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Correlation between Teachers' Digital Competency and their Self-Efficacy in Managing Online Classes

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ABSTRACT

Adoption of online teaching platforms for reaching learners and including technologies in lesson delivery was never so crucial before the Pandemic. The shift from regular classroom teaching to distant learning during the pandemic presented many challenges to educators. This study explored the correlation between teachers' digital competency and their self-efficacy during distant teaching. This research employed a quantitative approach, and a questionnaire was administered to a sample of teaching staff from Karachi's southern region. 155 respondents participated in this research including 85 Nursery teachers and 70 from lower primary level(I–II). The questionnaire included questions on factors for digital competency and teachers' self-efficacy in separate sections. The digital competency section assessed teachers' proficiency in using digital tools, platforms, and technologies relevant to online teaching. The self-efficacy section measured teachers' beliefs in their capabilities to perform specific tasks related to two factors, which were instructional strategies and students' engagement. Data analysis included correlation analysis to find the relationship between teachers' digital competency and self-efficacy , instructional strategies and students engagement .Correlation values (.839) , (.727) and (.764) where $p < .001$ revealed statistically significant relationship between the research variables, concluding the significant role of digital competencies in online teaching. The findings further highlighted the importance of professional training in equipping teachers with technical knowledge and digital competence in order to use online teaching tools with high self-efficacy, which will eventually improve their overall performance in online lesson delivery. Additional qualitative and quantitative research is suggested on further factors that influence teachers' self-efficacy in their online teaching through digital resources.

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1. Introduction

The widespread malady of the infectious Corona virus had adverse effects on the world economy, every nation was affected in the pandemic but the effect on developing countries was marginal due to lack of efficiencies in their technologies, infrastructures and health services (Dolighan & Owen, 2021). Prominent affect was witnessed on global education systems and the pandemic encompassed long-lasting effects on academic and instructive exercises. As reported on April 17, 2020, by UNESCO, 91.3% of school-going children and approximately 1.5 billion learners were isolated in this Pandemic. During COVID-19's widespread spread, the state of education was no longer conducive, resulting in an instructive quality that was less than perfect.

Schools, colleges, and other educational institutions were temporarily closed, and on-campus learning was shifted to online modes. However, internet connectivity, limitations of resources, and a lack of infrastructural support for distant learning made the whole exercise

challenging for the educators and students. Since face-to-face teaching no longer remained possible, the school leaders had to switch to different online modes to continue the teaching process. While moving on the new venture of online teaching and learning, the majority of academic institutions ran into a variety of obstacles, including network issues, a lack of resources, issues with faculty and student adjustment to the new education protocol (Mseleku, 2020). Schools that already had their Portals or other learning management systems (LMS) started reaching the students through their Portals and providing learning material to them.

Others immediately opted for available resources like Zoom classes, Google Classrooms, or Microsoft Teams because the process of teaching and learning had to start by any means. Due to the rapid increase in COVID-19 cases and the sudden closure of schools, teachers did not get sufficient time for preparations. As mentioned by Ng and Renshaw (2020), the increased risk for the spread of coronavirus infection forced teachers to put together learning materials in a very short period of time that enabled learning via paper-based material and online-based modes. Even WhatsApp classes were delivered by teachers from small setups or mushroom schools. This article elaborated on the concerns that teachers faced in their efforts to cope with online teaching methods and presented a correlation between teachers' digital competency and their self-efficacy assessed with two factors, i.e., instructional strategies and students' involvement in managing digital platforms and resources.

1.1. Background of the Study

With reference to school closure, UNESCO on March 10th, 2020, mentioned teachers stress and confusion as an adverse consequence of the lockdown, the uncertainty about the situation, and teachers' lack of understanding regarding remote education. The implementation of online teaching strategies intensified due to the COVID-19 epidemic, making digital competency a necessary ability for teachers. The method of education needed to be changed because of the changes that were required for students, teachers, and parents to acquire the skills necessary to manage novel and unconventional teaching methods (Ng & Renshaw, 2020). An active and effective online contact was also hindered by a variety of factors, including a lack of devices and limited online experience on the part of the educator who was executing distance education. Mseleku (2020) elaborated stakeholders concerns for the outcomes of online teaching as government authorities, parents, students and academic staff had questions related to the quality of online teaching and learning.

As elaborated by Korkmaz and Toraman (2020) teachers had inefficient digital teaching skills and lacked skills in delivering online instruction and conducting online assessments. Due to such limitations, teachers were unable to conduct online classes without being trained and prepared for the new teaching methods. In this context, the instructors' digital competency and self-efficacy in administering online classes are critical for the success of remote teaching. The sudden transition to new teaching modes had placed additional challenges and responsibilities on educators and negatively impacted their health, both physically and mentally. Pisano, Galimi, and Cerniglia (2020) mentioned that teachers went through physical and mental stress in their attempts to keep balance between their personal and professional commitments.

Ben-Amram and Davidovitch (2021) concluded that during COVID, work stress was the driving factor behind teachers' decisions to quit their jobs. in addition to their dislike for school support and the work environment (Hatlevik & Hatlevik, 2018).According to Dolighan and Owen (2021) teachers needed special training to develop confidence since they were apprehensive and shaky about adapting to a new teaching and learning environment due to a lack of skills and competencies to tackle the digital resources.

1.2. Teachers Concerns

In order to better understand what support and training teachers will need to make the transition to fully online environments as well as for ongoing professional learning and training going forward in the context of the COVID-19 pandemic, this research aimed to explore the relationship between instructors' self-efficacy in administering online classes and their digital competency and the lasting effects on education.

1.3. Rationale of the Study

Online teaching mainly depends on the educators' competency in conducting the lesson. As mentioned by Martin, Budhrani, Kumar, and Ritzhaupt (2019) in online learning, the teacher performs various roles; he or she becomes a knowledge steward, facilitator, guide, information disseminator, and learner. This study intends to contribute to the body of information on efficient practices for online teaching by exploring the relationship between teachers' digital proficiency and self-efficacy in managing online classes. The research findings and recommendations will help educators, academic managers, and organizations execute professional development programs that cater to the particular requirements of teachers in the digital sphere. The research findings can also be used by decision-makers in budget allocation, planning training programs, and revising educational policies that will support effective online education.

1.4. Statement of the Problem

Qualified educationists, although they possessed subject knowledge and expertise to teach in regular classrooms, found disseminating the knowledge through online tools a hindrance in their delivery as the teaching conditions were not favourable. Subject knowledge had given them grip over the content, but the question was whether they were able to transfer that knowledge to the learners confidently without being equipped with the required technological skills.

1.5. Significance of the Study

This research is aligned with the current situation of educational institutions and seeks to find possible measures that can be incorporated to enhance the capacity of educators to manage online methods.

1.6. Objectives of the Study

- To explore difficulties that teachers encountered during COVID-19
- To investigate how the pandemic affected classroom practices?
- To find the correlation between teachers' digital competency and their level of self-efficacy in taking online classes.
- To find the correlation between teachers' digital competency and their capabilities of incorporating instructional strategies in online classes.
- To find the correlation between teachers' digital competency and their capabilities of engaging students in online classes.
- To investigate how well-versed teachers are in technology and how that relates to their ability to keep students interested in their online courses.

1.7. Research questions

- What were the challenges faced by the teachers in switching to online methods?
- What was the effect of the pandemic on the overall education landscape?
- What kind of support do teachers need to combat the challenges of online teaching?
- What were teachers' concerns related to remote teaching?

1.8. Research Hypothesis

H: There is a strong correlation between Teachers' digital competency and their self- efficacy for online teaching.

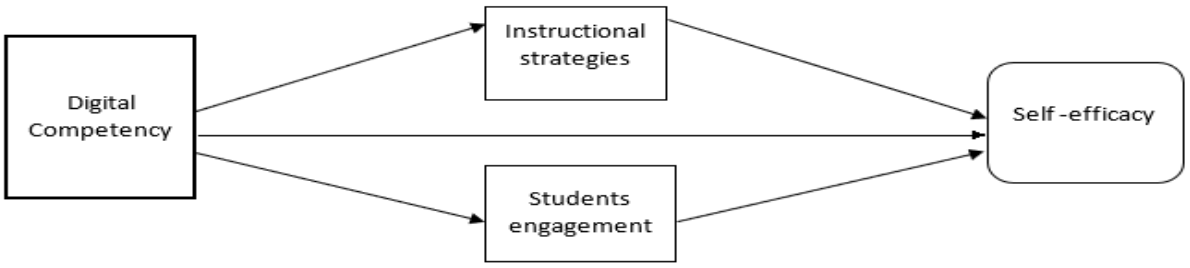
Ha: A significant correlation exists between teachers' digital competency and their instructional strategies for conducting online classes.

Hb: A significant correlation exists between teachers' digital competency and their capabilities to engage students in online lessons.

2. Conceptual Framework

Conceptual frameworks supported the research in assessing the variables and finding the relationship between the dependent and independent variables for this particular research.

Figure 1



Digital competency improves teachers' instructional strategies and capabilities of engaging students in a virtual setup, which enhances their self-efficacy.

3. Literature Review

The research on ICT highlights the significance of digital skills and also discusses the role of a teacher, which has been shifted to distant education. Barbour and Unger (2014) stated that online teaching is significantly different from face-to-face teaching, for which teacher preparation and training become an ultimate requirement. Kivunja (2013) referred to digital competency as an Art of teaching and further elaborated that computer-based technologies enrich the whole curriculum by enriching teaching, learning, and assessments.

According to Fullan and Langworthy (2013) the combination of technology and pedagogy creates new learning stimuli. Further, Kivunja (2013) focused on pedagogy as a specific feature of digital competence. However, after encountering COVID, it appeared that the educational systems did not have the capacity to keep up with and adapt to the high rate of technological progress. Online education exposed many of the same problems in all of the countries where it was implemented (OECD, 2020). From the perspective of teachers', they had many limitations while managing online classes. Some key challenges included limited access to technology, a lack of technical skills, difficulty monitoring student engagement, and the need for increased communication and collaboration with students. Other challenges included maintaining student motivation, ensuring equitable access to resources, and addressing issues related to privacy and security.

Dolighan and Owen (2021) in their work related to teachers' self-efficacy for online teaching mentioned some factors as barriers to online teaching; these factors included teachers' resistance, the reliability of technical resources, and a lack of institutional support as prominent issues.

3.1. The theoretical framework of the study

3.1.1. Self-Efficacy Theory: Recognizing and Maximizing Human Potential

Bandura and Walters (1977) made an important addition to psychology with his self-efficacy theory, which is applied to various aspects of human functioning. A person's self-efficacy relates to their confidence in their capacity to carry out particular tasks successfully, achieve desired goals, or act appropriately in particular circumstances. According to Bandura's self-efficacy theory, people's decisions, efforts, and level of resilience in difficulties are all significantly influenced by their self-beliefs, and it influences their decisions as well. Self-efficacy beliefs are driven by experiences, observations, influences, and the emotional and physiological state of a person. When individuals successfully complete tasks, achieve goals, or overcome challenges, they gain confidence in their abilities. These personal accomplishments serve as building blocks for developing and strengthening self-efficacy. With Reference to teachers' self-efficacy, Joo, Park, and Lim (2018) concluded that when using new technologies in classrooms, it's the teachers' motivation that plays a significant role. Positive and constructive feedback that reinforces individuals' capabilities and highlights their strengths enhances self-efficacy, whereas unstable physiological and emotional states have a negative effect on a person's self-efficacy beliefs. As mentioned by Schonert-Reichl (2017), when the teacher is stressed out, it adversely affects her students, and they also feel stressed out as high levels of stress, anxiety, or physical discomfort diminish self-efficacy. On the contrary, positive emotions and a sense of calm can enhance self-efficacy. Research has identified teachers' self-efficacy and confidence as key factors in the successful integration of ICT in schools (Krause, Pietzner, Dori, & Eilks, 2017).

3.2. Digital Competence of Educators

Digital competency refers to one's ability to navigate in a digitalized environment**.** Teachers who teach online must possess a variety of digital competencies, including the knowledge and abilities needed to use digital tools and platforms efficiently (Kivunja, 2013; Krumsvik, Jones, Øfstegaard, & Eikeland, 2016). A number of studies have elaborated on the need for digital competence for those related to schools and education. In Vision 2025, the Digital Pakistan Policy states "To become a strategic enabler for an accelerated digitization ecosystem to expand the knowledge-based economy and spur socio-economic growth". (Digital Pakistan Policy, p. 5). The policy highlights the holistic digital strategy, which refers to the need to create digital infrastructure and institutional frameworks for the swift provision of advanced digital applications, services, and content. As technologies have become part of our daily lives, it has also impacted educational planning, presentation, and feedback. Pettersson (2018) added that teachers needed to transform traditional education with the integration of technology as the school digitalization has created a need for developing, supporting, and enhancing competences for teaching and learning in order to turn the school into a digital environment.

3.3. Digital Competencies and Teachers' Self-efficacy in Online Classes

During the period of the pandemic, while teachers had to switch to online mediums, there were multiple challenges that affected their performance in their distant teaching. Gudek (2019) summarized that online teaching depends on teachers' ICT skills and competencies; it relies on their perception and behaviour towards technology. Arens and Morin (2016) concluded that teachers' ICT skills have an impact on their class management and students' performance.

During COVID, teachers faced challenges like technical lapses, students' engagement, feedback and assessments, and time management. Gurung (2021) considered online teaching to be the greatest challenge itself for the reason that teachers were used to classroom teaching and were new to using online methods for teaching purposes. It was because they had to address students' low digital skills with their own weak pedagogical digital skills. According to Francom, Lee, and Pinkney (2021) during the pandemic, which was a time of uncertainty, teachers needed training more than regular support to overcome stress and burnout and get assistance in performing their teaching tasks in a smooth manner. Among many other issues, language barriers and lack of confidence were the main concerns that hindered teachers' performances in taking digital sessions.

To obtain the desired academic outcome of any activity, proper instructions are equally important as teachers. In this regard, Çınar, Ekici, and Demir (2021) mentioned that successful online teaching is influenced by teachers' preparations and training for conducting online classes. In this exercise of transformation, teachers' personal capacity plays an exceptional role in managing distant education. Mndzebele (2013) emphasized on being adaptive to technical advancements and considered technical skills to be an integral part of professional capacity. As mentioned by Coccoli, Guercio, Maresca, and Stanganelli (2014) computer-aided technology undoubtedly inspires teachers to work purposefully and with a sense of play to create a fun-filled learning environment for the students.

3.4. Building Teachers capacity: a race against time

During the imposed closure of schools, teachers were given emergency training to equip them with skills for starting their online tasks without further delay. With reference to teachers need for capacity building, AbuSalim et al. (2022) stated that teachers were forced to acquire new teaching strategies and equip themselves with online communication methods in order to adapt to the new norms necessary for managing homeschooling and surviving the Pandemic. Initial planning for online lessons took additional time, and in this attempt, there were experiences of stress, burnout, and burdens that teachers encountered once they faced the challenge of the new tasks. Pellegrini and Maltinti (2020) found a rise in reports of people experiencing mental anguish. Educators improved their IT skills through continuous attempts, which enabled most of them to use technology with confidence to deliver instruction and engage students in the remote learning process. Once technology was incorporated into teaching methodologies, teachers adopted new strategies to overcome their problems of connectivity, use of software, digital tool applications, and students' motivation, due to which they were losing their confidence at the initial stages of distant teaching as technology boosted their self-esteem. It was witnessed that digitally competent teachers created engaging content, e.g., they included videos and interactive tools that enhanced their lessons, and they were able to gauge students'

attention in their lessons. As mentioned by Jamieson-Proctor et al. (2013), pedagogical aspects of education are strongly covered with the integration of technology, as ICT elements lead to effective learning.

3.5. Research Gap

Despite the fact that there is a growing amount of research on instructors' digital competency and self-efficacy in general, there is a dearth of studies conducted in Pakistan, especially studying the correlation between these factors in the context of administering online classes. Investigating this connection in the context of online classes can reveal important information about how digital competence affects teachers' efficacy and confidence in remote teaching.

4. Methodology

4.1. Research Methodology

Ørngreen and Levinsen (2017) explained research methodology as the study's procedural flow, where researchers describe, predict, and explain the phenomena of their work. This research used the quantitative research survey method for the convenient interpretation of the data.

4.2. Target Population of the Research Study

Primary school teachers were targeted for this study as primary teachers were most affected by the closure of schools, and they needed extreme transformation in teaching pedagogy to cope with young learners in online classes. As commented by L. E. Kim and Asbury (2020), online learning may not give enough opportunities to young children who need hands-on activities and interaction to focus on the content as compared to adult learners. J. Kim (2020) further stressed on young learners' developmental needs and added to focus on such online tools which are suitable for their age and can enhance their participation.

4.3. Sampling Technique: Convenience Sampling

It is the most popular non-probability sampling method used in psychology (Zhao, 2021). This method is used both in qualitative and quantitative research. It involves less cost, minimum effort, and reduced time; therefore, it is preferred by many researchers. Scholtz (2021) mentioned that in this sampling method, the researcher collects the data from willing participants or from those who are approachable, in other words, conveniently available to the researcher. As mentioned by Alvi (2016), it is not as complicated as working with randomized sampling. Sedgwick (2013) explained that in the convenience sampling technique, researchers utilize a readily available sample that is accessible to them, and this convenient sampling method is applicable to most of the researchers.

4.4. Research Sampling

155 primary teachers took part in this study and conducted online classes for the 2020 session 2020.Teachers from four Private schools in Karachi's South District participated in this study. 85 Nursery teachers and 70 lower primary (grades I–II) teachers filled out the online questionnaire.

4.5. Development of research instruments

Google Forms was developed based on research from Michigan Nurse Educators' sense of efficiency for online teaching (MNESEOT). The research instrument used in the work of Black (2019), Educators' Sense of Efficacy for Online Teaching Scale (ESEOTS), was adapted for this study. The questions of the tool were divided into three factors: use of the computer (digital competency), students' engagement, and instructional strategies. Out of 32 items from the instrument, 24 items were included for this research, with 8 items for each factor, and responses were collected on a 5-point Likert scale: 5-a great deal, 4-quite a bit, 3-some, 2-very little, and 1-nothing. The remaining questions were not included in the scale for this study. The purpose of the instrument was to measure the self-efficacy of teachers in delivering online classes. Three factors were assessed on the scale: digital competency, students, engagement, and instructional strategies. Prior Permission was obtained from the school authority, and with the approval of management, the form was shared with the faculty members.

4.6. Reliability of the Instrument

Reliability Analysis was done for the collected data and the Cronbach's alpha value. 732 signified the reliability of the instrument.

Figure 2

Reliability

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	154	99.4
	Excluded[a]	1	.6
	Total	155	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.734	24

4.7. Data Analysis Tool

For the data analysis of this study, Statistical Packages for Social Sciences (SPSS) was employed for analyses of the collected responses, and the data was presented in tabular form.

4.8. Study Variables

Independent variable: digital competency

Dependent variables: instructional strategies, students' engagement, and teachers' self-efficacy

5. Results

According to Hypothesis Ha, the results represented that teachers' capacity to use strong instructional strategies and actively engage students in online classes rises with their level of digital competence. The data revealed the importance of instructors' digital skills, which play a crucial role in creating dynamic online classrooms and engaging students. Incorporating multimedia resources, interactive activities, and online collaboration opportunities are just some of the ways in which teachers who are adaptive with digital tools and platforms applied appropriate online instructions, which increased student engagement in the lessons.

Figure 3

Correlations

		Digital Competency	Teachers Self-efficacy	Students Engagement	Instructional Strategies
Digital Competency	Pearson Correlation	1	.839**	.727**	.764**
	Sig. (2-tailed)		.000	.000	.000
	N	154	154	154	154
Teachers Self Efficacy	Pearson Correlation	.839**	1	.719**	.814**
	Sig. (2-tailed)	.000		.000	.000
	N	154	154	154	154
Students Engagement	Pearson Correlation	.727**	.864**	1	.679**
	Sig. (2-tailed)	.000	.000		.000
	N	154	154	154	154
Instructional Strategies	Pearson Correlation	.764**	.706**	.713**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	154	154	154	154

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

Correlation between teachers' digital competencies and their self-efficacy, instructional strategies, and students' engagement.

Hypothesis: A significant correlation exists between teachers' digital competency and their self-efficacy while managing online classes.

$$r\ (154) = (.839) = .000 \text{ where } p.001$$

Self-efficacy as a dependent variable was assessed with the digital competency of the teachers, where digital competency was the independent variable and self-efficacy was the computed variable of instructional strategies and students' engagement.

The correlation coefficient between the two variables, r (154) = 0.839, indicated a strong positive correlation, which represented that with the increased digital competency of teachers, their self-efficacy also improved, and the p-values less than.001 made the correlation statistically significant.

H(a): A significant correlation exists between teachers' digital competency and their instructional strategies while managing online classes.

$$r\ (154) = (.764) = .000 \text{ where } p.001$$

The correlation coefficient presented is r = 0.764, which indicates a strong positive correlation between teachers' digital competency and instructional strategies. The p-value of .001 indicates that this correlation is statistically significant at a high level of confidence.

Based on this statistical analysis, it was evident that when teachers are comfortable with online teaching methods, their self-efficacy tends to be higher. In other words, as the challenges and difficulties associated with online teaching lower their self-efficacy, teachers tend to get demotivated with their work.

H(b): A significant correlation lies between teachers' digital competency and their capabilities of engaging students in online lessons.

$$r\ (154) = (.727) = .000 \text{ and } p.001$$

According to the data analysis for the hypothesis, it is highlighted that classroom instructors' level of technological efficiency predicts how well they would motivate their students to participate in online learning environments. The 0.727 value for the correlation coefficient establishes a high degree of association between the two variables; a p-value less than 0.001 reflects that it is highly improbable that the correlation was due to chance alone.

6. Discussion

- The benefits of digital competency are not confined to online classes only; digitally competent teachers make their regular classes interesting and are able to cater to students of all learning styles. Educators who are equipped with skills are able to use better instructional strategies for their students'. They develop confidence in online instructions by using a variety of digital resources for delivering interesting lessons in a virtual classroom. Abdallah (2009) highlighted the importance of instructions in the teaching process. He mentioned that, when the instructional design of a teaching course is good, students get a positive experience, whereas technical issues increase the level of frustration for teachers and students, as concluded by Horvitz, Beach, Anderson, and Xia (2015).

- Teachers who are able to troubleshoot technological issues that may develop in online classes by using their knowledge of digital tools, software, and online platforms Since they are technically savvy, they can fix issues quickly and keep students from being distracted. They have the ability to efficiently plan and execute online lessons that maintain student interest and comprehension Technology helps teachers encourage student cooperation, interaction, and active participation through a variety of platforms and tools. They can create a lively virtual classroom by incorporating aspects like online conversations, group projects, and multimedia.

- Digitally competent teachers are in a better position to modify their lessons to meet the requirements of their students. With the use of the internet, multimedia tools, and adaptive learning platforms, teachers can give each student a unique education that caters to their specific needs.

- Teachers who are comfortable with technology have a better chance of producing, delivering, and analyzing valid and reliable online tests and quizzes. They can also use digital tools and novel approaches to assessment, such as quizzes, online exams, and the submission of multimedia projects, to give pupils timely feedback, allowing for consistent growth in their knowledge.

- Digitally competent teachers are better equipped to keep abreast of developments in educational technology, digital trends, and adopt best practices in online instruction. In order to better serve their students, teachers' participation in ongoing professional development opportunities are significant as in-service and once a term training is insufficient for teachers; instead, they should gain self-confidence to explore new and relevant methods on a continuous basis for improving teaching by gaining digital competence.

7. Conclusion and Recommendation

Through the literature and further explicated by Anwar and Yoo (2022) learning by memorization is the conventional teaching method that failed to prepare the generation to compete with the digitally competitive, intertwined and complicated era.

The data analysis of the hypothesis of this research made it evident that instructors who are comfortable and confident using digital tools have the ability to make use of technological resources, tailor lessons to individual students, encourage class participation, and maintain a secure and effective virtual classroom.

Educators who are comfortable in front of a computer are in a prime position to enrich their online classes with multimedia content like videos, images, and interactive presentations. Student learning, participation, and outcomes can all benefit from these digital tools. However, teachers who lack basic computer skills may struggle to keep up with the pace of online education.

Successful deployment of online instruction requires acknowledging the necessity of helping educators build their digital competence. Dolighan and Owen (2021) suggested that teachers' professional development should enable both internal and external changes. In terms of internal change, the program should cater to teachers' knowledge, beliefs and attitudes whereas it should provide opportunities for external collaboration to sustain the change.

School districts may help teachers become more comfortable and proficient with technology by providing them with training, professional development programs, and technical support. With this help, they will be able to produce interesting multimedia materials and conquer the difficulties of online instruction. Mannila, Nordén, and Pears (2018) added that in the process of being digitally competent, teachers' self-efficacy plays a crucial role since it is closely tied to their ability to continue with strength in difficult situations.

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