learning, and make meaningful contributions to society.

Indeed, digital competence refers to the ability to carry out effective digital activities in areas such as business, education, leisure, and other aspects of everyday life. It enhances the quality of an individual's life by involving the acquisition and application of information and technological skills, together with attitudes, personal attributes, planning abilities, and self-awareness as a digitally competent individual. It also includes the capacity to reflect on and further develop one's digital literacy. In simple terms, digital competence is the awareness, attitude, and capability of individuals to appropriately use digital tools and technologies in identifying, accessing, managing, integrating, evaluating, analyzing, and synthesizing digital resources, as well as in creating new information.

Undeniably, digital competence plays a significant role in today's society; thus, this in-service training program on digital competence was conceptualized.

Objectives: This program aims to improve and enhance the extent of digital competence of the kindergarten teachers of public elementary schools in the Schools Division of the City of Manila.

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Expected Final Outcomes/Success Indicator: At the end of the program, the extent of digital competence of the kindergarten teachers of public elementary schools in the Schools Division of the City of Manila will be enhanced/improved.

Program Content Focus/Matrix

Program Title	Training Content	Duration
Seminar-Workshop on Professional Engagement	This session will focus on: 1. Using various digital channels to communicate with parents and peers (such as emails, blogs, school's website, WhatsApp, etc.) 2. Using digital technologies to work with peers (teachers) at and out of school 3. Actively working on developing digital teaching skills 4. Participating in remote training opportunities (such as training courses, workshops, virtual conferences, and courses through open platforms such as MOOCs)	1 day
Seminar-Workshop on Digital Resources	This session will focus on: 1. Using different websites and search strategies to find and select different digital resources 2. Creating one's own digital resources and modify existing ones to suit one's needs 3. Effectively protecting personal data, such as exams, grades or personal data	1 day
Seminar-Workshop on Teaching and Learning	This session will focus on: 1. Carefully assessing how, when and why to use digital technologies in the classroom with students to ensure that they add value 2. Monitoring the activities and interactions of students in the online collaborative environments 3. Using digital technologies to acquire and reflect knowledge when they work in groups 4. Using digital technologies to enable students to plan, document and monitor their own learning process	1 day
Seminar-Workshop on Evaluation and Feedback	This session will focus on: 1. Using digital assessment tools to monitor student progress	1 day

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	2. Analyzing all available data to effectively identify students in need of additional support 3. Using digital technologies to provide feedback to students	

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