Teachers' Practices Towards Strengthening Digital Literacyskills

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Article Info	Abstract
	Regarding the global scenario due to the pandemic, the world is moving towards virtual. The need for digital literacy is inevitable. Therefore, this study aimed to investigate teachers' knowledge of digital literacy and practices towards strengthening digital literacy skills through online learning platforms. In this research, three objectives were developed such as (1) to assess the existing level of knowledge ofdigital literacy skills of the teachers (2) to exploreattitudes of secondary school towardsstrengthening digital literacy skills, and (3) to investigate teachers' practices towards strengthening digital literacy skills through online learning platforms.This study was quantitative and descriptive. Researchers implemented a survey technique to collect the primary data. All male and female teachers teaching at the secondary school level in the Faisalabad division were the population. A sample of four hundred fifty teachers was selected through a simple random method. Researchers developed a questionnaire based on a five-point Likert scale was used to collect the primary data. Before the execution of the questionnaire, the validity was ensured by experts' opinions, and reliability was confirmed by pilot testing. The questionnaire's reliability occurred as (α=.81). After data collection, the same were analyzed in SPSS, and statistical tests like mean scores, standard deviation, and t-tests were carried out. Furthermore, structural equation modelling (SEM) was used for hypotheses assessment. Structural equation modelling is a robust multivariate statistical tool based on the covariance statistics. The SEM outcomes reported that teachers had a moderate level of digital literacy skills, a moderate level of practice for strengthening digital literacy skills through online learning platforms, and high level of agreement towards the hindrances in practicing digital literacy skills in online learning. Furthermore, this study also discovered an important positive relationship between teachers' practices and strengthening digital literacy skills (r=.742). This research suggests that workshops and training sessions be held to help secondary school teachers learn more about digital literacy.

Introduction

The concept of "21st century skills" is not new. In fact, schools have been teaching students how to solve problems, work together, and think critically for a long time. Literacy is one of the skills that is needed in the 21st century, among other key skills such as learning skills and life skills. The concept of multiliteracy highlights the depth and breadth of literacy, including digital literacy (Pratolo&Solikhati, 2020). According to Gilster (1997), digital literacy is the capacity to accept information in a number of different formats that are dependent on the computer. When computers were first introduced, twenty years ago, they were widely regarded as the pinnacle of technological advancement. People are now able to acquire knowledge from a wider variety of sources because to the rapid advancement of technology.Digital literacy was defined by Eshet-Alkalai (2004) as the capacity to use software and digital technology to give what people needed. This ability encompassed cognitive, social,and emotional abilities. Others have referred to it as knowledge literacy, which demands a certain level of cognitive ability in order to read, analyze, and produce information using digital technologies (Nuzzaci, 2017). In addition, according to the American Library Association (2011), digital literacy refers to the ability of individuals to utilize information and communication technologies (ICT) to locate, assess, create, and convey information using both cognitive and technical abilities.

According to Covello (2010), Goodfellow (2011) and Simsek and Simsek (2013)that digital literacy is a combination of six literacies such as computer literacy, information literacy, technology literacy, visual literacy, communication literacy and media literacy. People are considered to have digital literate if they have a grasp of these six types of literacy.Mohammadyari and Singh (2015) stated that individuals who possess the range of skills necessary to make successful and efficient use of digital technology are said to be "digitally literate". A more exact definition of digital literacy was provided by Ozden (2018), who defined it as the capacity to gather information from a digital media. UNESCO (2018) also said that digital literacy is the ability

to use digital technologies to access, manage, understand, integrate, communicate, evaluate, and create information in a safe and appropriate way for employment, decent jobs, and starting your own business. It covers skills that are sometimes called computer literacy, ICT literacy, information literacy, and media literacy.According to List (2019), the term "digital literacy" refers to a collection of interconnected skills and abilities that are necessary for functioning effectively in a digital environment.

Spires et al., (2017), mentioned that knowledge may be received from a multitude of sources, and digital literacy is comprised of language, phrase, visual display, motion graphics, audio, video, and multimedia. This information can be found in digital literacy.According to Boche (2014), multiliteracy enables individuals to access more diverse knowledge from a variety of technological sources. Literacies like as digital literacy, game literacy, and multiliteracy are examples of multiple literacies. These are new forms and distinct methods of reading meaning that are not found in written text (McCord, 2015). McCord (2015) further mentioned that a teacher's level of multiliteracy awareness has an influence on how they place it in the teaching process. It is possible to create an environment in the classroom that is both more productive and more exciting by integrating new and older forms of technology. Combining information from several different sources, such as a printed book, an online learning platform, the internet, and video observation, is one example (Alice, 2012). According to Gee (2009), in this contemporary age of learning, many literacies are required because of the broad media format of literacy.

The students of today are familiar to digital tools and are able to easily gather, produce, and disseminate digital content (Ting, 2015). In addition,today's students are learning differently than previous generations since digital technology is so pervasive in the classroom. Mobile devices, web-based tools, application software, data transmission and storage services, etc. are all examples of digital technology. Email, learning management systems, e-books, online diaries, online quizzes, online discussion forums, and other forms of digital media are all used by students in the classroom. Thus, teachers now need to be digitally literate in order to support their students' use of technology in the classroom (Tang & Chaw, 2016). According to Coklar and Kabakci, Yurdakul (2017), technological integration is directly tied to the ability of teachers to adapt themselves to quickly growing technologies that are appropriate to learning contexts. Digital literacy allows individuals to engage in contemporary learning, working, and social activities by manipulating digital material and using digital communication and collaboration technologies (UNESCO, 2018; European Commission, 2020).

The teachers are considered most important component of any education system and facilitators of educational sustainability (Salite, 2016; Fedosejeva et al., 2019; Salite et al., 2020; Heasly et al., 2020). The ability of teachers to adapt themselves to rapidly growing technologies that are suitable to learning is directly tied to the integration of technology (Coklar, Kabak&Yurdakul, 2017). As society has become more digital, the need for teachers who know how to use technology has grown. This has shown the need for new ways to incorporate technology into education (Instefjord&Munthe, 2017). The modern digital world provides educators with a unique chance to have access to knowledge, tools, and sources that may be used to educate and instruct through digital media. Therefore, it is absolutely crucial for teachers, who play a significant part in the development of future generations, to be equipped with the knowledge and skills required for digital literacy. (Gunduzalp, 2021).

Digital literacyrequires a different combination of skills, knowledge, and attitudes than traditional literacy, in order to keep up with the rapid pace of change brought about by new technology. Teachers are unique amongst technology users because of their unique needs in the digital world. These needs include, but are not limited to, teaching and training procedures, social communication, buying, bill paying, and sharing. Most children nowadays have grown up with computers and other digital technologies, making the transition to online learning a must. Students' increasing reliance on mobile devices like tablets, smartphones, and laptops makes it more challenging to include traditional teaching methods into their lessons. Because of this, educators play a crucial role in facilitating the use of technology in the classroom (Gunduzalp, 2021).

Literature Review

Since the introduction of the term "Digital Literacy", researchers have been interested in determining and categorizing the many different competences that are associated with its operation. Several different categorizations of digital literacies, competences, and abilities have arisen as a result of using the scholarly publications that have been cited the most in this line of research.

The term "digital literacy" was coined by Glister (1997), who was the first person to define it as the ability to understand and make use of information collected from a range of digital sources. Today, digital literacy is defined as the ability to evaluate the quality and validity of information in a digital environment, create new significant materials on graphical screens, and read the instructions displayed on these screens, in addition to having the complex cognitive, sociological, and emotional skills necessary for users to be successful (Porat, Blau, & Barak, 2018). Digital literacy involves using digital tools to achieve personal, professional, and work objectives. Digital literacy includes cognitive, physical, social, and emotional abilities needed to function

successfully in digital contexts. In addition, digital literacy involves the critical usage of digital tools (Claro et al., 2018).Now, from the very beginning of education, digital literacy has become a necessary skill (Karabacak&Sezgin, 2019).

The present era of 21st century which is considered as a quickly changing world demands newer, wider, and more complex teaching skills. Teaching must adapt to a culture that requires increasingly complicated skills. Due to the quick speed of development in computer technology and the availability of digital devices and applications, teachers must develop their digital literacy skills. Educators must realize the strategic importance of digital education since their own digital literacy affects both their teaching practices and their students' achievement. (Benali, Kaddouri, &Azzimani, 2018). In addition, students who are closely tied to technology cannot be taught by ignoring the digital world and focusing exclusively on the actual world. Teachers require digital knowledge. Teachers will succeed if they can tailor classes to their students' requirements, utilize digital tools properly, engage in e-learning platforms, and gather student performance data (Gunduzalp, 2021). Technological changes may be avoided if instructors have these skills and grow continuously. Effective usage of digital platforms demands digital literacy. Digital literacy helps instructors utilize computers, software, databases, and other technology to achieve personal, professional, and academic objectives (Durodolu&Mojapelo, 2020).

Basic digital literacy skills refer to the familiarity with both the hardware and the software necessary to operate a wide range of digital tools (computers, smartphones, software (word processors, applications)), online operations (Internet, search engines, social networks, e-commerce, privacy), and communication channels (cellular and Internet protocol networks). Knowledge of a programming language is useful for intermediate skillsets, whether it's for manipulating spreadsheets with Visual Basic macros, creating websites with HTML and JavaScript, or developing apps (accounting, enterprise resource planning, etc.). Professionals may continue to learn new skills and advance in their fields by participating in workforce upskilling programs after they graduate from a HEI. The goals of these skills go beyond those of beginner or intermediate technology users and need knowledge of programming since they call for the creation of new digital tools and features. Science, technology, engineering, and mathematics (STEM) as well as social, mobile, analytic, and cloud computing are all examples of advanced digital abilities (SMAC) (ITU, 2020).

A 21st century skill and necessity is gathering information using digital technology and presenting it in a way that support students' learning. Teachers must have knowledge and digital literacy to support learning and develop future generations. Digital literacy skills are necessary for teachers who play a big part in educating NET generation due to their dependence on technology (Gunduzalp, 2021). Chien et al. (2014) found that students had high expectations for technology integration in the classroom since they grew up with modern technologies. Teachers are required to satisfy the learning demands of digital natives (Ng, 2012; Anisimova, 2020; Dashtestani&Hojatpanah, 2020; Zahorec, Hakova, & Munk, 2019; Rizal, Rusdiana, Setiawan, &Siahaan, 2020;). Pratolo and Solikhati (2020) reported that teachers used computer and smartphone to search for digital information in order to enhance digital literacy skills. Teachers showed positive attitudes in using digital literacy for teaching. However, teachers said that problems related to lack of technology, students' background, lack of time and limited budget were the major hindrances in learning and implementation of digital literacy skills.Cervera et al., (2021) also reported in their investigation that teachers had fewer digital skills. They further reported that it is important to offervarious training programs to improve teachers' digital literacy as teachers are expected to use technology to both make their own work more efficient and to provide students with relevant subject-related technological skills. According to recent research (Galindo-Dominguez &Bezanilla, 2021), pre-service teachers scored much lower scores on content creation in comparison to other components of digital literacy skills.Basilotta-Gomez-Pablos et al., (2022) found that teachers have low or medium-low digital competence and lack specific abilities, notably those connected to evaluating educational practice through teachers' digital self-assessment tool. The research findings of Şengul and Demirel (2022) showed that the digital literacy levels of Turkish teacher were moderate.

With aforesaid context, this study aimed to explore teachers' current level of knowledge ofdigital literacy skills, attitude toward learning digital literacy, and their practices towards strengthening digital literacy skillsat secondary level in Pakistan according to secondary school teachers'sentiments. The present era of digitalization in which rapid transformation has been observed in the education sector which demands teachers to be competent in digital literacy. For this purpose, the following research question were framed: What is the existing level of knowledge ofdigital literacy skills of the teachers? What is teachers' attitude towards strengthening digital literacy skill, what are teachers' practices towards strengthening digital literacy skills? Is there a significant relationship between teachers' knowledge, attitude and practices to strength digital literacy skills?

Research Methodology

This investigation was carried out under descriptive research design in which quantitative data were collected from the respondents through an online survey questionnaire developed in Google Form. Teachers working at government secondary schools of Faisalabad division were the population of this study. A sample of

450 secondary school teachers from three districts of Faisalabad division (Faisalabad, Chiniot &Jhang) was selected through convenience sampling technique. Data were collected from the teachers through researchers' designed questionnaire based on five-point Likert scale having 24 positive statements along with demographic questions. Before administering the questionnaire, its validity and reliability was confirmed by obtaining experts' opinions and conducting a pilot study. The Cronbach alpha coefficient of the questionnaire was calculated as (α=.81). Later on, all the data were collected by the researchers and descriptive, inferential, structural equation modelling as statistics were used in order to explore the answers of the research questions. The following results were occurred during data analysis:
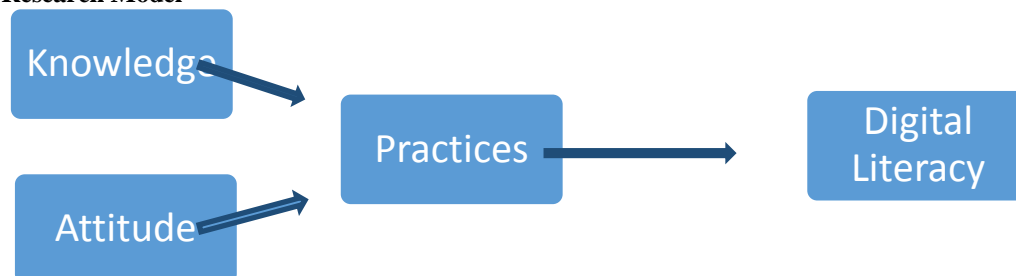
Research Model

Figure 1: Research Model of the study.

Results and Discussion

Table 1

| Variables	Mean	S. D	α	1	2	3	4
Knowledge	3.91	.714	.68	.605**			
Attitude	3.90	.86	.88		.512**		
Practices	3.83	.689	.86			.664**	
Digital Literacy	3.85	.831	.85				.742**

Results of Table 1 shows the mean scores, STD deviation, alpha value, and relationship statistics among the variables. This research contains four variables, knowledge (IV), attitude (IV), practices (M), and digital literacy (DV). The mean score for all four scales shows that responses are close to agreed portion of five-pointLikert scale. The reliability score (Cronbach's alpha) for each research instrument shows internal consistency of scales under the suggested alpha threshold by Nunnally, (1978). Furthermore, the correlation analysis estimates the strength and weakness of association among variables. In this regard, all variables have positive and significant correlations. Correlation evidently shows that there is no issue of overlapping or multicollinearity among variables.

Structural Equation modelling (SEM)

The behavioral sciences frequently employ the highly generic statistical modelling method known as structural equation modelling, or SEM. It can be thought of as combining path analysis and factor analysis (MacCallum and Austin, 2000). The latent components, which are theoretical constructs represented by SEM, are frequently of interest. Regression or path coefficients between the components represent the relationships between the theoretical entities. Covariance structure modelling is another name for structural equation modelling, which assumes a structure for the covariance between the observed variables (MacCallum and Austin, 2000). The SEM also includes confirmatory factor analysis to examine the measurement model. It is necessary to examine the validity of latent constructs. This study has performed CFA analysis to assess the measurement portion of the model. Afterwards, study performs structural analysis for hypotheses assessment.

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Confirmatory Factor Analysis

Figure 2: CFA Results
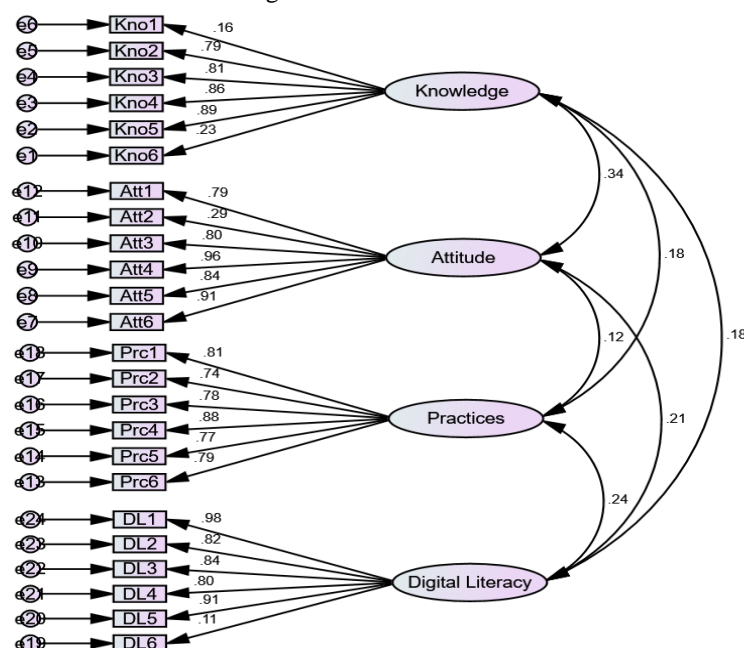
CMIN/DF	P-VALUE	GFI	AGFI	TLI	CFI	PCFI	RMSEA	P-CLOSE
5.47	.211	.762	.750	.802	.823	.759	.099	.052

The figure 2 demonstrates the CFA results in terms of conceptual analysis. The model shows four constructs, namely as, knowledge, attitude, practice, and digital literacy. Each of the latent construct has 6 measured items. The model is only performed to examine the factor loadings, and it is seen that some of the measured items have low item loadings. In this case, items having low loading should be removed from the model to reach on the better goodness of fit of the model (Jacksen et al., 2009). Furthermore, the covariance statistics shows the discriminating ability of each latent construct. Hence, each of the construct's items have ability to explain the respective construct. In addition, the tests like composite reliability and average variance extracted have been examined to validate the convergent and discriminant validities. In this regard, model has established convergent validity because each of the construct has score greater than >.70 (Jacksen et al., 2009). However, AVE for attitude and Knowledge has not been established which indicates that model need to be improved. Lastly, the goodness of fit indices was observed. The indices such as, CMIN/DF, P-CLOSE, GFI illustrating that CFA model should be modified.

Figure 3: CFA Modified
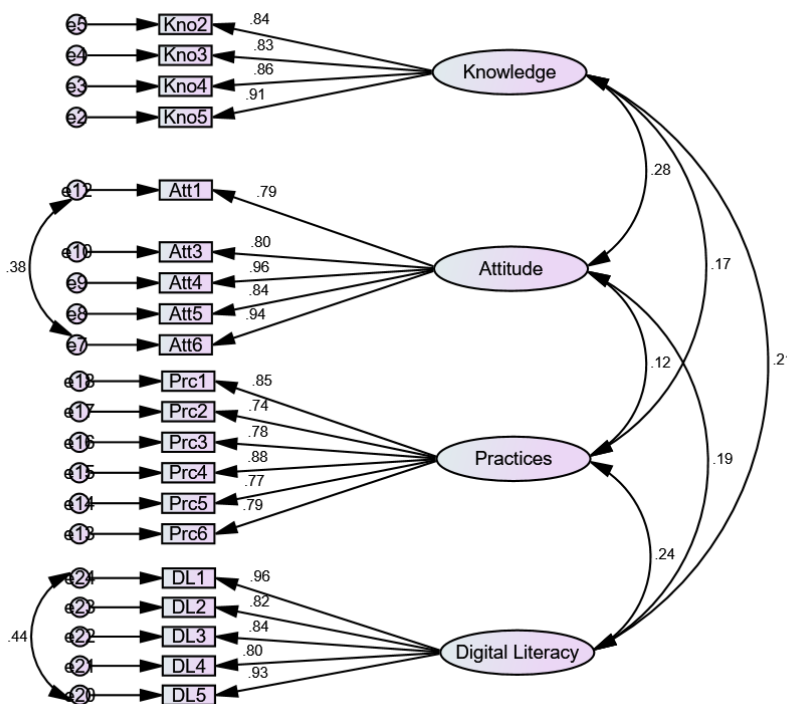
CMIN/DF	P-VALUE	GFI	AGFI	TLI	CFI	PCFI	RMSEA	P-CLOSE
1.47	.011	.912	.901	.912	.893	.929	.034	.033

Figure 3 representing the results after suggested model modifications. The suggestion for the model modifications were taken up from AMOS software. In this connection, the items having low loading (Kno6 and Att2) were been removed. Moreover, AMOS suggested to have covariance of residuals of the same constructs. Keeping in view, covariance matrices were linked in between e12, e7, e24 and e20. In addition, composite reliability and average variance extracted again examined to validate the convergent and discriminant validities. In this regard, after suggested model modification convergent validity were suitably observed because each of the construct has score greater than >.70 (Jacksen et al., 2009). Previously, AVE for attitude and Knowledge were not suitably enough, however, after model modification all AVE scores for each of the latent constructs have value greater than >.50. Lastly, model fit indicators were also improved that shows suitable GoF of the model.

Structural Model Outcomes for H1, H2
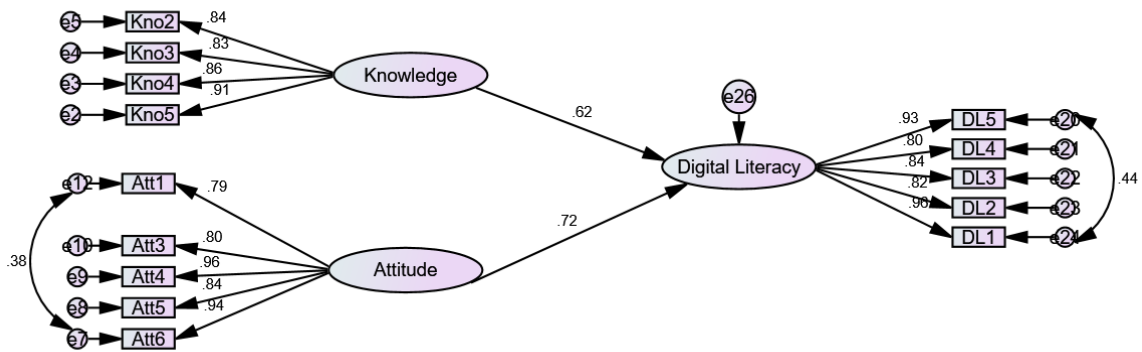
Figure 4: Direct Effect on IVs on DV

Figure 3 illustrates the results of inner model which is also called structural model. The confirmation of the constructs enabled this research to assess the proposed hypotheses. This study had proposed that Knowledge had a positive significant impact on digital literacy (H1) and attitude has a positive significant impact on digital literacy (H2). In this connection, the outcomes in figure 4 shows that knowledge had .62 or 62% positive impact on digital literacy at 0.001 level of significance. Moreover, attitude had .72 or 72% positive impact on digital literacy at 0.001 level of significance. Based on these results, this research had confirmed H1 and H2.

Figure 5: Mediating Effects, H3 and H4
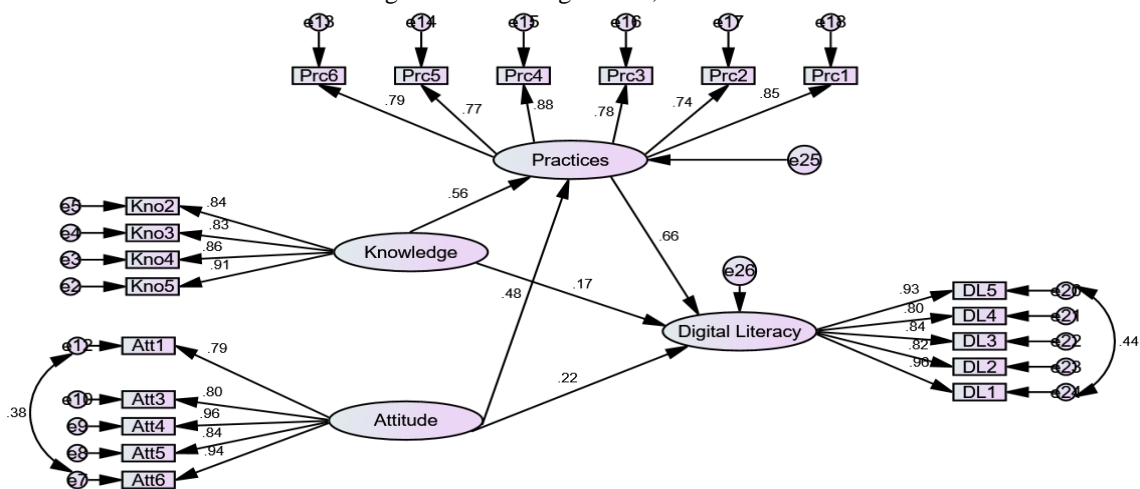
The figure 5 of this research shows the final model outcome of the study. The core object of this research was to assess the mediating effect of practice on the relationship between knowledge and digital literacy. In same way, practices mediate the relationship between attitude and digital literacy. The model results indicate that after intervention of practice in between knowledge, attitude, and digital literacy the direct effect is been reduced .17 (knowledge → digital literacy) and .22 (attitude → digital literacy). This is one of the types of evidence of mediation. However, the indirect effect (*through mediator)* was assessed with the help of t-statistics and its level of significance. In this connection, https://www.danielsoper.com/ website was used to compute the indirect effect. The results of danielsoper for indirect effect knowledge → practices → digital literacy shows as below:

Sobel test statistic:3.06760127
One-tailed probability:0.00107892
Two-tailed probability:0.00215784

Therefore, results indicate practice mediates on the relationship between knowledge and digital literacy. Hence, Hypothesis 3 has been accepted. In same manner, danielsoperis again performed for assessment of indirect effect attitude → practices → digital literacy.

Sobel test statistic:3.24347822
One-tailed probability:0.00059040
Two-tailed probability:0.00118080

The above-mentioned results confirmed that practices once again mediate the relationship between attitude and digital literacy. Therefore, hypothesis 4 (H4) of this research stand accepted.

Conclusions

Based on the results above, this study came to the conclusion that secondary school teachers had a moderate level of knowledge, attitude, and practices to strengthen digital literacy skills. This study also found a statistically significant relationship between teachers' knowledge of digital literacy, their attitudes about it, and their practices at different digital platforms to strengthen their digital literacy skills.Moreover, SEM results also confirmed that independent variables (knowledge, attitude) had a positive relationship with dependent variable (digital literacy). In addition, mediation mechanism was inducted by introducing practices as mediator. Hence, it was revealed that practices mediate the relationship between knowledge, attitude, and digital literacy skills. The emphasizing effect of practices over digital literacy skills confirms that the direct relationship of knowledge, attitude on digital literacy can be more rigorously explained by the intervention of practices as mediator. This study recommends that workshops and training sessions be carried out to enhance the digital literacy skills of secondary school teachers.

Limitation and suggestions for future research

Future researchers may conduct these types of studies at the higher education level, where digital literacy is recognized as a new label of education, because at the higher education level, digital literacy is essential for university success as well as for quality research productivity.

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