Exploring 21st Century Digital Literacy Skills among the Prospective Teachers for Holistic Learning

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Abstract

The research study presents the status of 21st century digital literacy skills among prospective teachers including media literacy, ICT literacy, and ability to access, assess, and share information. The investigations on the perception levels of digital literacy skills with the demography of prospective teachers, their gender, locality, educational qualification and specialized subject have highlighted. The reflection of prospective teachers on their teacher education curriculum emphasizing the techno-pedagogical integration, technology enabled hands on experiences opportunities and adaptability as per changing educational needs have also explored for holistic learning. Kerala, is being recognized as model state in the country effectively implementing the ICT curriculum for school education. As a sample for data collection, the 860 prospective teachers of five districts of northern part of Kerala have taken. The Multiple sources of data, including a Likert scale and a closed ended questionnaire have used to gather data. The various descriptive and inferential statistical techniques and tests such as independent sample t-test, ANOVA, and percentage analysis have used to calculate and interpret the obtained data. The findings revealed that the prospective teachers have an average level of digital literacy skills. It has also been reported that present curriculum for teacher education does not provide enough opportunity for fostering the digital literacy skills. The findings have also discussed in the light of the relevant literature.

Keywords: Digital literacy skills, prospective teachers, techno-pedagogy, ICT literacy, 21st century skills

Introduction

The National Education Policy 2020 recognises the need of optimizing the technological advantages and underlines the benefits of online/digital education. To address the present and future difficulties of delivering quality education for all, it is essential to optimize and expand existing digital platforms and ongoing ICT-based educational initiatives. In this context, it is essential to understand the perceptions of the future teachers about the digital literacy skills as it is one of the prominent skills enlisted in 21st century skills set. Technological proficiency is considered to be one of the key indicators of quality education in the prospective teaching-learning scenario (Maderick, Zhang, Hartley, & Marchand, 2015) and the quality of the teachers is assessed on the basis of their level of perception and degree of awareness of digital literacy skills and related competencies and extent to which they are easily integrate them into their classroom practices (Ata & Yıldırım, 2019). It is essential to investigate whether prospective teachers of the present time, even

though they are all digital natives, do possess enough digital literacy skills and self-reliant in using technology in the classroom? (Li & Ranieri, 2010).

Therefore, the present study aims at investigating the very significant question that to what extent do prospective teachers possess digital literacy skill (Figure 1). To answer this question, it is necessary to check how far teacher education program really prepare the prospective teachers with these skills. This will help to understand whether there is any growing gap between essential teaching practices in the current classrooms and the application of digital tools by teachers. For this, the understanding the beliefs and attitudes of prospective teachers on digital literacy skills and its significance in the present education scenario is crucial (Partnership for 21st Century Skills; 2009).

Review of Literature

At present, there are only limited studies available to prove overarching information on digital skills of the prospective teachers. There are few selected of studies which investigated the levels and perceptions of digital competence of the teacher trainees (Alarcón, del Pilar-Jiménez, & Vicente-Yagüe, 2020; Gutiérrez-Porlán & Serrano-Sánchez, 2016; Lázaro-Cantabrana, Usart-Rodríguez, & Gisbert-Cervera, 2019) and few studies emphasized the relevance of integrating digital literacy skills in the curriculum of pre service teachers (Angeli & Valanides, 2009; Mishra & Kohler, 2006). The researches of Chai, Koh, & Tsai (2010); Finger, Jamieson-Proctor, & Albion (2010); Harris et al., (2009); Jang (2010); Mishra & Kohler (2006) examined the possession of various components of Technological Pedagogical Content Knowledge (TPACK) among the prospective teachers. It is also evident from the above studies that the teachers who are fresh appointed in the schools need to have both theoretical and practical knowledge of technology and possible means of integrating the educational technology into the curricular practices.

Figure-1: Meaning of Digital Literacy Skills
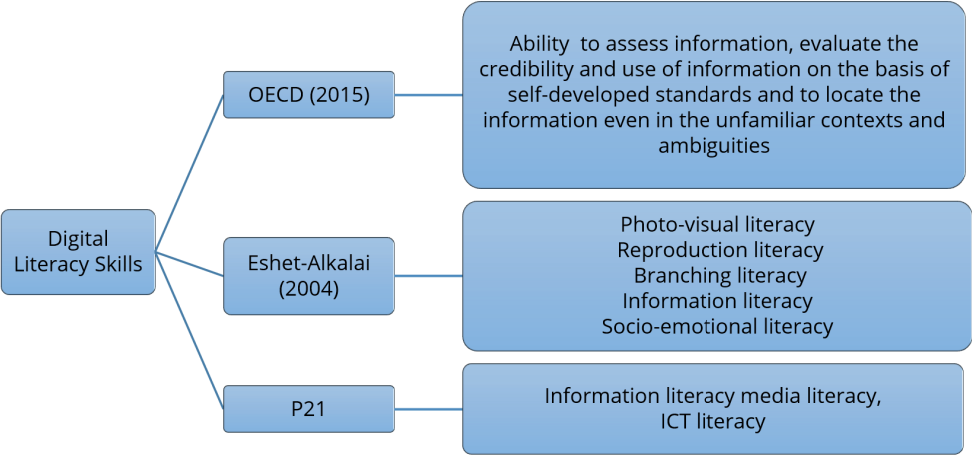
Rationale for the Present study

The success of teacher education program in the 21st century is depended on the achievement of producing digitally competent teachers and how far they are able to apply digital tools in their classrooms. The teacher training

programs must focus on preparing the teacher trainees with digital literacy (Agyei & Voogt, 2011; Gudmundsdottir & Hatlevik, 2018). Research on the enhancement of digital competencies revealed that the teacher trainees feel that their teacher education programme inadequately and inefficiently integrated digital technologies (Instefjord & Munthe, 2017). Therefore, the present study aims at investigating the very significant question that to what extend do prospective teachers possess digital literacy skills. To answer this question, it is necessary to check how far teacher education program really prepare the prospective teachers with these skills. For exploring the answers, the following objectives were formulated and accordingly the hypotheses were framed:

1. To understand the status of 21st century digital literacy perception levels of prospective teachers?

2. To analyze if there exists any significant difference in the mean scores of digital literacy skills among prospective teachers based on their gender, locality, educational qualification and specialized subject

3. To understand the views and opinion of prospective teachers about current teacher education programme in preparing them with digital literacy skills?

Based on the above objectives, certain hypotheses were framed:

1. There is no significant difference in the mean scores of digital literacy skills among prospective teachers based on certain demographics (gender, educational qualifications, types of institution, locale)

2. There is no significant difference in the mean scores of digital literacy skills of prospective teachers belonging to various subjects.

Methodology

The present study adopted descriptive survey method to assess the status and issues of the digital literacy of the prospective teachers of Kerala. Being one of the recognized as model states in the country, Kerala effectively implement the ICT curriculum for school education and hence it is used as sample reference.

Participants

The survey involved 860 prospective teachers (male n=157 and female n= 703) from five districts of Northern part of Kerala who were enrolled in three state universities of Kerala and their affiliated teacher education colleges. Purposive sampling was carried out for the selection of the sample. There were 860 participants (male= 175 female=382; studying in government institutions= 359, private colleges= 501; Under Graduates = 274, Post Graduates= 586; living in urban areas= 463, rural= 397) who responded to the data collection tools during the data collection. The participants were all in the second semester of their course belonging to five subject specialization (N= Language= 146, Social Science=312, Mathematics= 126, Science=232, and Commerce=44).

Data collection tool

The researchers constructed Digital Literacy Scale based on the P21 Century Skills Framework and OECD framework of 21st Century Skills and was used for data collection. The Scale was prepared to cover three dimensions of digital literacy skills ("Information literacy", "Media Literacy" and "ICT Literacy"). Ten teachers who are expert in the area of ICT and educational technology

were identified and asked to evaluate the scale and revisions were made on the items as per their guidance. It is a 5-point Likert-type scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). The Cronbach's alpha was found to be .78 and ensured the content validity of the tool. A Questionnaire was also developed by the researchers to analyse the opinion of the prospective teachers related to their views and opinion about the teacher education programme that we have today in preparing and enabling them with digital literacy skills. The Questionnaire contains 10 items related to their views regarding how far the present mode of transaction of curriculum is enhancing digital literacy skills among them. The draft questionnaire was given to 10 subject experts and modified as per their corrections and modifications. The items and the responses of the participants (in percentage) are presented in Table 4.

Data analysis

Both descriptive and inferential analysis were carried out for the analysis and interpretation of the obtained data. The assumptions about the statistical analysis were tested before a analysis.

In this context, the normality of the distributions of the responses were examined by calculating Skewness (.328) and kurtosis (.447) and since these values were in the ranges specified by George & Mallery (2010), it can be said that the normal distribution assumptions were met. To analyse prospective teachers' perception of digital literacy skills on the basis of various demographic variables, independent sample t-test and one-way ANOVA were applied.

Data Analysis and Interpretation

This section presents the major findings of the study on the existing level of digital literacy skills among prospective teachers and whether those skills significantly differ on the basis of gender, type of institution, subject specialization, locality, and educational qualifications. Hence the collected data are analysed as per the objectives and hypotheses constructed for the study.

What are the perceived levels of digital literacy among prospective teachers?

The obtained data have been analyzed by using frequency and percentage and the result is presented as Table 1.

Table-1: Digital Literacy Level of Prospective Teachers

	Frequency	Percentage
Low	113	13.1
Average	616	71.6
High	131	15.2
Total	860	100

Table 1 as well as Figure 2 indicate the digital literacy skills level of prospective teachers. From the Table 1, it is evident that the 13.1 per cent of prospective teachers have a low level of digital literacy skills, 71.6 per cent have average and 15.2 per cent have high level of digital literacy skills.

Figure-2: Digital Literacy Level of Prospective Teachers
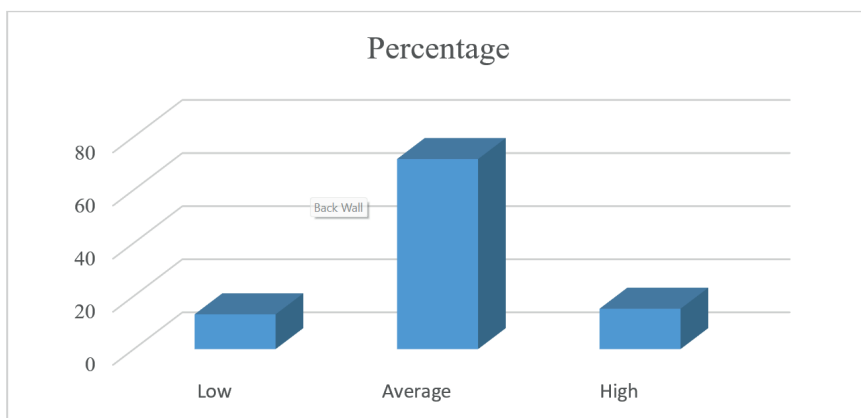
Does the perception of digital literacy of the prospective teachers vary by their demographics?

To check whether mean scores of digital literacy skills differ among the prospective teachers based on their gender, type of institution they have enrolled, subject of specialization in their teacher education programme, locality they reside, and educational qualifications, hypothesis was formulated as there exists no significant difference in the mean scores of digital literacy skills among prospective teachers based on certain demographics. Independent sample t-test was carried out for the mean difference analysis and .01 levels of significance was fixed. The result is presented in Table 2.

Table-2: t-test Results of mean scores of Digital Literacy skills among Prospective teachers on Selected Demographic Variables

Variables	Group	N	Mean	SD	df	t	p	Remarks
Gender	Male	157	96.06	9.41	858	1.21	0.22	Not Significant p > 0.05
	Female	703	95.15	8.26				
Educational Qualification	UG	274	95.62	8.03	858	1.53	0.12	Not Significant p > 0.05
	PG	586	94.67	9.36				
Locale	Urban	463	95.44	8.89	858	0.47	0.63	Not Significant p > 0.05
	Rural	397	95.17	7.99				
Type of Institution	Govt.	359	95.70	8.35	858	1.11	0.26	Not Significant p > 0.05
	Private	501	95.05	8.58				

From the Table 2, it is found that mean scores of the prospective teachers for digital literacy skills on the basis of gender were 96.06 and 95.15 for male and female respectively. Furthermore, the independent sample 't' test value was 1.21 with the '*p*' value 0.22 which was not significant at 0.05 level of significance. Hence it is found that "there was no significant difference between male (*M*=96.06, *SD*=9.41) and female (*M*=95.15, *SD*=8.26) prospective

teachers' scores of digital literacy skills t (858) =1.21, p=0.22". Furthermore, the mean scores of the prospective teachers for digital literacy skills on the basis of educational qualifications were 95.62 and 94.67 for undergraduates and postgraduates respectively. Furthermore, the independent sample 't' test value was 1.53 with the 'p' value 0.12 which was not significant at 0.05 level of significance. Hence it is found that "there was no significant difference between undergraduates (M=95.62 SD=8.03) and postgraduates (M=94.67, SD=9.36) prospective teachers' scores of digital literacy skills t (858) =1.53, p=0.12". In the similar fashion, mean scores of the prospective teachers for digital literacy skills on the basis of locality were found to be 95.44 and 95.17 for urban and rural respectively. Furthermore, the independent sample 't' test value was 0.47 with the 'p' value 0.63 which was not significant at 0.05 level of significance. Hence it is found that "there was no significant difference between urban (M=95.44, SD=8.89) and rural (M= 95.17, SD=7.99) prospective teachers' scores of digital literacy skills t (858) =0.47, p=0.63". Again, the mean scores of the prospective teachers for digital literacy skills on the basis of type of institution were found to be 95.70 and 9.05 for government and private institutions respectively. Furthermore, the independent sample 't' test value was 1.11 with the 'p' value 0.26 which was not significant at 0.05 level of significance. Hence it is found that "there was no significant difference between government (M=95.70 SD=8.35) and private (M= 95.05, SD=8.58) prospective teachers' scores of digital literacy skills t (858) =1.11, p=0.26".

To find out whether there is any difference in the perception of digital literacy skills among the prospective teachers based on the subjects they have opted in their teacher education course, the hypothesis was formulated as there exists no significant difference in the mean scores of digital literacy skills among prospective teachers based on Subjects. Hence, to check whether the prospective teachers who have opted for Commerce, Languages, Mathematics, Science, and Social Science differ significantly in terms of mean scores of digital literacy skills, One-Way Analysis of Variance was applied and results are presented in Table 3.

Table-3: ANOVA test of Digital Literacy Skills and Subject Specialization of prospective Teachers

Sources of Variance	Sum of squares	df	Mean Square	F	Level of Significance
Between groups	443.728	4	110.93	1.54	.18
Within groups	61458.97	855	71.88		
Total	61902.70	859			

As shown in Table 3, the mean scores of perceptions of digital literacy skills prospective teachers belonging to various subjects opted such as Commerce, Languages, Mathematics, Science, and Social Science were compared using one-way ANOVA.

The F (4, 855) = 1.543, p> .05, which is statistically not significant at 0.05 level. This suggested that there is no significant difference in the mean scores of digital literacy skills of prospective teachers belonging to various subjects.

How Far the Present Modes of Curriculum Transaction Enhance Digital Literacy Skills?

The investigators tried to identify how far the present modes of transaction is effective for enhancing digital literacy skills. The details are given below in Table 3.

Table-4: Percentage of Responses of Prospective Teachers for the Analysis of How Far the Present Modes of Transaction Effective for Developing Digital Literacy Skills

Sl.No.	Items	Yes (%)	No (%)
1.	Does the syllabus encourage the student to learn with the help of digital technology?	46	54
2.	Does the transaction mode create an atmosphere for e-learning in your classroom?	42	58
3.	Do you think that the present modes of transaction enhance the level of digital skills in the prospective teachers?	38	62
4.	Do the you able to apply various ICT tools and techniques used in today's classrooms?	57	53
5.	Do you get enough support from the teachers for making any ICT tools/ e-resources for learning	35	65
6.	Do you encourage others to make e-resources?	62	38
7.	Do the students get the opportunity to show their digital literacy Skills during classroom transaction?	51	49
8.	Do you think that whether the prospective teachers receive enough preparation for developing digital literacy skills through the syllabus?	55	45
9.	Do you think that teacher education curriculum stresses only the acquisition of specific facts, ideas, concepts related to teaching?	44	56
10.	Does the teacher education curriculum of your university provide activities for improving the digital literacy skills?	35	65

The feedback and the responses of the prospective teachers on the items in the questionnaire reveal that only 46 per cent were of the opinion that the syllabus encourages students to learn with the help of digital technology. Only 42 per cent of the teachers opinioned that the transaction modes create an atmosphere for e-learning in their classroom. Only 38 per cent of the prospective teachers think that the present modes of transaction enhance the level of digital skills in the prospective teachers. About 57 per cent of the prospective teachers opinioned that they are able to apply various ICT tools and techniques used in classrooms. Only 35 per cent of the prospective teachers opinioned that they get enough support from the teachers for making any ICT tools/ e-resources for learning. Around 62 per cent prospective-teachers opinioned that they encourage others to make e-resources and 51 per cent were of the opinion that they get the opportunity to show their digital literacy skills during classroom transaction. About 55 per

cent of the prospective teachers feel that they receive enough preparation for developing digital literacy skills through the syllabus. Only 44 per cent of the prospective teachers feel that teacher education curriculum stresses only the acquisition of specific facts, ideas, concepts related to teaching. Around 35 per cent of the prospective teachers were of the opinion that teacher education curriculum of your university provides activities for improving the digital literacy skills.

Discussion and Recommendations

The results showed that the digital skills of the prospective teachers is average and they do have an average level of opinion about the current teacher education curriculum in enhancing digital competence. The present study also correlated with the literature stating that there is general view among the prospective teachers that they do have a low level of competence in the areas of digital literacy skill (Gutiérrez-Porlán & Serrano-Sánchez, 2016; Hinojo- Lucena et al., 2019). Unlike the studies of Keskin & Yazar (2015); Esteve-Mon et al. (2020); Casillas-Martín et al., (2019), and Guillén-Gámez et al. (2020), the present study state that there is no significant difference in the perception level of digital literacy skills among the prospective male and female teachers. It is, may be, and due to the equal educational and technological opportunity received by the students of Kerala irrespective of their gender.

The study recommends following suggestions and for enhancing the digital literacy skills of prospective teachers;

- The digital competency is a set of skills which need to be developed at early age and fostered throughout life. For providing the relevant training during the teacher education programme, the curriculum must

encourage to learn with the help of digital technology.

- Along with the theory, the transaction mode must create an atmosphere for e-learning for fostering digital literacy skills of prospective teachers.

- Although, study reveals equal digital literacy levels among the prospective teachers in spite of their gender, educational qualifications, type of institutions they study, and the subject of specialization, the technology must be integrated contextually.

- There must be instructional strategies for the transaction of teacher education program which may develop the digital competency among prospective teachers.

- The educational planners and policy makers should make digital literacy skills as part of the requirements for teachers' employment at all levels and curriculum planners must make it as point to consider digital literacy into every subject in the curriculum at teacher education curriculum.

- There must be continuous training programme, workshops, and awareness programmes arranged for prospective teachers on digital literacy to understand and update digital competency among them.

Conclusion

Digital literacy skill is of great demand and an essential requirement for the present century education. Educationists who are interested in digital technologies have pointed the significance of using the potential of digital competency in the classroom practices in the 21st century. It is revealed from the findings that prospective teachers have an average level of digital literacy skills; however, it was observed in the questionnaire that

they do have an average level of opinion about the curriculum transaction mode for enhancing digital competency among the prospective teachers.

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