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Digital Literacy of School Students in India: A Study

Charu Bansal* and Pradeep Kumar Misra

Department of Education, Chaudhary Charan Singh University, Meerut, India

Corresponding author: charu.goel2379@gmail.com

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ABSTRACT

Today, digital technologies such as laptops, tablets, smartphones, internet, web 2.0, and social media are a common good. These devices cater to fulfill the needs of learners of every age, but still the digital world is one with its own set of rules and risks. Therefore, digital literacy has become the prerequisite skills to survive in this digital world. Digital literacy is the ability to understand, use, and interact with technology, media, and digital resources in real-world situations. The importance of digital literacy motivated the researchers to identify the current status of digital literacy of the secondary school students having varied digital education experiences. To conduct the study the sample of 540 secondary school students were selected through multistage sampling. For data collection researchers developed and standardized 'Digital Literacy Assessment Test' (DLAT). The assessment was conducted in online mode. The results revealed that majority of the students performed at good level of digital literacy while none of them performed exceptionally well. Also, students with average digital education experiences performed moderate in their digital literacy under four different dimensions. Moreover, the study revealed interesting outcome in case of digital literacy of different gender and class. The obtained results are further used to provide some useful suggestions for the school to enhance the digital literacy skills of the students.

Keywords: Digital Literacy, Digital Literacy skills, Secondary School, Students, School

Digitalization has transformed the possibilities of every work area with global propagation in every sector including the education system. The application of digitalization in the education

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sector is affecting the learning environment and also contributing to the replacement of the 'old school system' with a 'new school system'. Sarsa and Soler (2011) commented that technological innovations are emerging very fast by introducing new educational innovation processes constantly. Hashim (2018) has named several new and emerging technologies that are being applied in the classrooms. Some of them are cloud computing, mobile technologies, massive open online courses (MOOC), games and gamification, etc. The use of such technologies supports learning, social interaction, content creation, publishing, and collaboration in classrooms (Kiran, 2014; Kukulska-Hulme *et al.* 2009).Department of elearning (2015) featured that technology is creating an interesting and engaging teaching-learning environment with the growing digitalization in education for the students.

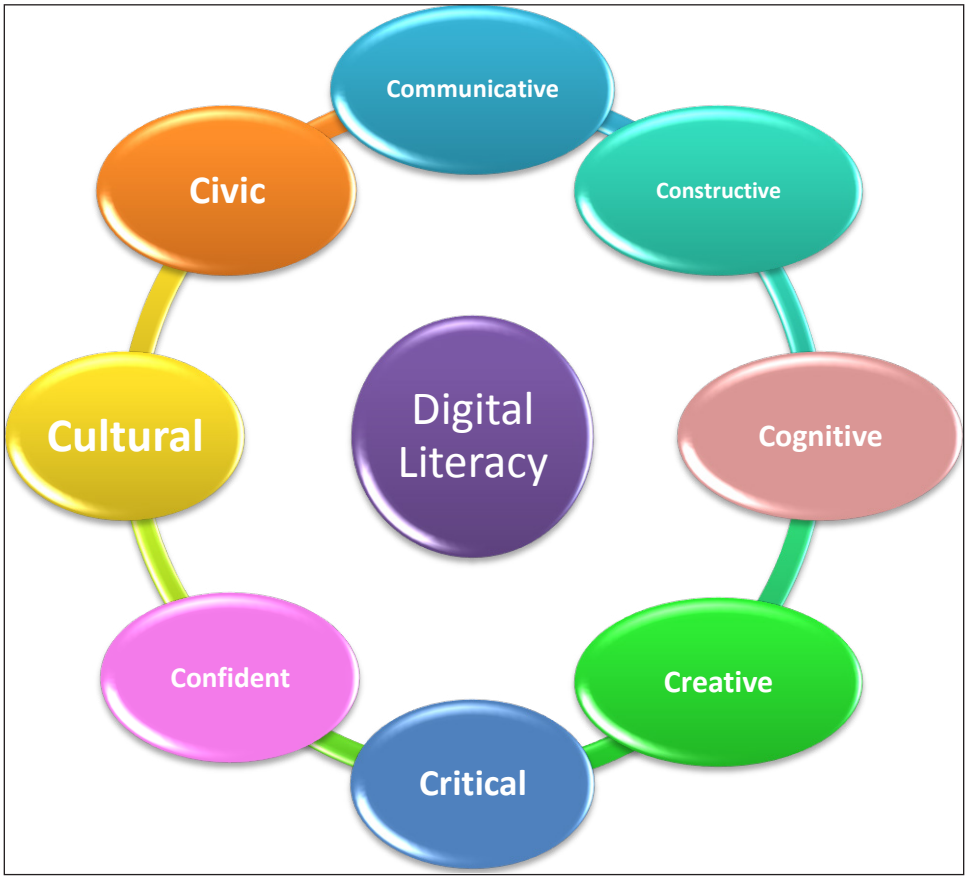

Fig. 1: Elements of Digital Literacy

Nowadays, the schools utilize digital technologies with the internet, World Wide Web, interactive white boards, social media, etc. to enable the learner to excel in this technology embedded environment. Every interaction with the Internet or digital media requires some

level of digital literacy. To simply understand the term digital literacy, the Department of elearning, Malta (2015, p.4) states, "Digital literacy is literacy via technology". In an article, Phuapan, Viriyavejakul, and Pimdee (2015) suggested that digital literacy means the ability to use digital technology, communication devices, and the network in digital environments to successfully survive in the digital world. According to them, the basic elements required in attaining digital literacy skills are Accessing, Managing, Integrating, Evaluating, Creating, Communicating, Analyzing, and Synthesizing.

Belshaw (2011) assumed that to be digitally literate the good balance of 8 elements in terms of their digital skills, attributes, practices, and identity is required by an individual. These elements are contextual as they depend on the personal, social, and cultural context of an individual. These core elements provide a foundation on which more subject-specific and contextual literacies can be strengthened. Given by Belshaw, Podcaster (2012) explained these 8 essential elements of digital literacy following manner:

- **Cultural:** Cultural means the ability to move easily between different digital environments. It includes awareness of the norms, values, and codes while using technologies.
- **Cognitive:** Cognitive means 'how to' of specific tools and technologies while engaging with a wide range of operating systems, platforms, devices, and software.
- **Constructive:** Constructive means to understand and demonstrate how to take existing resources and content to create something new.
- **Communicative:** Communicative means an understanding to communicate with different devices, including mobile and other digital devices. It also includes an understanding of the particular norms, values, protocols, and ethics that are appropriate to social networking, and other web 2.0 technologies.
- **Confident:** Confident includes an ability to assess and review one's competence with digital technologies, manage own digital personal learning environment, and develop a community of practice to progress one's skills and attributes.
- **Creative:** Creative element involves the use of digital technologies to create new things which have value to oneself and others. It includes randomness and discovery when engaging with digital technologies. Also an understanding of the processes, procedures, and systems that lie behind digital technologies rather than the specific elements of software/hardware involved.
- **Critical:** One needs to be a critical user of digital technologies by becoming aware of the power structures and assumptions behind different digital tools and practices. It also involves developing an understanding of online security, identity, and data management.
- **Civic:** One needs to make use of digital technologies to prepare oneself to participate as fully as possible in society. It involves opportunities for public engagement, global citizenship, and the enhancement of democracy through one's use of digital technologies.

To summarize, digital literacy is the ability to understand, use, and interact with technology, media, and digital resources in real-world situations. Furthermore, it is very well known that the school students of the current century are digital natives surrounded by digital technology but still they need to have right knowledge and skills to live efficiently and successfully in the digital world (Schliecher, 2017). The students are required to be an active producer of information for oneself and for society as well (Department of e-learning, 2015). Their success and failures depends on their digital literacy skills in this digital world. But still technology invades our daily lives with possible dangers also thus it is essential to have awareness and critical analysis while using them. Considering the importance of the digital literacy skills and the varied digital education experiences in student school life, the present paper tries to explore the current status of digital literacy among students in accordance to their varied digital education experiences.

Objectives of the Study

Considering the above mentioned, the present paper aims:

- To identify the current status of digital literacy of secondary school students.
- To explore the digital literacy of secondary school students with varied digital education experiences based on different dimensions.
- To explore the digital literacy of secondary school students with varied digital education experiences based on gender.
- To explore the digital literacy of secondary school students with varied digital education experiences based on different class.
- To provide suggestions for schools to enhance the digital literacy of the students.

Delimitations of the Study

1. The study is conducted on the students studying in schools affiliated to the Central Board for Secondary Education (CBSE).
2. The study is confined to secondary schools with computer and internet facilities for the students.
3. The study is conducted on the students studying in class IX, X, and XI only.
4. The data collection was done only in online mode.

Methodology of the Study

To achieve the objectives of the study, the ex-post facto method was best suited and therefore applied by the researcher. Accordingly, criterion group design, which is a widely used research

design in ex post facto research, was used. The digital education experience of the school students was taken as the criterion for preparing the design of the study. Digital education experience refers to the availability, access, and use of digital technologies by the school students for educational and other purposes in school or off school. Basing on the criterion, the students were distributed in three groups:

- Students having low digital education experiences (LDEE)
- Students having average digital education experience (ADEE)
- Students having high digital education experiences (HDEE)

The researchers decided to conduct this study on the students studying in schools affiliated to Central Board for Secondary Education (CBSE) in India. The argument behind this decision was that in comparison to other School Boards, CBSE has pan-India presence, and most of the CBSE affiliated schools offer different digital education experiences to the students. Multistage sampling was used to conduct the study. During the sample selection process, extreme care had been taken to minimize the influence of an extraneous or intervening variable. Therefore to minimize the effect of the environmental variable; the locality and board of education held constant. The sample of the study was drawn from the single city of the Meerut district with a single board of education. Henceforth, Meerut city of the Meerut district and Central Board for Secondary Education (CBSE) was considered for homogeneity in the sample selection. The sample of the study comprised of 540 secondary school students.

To conduct the study the researchers have developed and standardized the 'Digital Literacy Assessment Test' (DLAT). The test comprises of 35 items. The content and construct validity was tested to ensure the validity of the test. Also, the reliability score obtained through Cronbach's alpha was (α = 0.86) found high. Henceforth, much faith can be placed in the results obtained through this test.

The preliminary information was gathered through a simple questionnaire from secondary school students (N = 540) related to their access, usage, and time spent on various digital gadgets. This information of the respondents used to group the students based on their digital education experiences. The obtained scores from the respondents were distributed on the normal probability curve and the students were grouped according to their scores on $M \pm 1\sigma$ and $M \pm 2\sigma$. The students were divided into three groups:

- Students with low digital education experience (LDEE)
- Students with average digital education experience (ADEE)
- Students with high digital education experience (HDEE)

Fig. 2 shows the distribution of students in the study based on their digital education experiences.

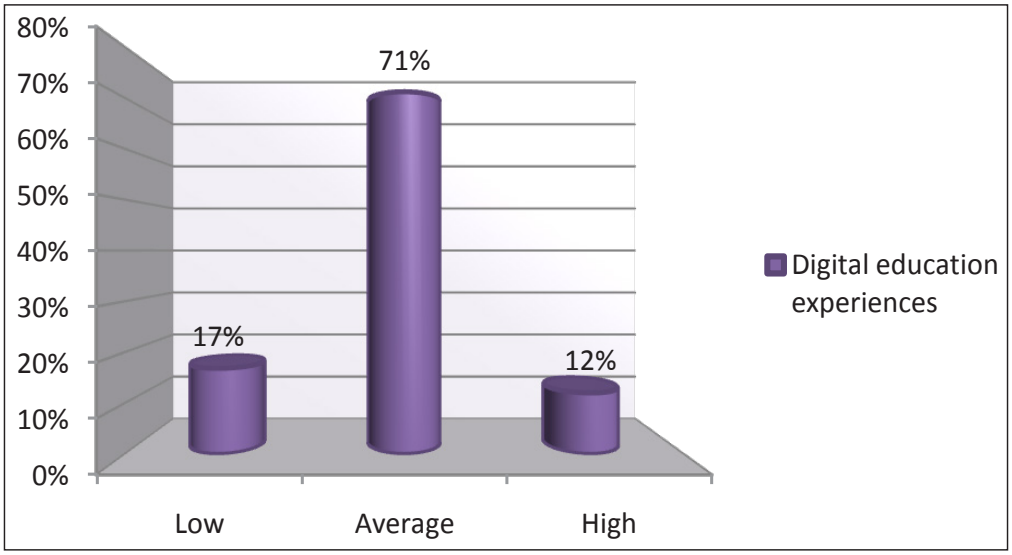

Fig. 2: Students based on varied digital education experiences

The study distinguished students based on gender (boys and girls). The total number of students in the study was 540. Among them 304 were boys and 236 were girls. Fig. 3 shows the gender distribution in the present study.

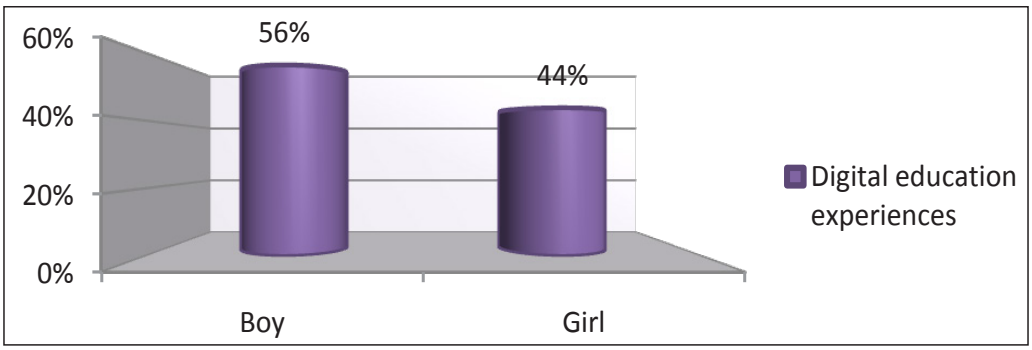

Fig. 3: Students based on gender

The secondary school students in the study include students of classes IX, X, and XI. Among the total number (N=540) students of different classes consist of 269 from class IX, 97 from class X, and 174 from class XI. Fig. 4 shows the class distribution in the present study.

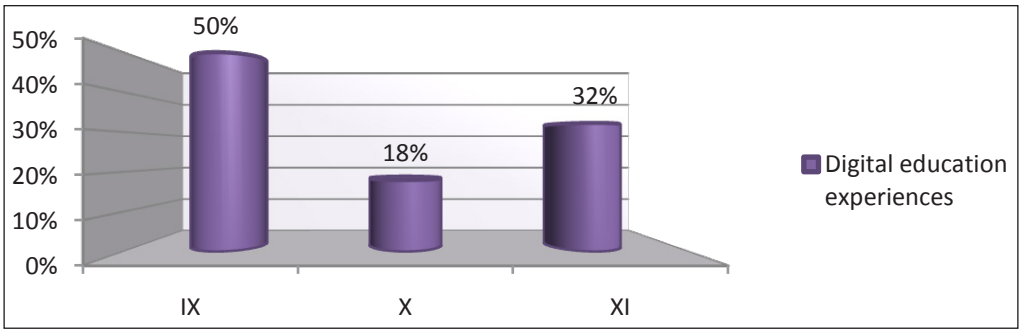

Fig. 4: Students based on different classes

Analysis and Interpretation

Objective 1: To identify the current status of digital literacy of secondary school students

The level of digital literacy of secondary school students was ascertained by the scores obtained by them on the 'Digital Literacy Assessment Test'. These scores were categorized according to the norms of 'Digital Literacy Assessment Test'. The details are as follows:

Table 1: Status of Digital Literacy of Secondary School Students

Sl. No.	Level of Digital Literacy	Number of secondary school students	
		f	(%)
1	Extremely Poor	42	7.78
2	Very Poor	26	4.81
3	Poor	57	10.56
4	Basic	61	11.30
5	Fair	88	16.30
6	Good	114	21.11
7	Very Good	113	20.93
8	Excellent	39	7.22
9	Exceptional	0	0.00

A glance at the data presented in Table 1 reveals that the performance of 21.11% of students was 'good' and 20.93% of students performed at 'very good' level regarding their digital literacy. Whereas, only 7.22% of students scored 'excellent' level of digital literacy. Furthermore, 16.30% of students possessed a 'fair' level of digital literacy and 11.30% of students possessed a 'basic' level of digital literacy. Whereas, performances of 10.56% students were rated 'poor', 4.81%

under 'very poor' and 7.78% of them fall under 'extremely poor' level of digital literacy skills. This reveals that majority of the students performed at 'good' and 'very good' level of digital literacy. But none of the students performed exceptional in their digital literacy skills (Fig. 5).

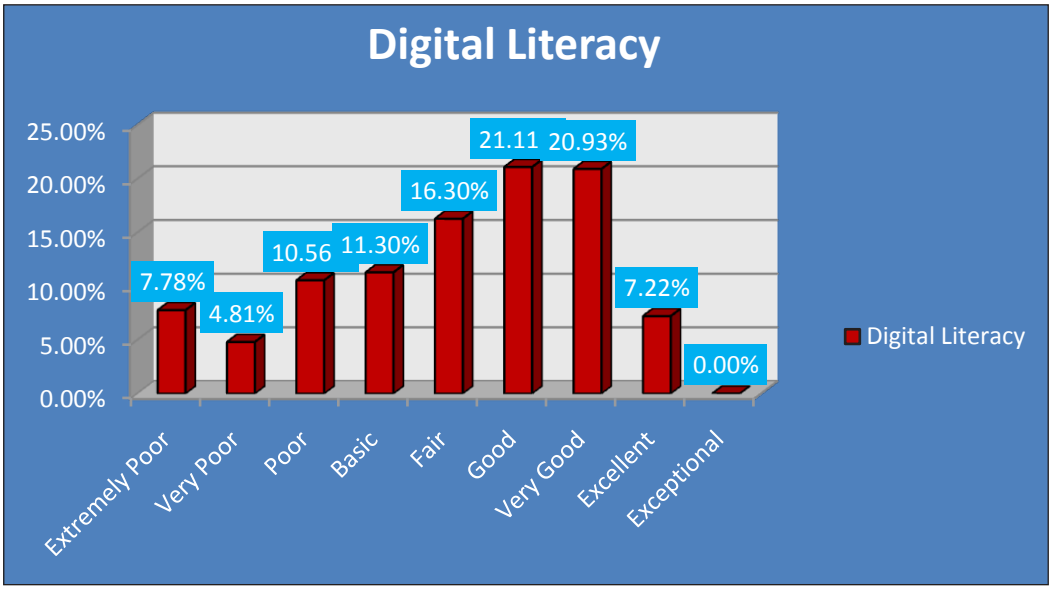

Fig. 5: Status of Digital Literacy of Secondary School Students

Objective 2: To explore the digital literacy of secondary school students with varied digital education experiences based on different dimensions

Table 2: Secondary School Students with Varied Digital Education Experiences under the Different Dimension of Digital Literacy

Dimensions of Digital Literacy	Number of secondary school students having above basic level of digital literacy					
	LDEE		ADEE		HDEE	
	f (N)	%	f (N)	%	f (N)	%
Functional Skills	41(91)	45.05	206 (384)	53.65	51 (65)	78.46
Psychological Skills	45 (91)	49.45	201 (384)	52.34	49 (65)	75.38
Critical Skills	32 (91)	35.16	200 (384)	52.08	47 (65)	72.31
Ethical Skills	32 (91)	35.16	204 (384)	53.13	44 (65)	67.69

A glance at the data presented in Table 2 makes it apparent HDEE students are performing better in terms of digital literacy scores. 78.46% of them scored better when assessed regarding their functional skills, 75.38% scored better when assessed regarding their psychological skills, 72.31% scored better when assessed regarding their critical skills and 67.69% scored better

when assessed regarding their ethical skills. This finding indicates that the availability of digital education experiences to the students enables to improve the digital literacy of the students.

However, the majority of students with LDEE were not able to score above basic level of digital literacy. Data presented in Table 2 depicts that only 45.05% of LDEE students scored above basic level regarding their functional skills, 49.45% of students scored above basic level regarding their psychological skills, and 35.16 % of students scored better regarding critical and ethical skills respectively.

However, students with ADEE performed moderately in all the four dimensions of the digital literacy test (see Fig. 6).

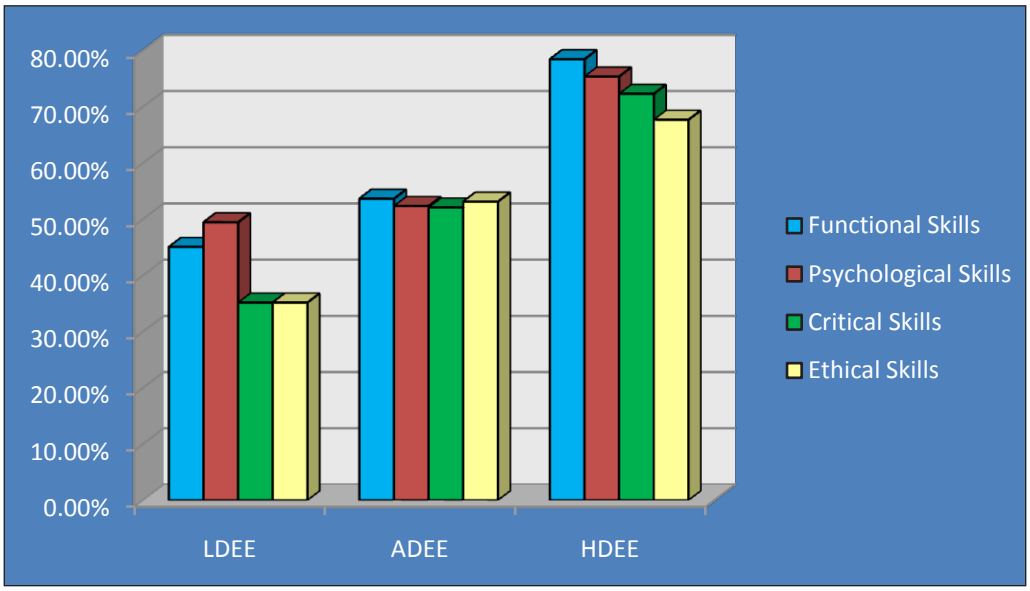

Fig. 6: Secondary School Students under Different Dimension of Digital Literacy

The analysis of the data indicates that secondary school students having low digital education experiences are lacking in terms of digital literacy. While students having average digital education experiences perform moderately to deal with situations involving functional, psychological, critical, and ethical skills. Though, students having high digital education experiences are performing well on almost all the parameters of digital literacy.

Objective 3: To explore the digital literacy of secondary school students with varied digital education experiences based on gender

A glance at the data presented in Table 3 makes it apparent that boy students with varied digital education experiences are performing better than girls' students in terms of digital

literacy scores. 44.44% of LDEE girls scored better when assessed regarding their digital literacy. Whereas, majority of boys with LDEE was not able to score above basic level of digital literacy. Data presented in Table 3 depicts that only 39.13% of LDEE boys scored above basic level regarding digital literacy.

Table 3: Gender-wise Digital Literacy of Secondary School Students with Varied Digital Education Experiences

Gender-wise Distribution	Number of secondary school students having above basic level of digital literacy					
	LDEE		ADEE		HDEE	
	f (N)	%	f (N)	%	f(N)	%
Boys	18 (46)	39.13	135 (217)	62.21	35 (41)	85.37
Girls	20 (45)	44.44	72 (167)	43.11	16 (24)	66.67

On the other side, a large number of boys with ADEE were able to perform better on digital literacy. Data in Table 3 depicts that 62.21% of boys scored better than basic level scores on digital literacy. But less than half, 43.11% of girls with ADEE scored better than basic level of digital literacy.

Among HDEE students' majority of boys and girls were able to perform better than basic level scores. 85.37% of HDEE boys and 66.67% of HDEE girls scored above basic level regarding digital literacy.

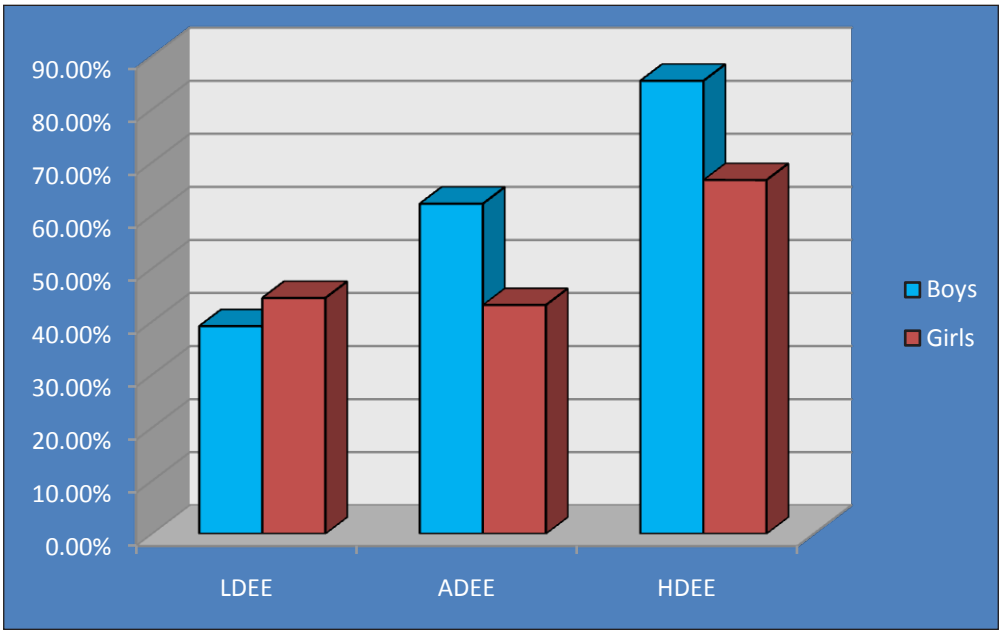

Fig. 7: Gender-wise Digital Literacy of Secondary School Students with Varied Digital Education Experiences

The analysis of the data indicates that secondary school girls having low as well as average digital education experiences are lacking in terms of digital literacy. Whereas, secondary school boys having average and high digital education experience are performing well regarding digital literacy. The secondary school boys and girls with low digital education experiences were not able to score better regarding digital literacy.

Objective 4: To explore the digital literacy of secondary school students with varied digital education experiences based on different class

Table 4: Class-wise Digital Literacy of Secondary School Students with Varied Digital Education Experiences

Class-wise Distribution	Number of secondary school students having above basic level of digital literacy					
	LDEE		ADEE		HDEE	
	f (N)	%	f (N)	%	f(N)	%
IX	22 (48)	45.83	87 (187)	47.59	25 (34)	73.53
X	5 (15)	33.33	37 (72)	51.39	8 (10)	80.00
XI	11 (28)	39.29	81 (125)	64.80	18 (21)	85.71

Data presented in Table 4 reveals that students of different classes (IX, X, XI) with varied digital education experiences vary in the performance of their digital literacy. Secondary school students having LDEE only 33.33% of students of class X scored better than basic level of digital literacy whereas, 45.83% of students of class IX and 39.29% of students of class XI performed better than basic level of digital literacy.

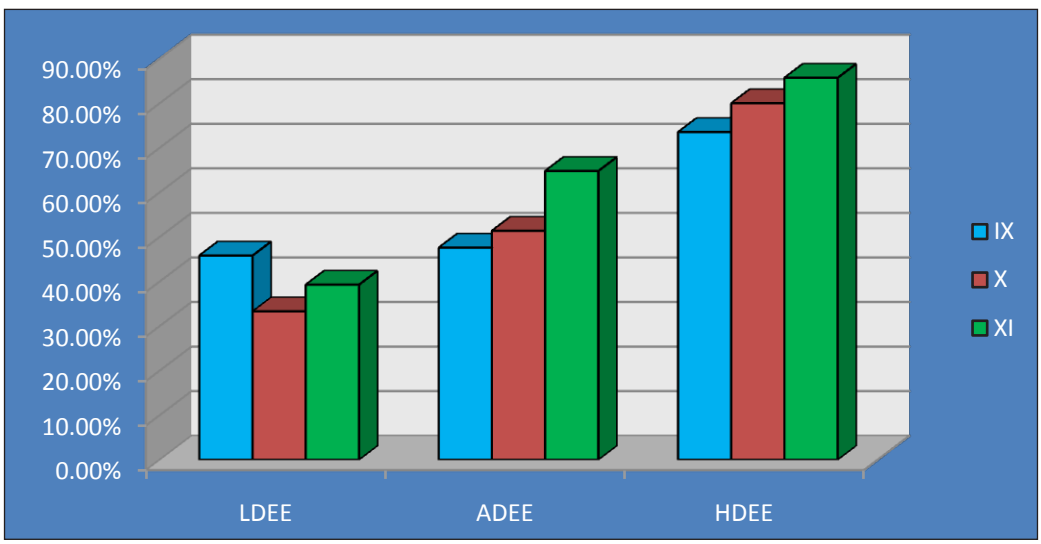

Fig. 8: Class-wise Digital Literacy of Secondary School Students with Varied Digital Education Experiences

However, the majority of students with ADEE of class (X, XI) were able to score above basic level of digital literacy. Data in Table 4 depicts that 51.39% of the student of the class of X scored better while 64.80% of students of class IX scored better than basic level of digital literacy. A slight drop in the performance of students of class IX having ADEE was seen when only 47.59% of students scored better than basic level of digital literacy.

However, the majority of students with HDEE of class IX performed better than basic level of digital literacy. The performance of the students with HDEE progresses with the class level. As 75.53% of students of class IX scored better while 80% of students of class X and 85.71% of students of class XI performed better than the basic level of digital literacy.

The analysis of the data indicates that a secondary school student of classes (IX, X, XI) with LDEE shows poor performance in their performance of digital literacy. While the majority of the students with ADEE performed consistently better regarding their digital literacy of varied classes (IX, X, XI). Also, secondary school students of class (IX, X, XI) having high digital education experiences were performing excellently well in terms of digital literacy.

Suggestions for schools to enhance the digital literacy of students

Based on the obtained results, the researchers would like to propose the following suggestions for schools across the country for consideration:

1. Schools must make provisions of regular assessment and evaluation of learning needs related to the development of digital literacy among students.
2. Schools must ensure an appropriate blend of the digital education experiences for the students. The teachers as well as educational administration are required to ensure the appropriate use of digital technologies in the educational settings.
3. Schools must find innovative ways to utilize different digital platforms to develop learning strategies to enhance such skills.
4. Schools must prepare teaching-learning modules in such a way that these modules will offer equal opportunities for both boys and girls to excel in different walks of life.
5. Schools must offer professional development learning opportunities to use digital technologies for the development of digital literacy within students.
6. Schools must organize different activities like panel discussions or workshops to understand the ever-changing trend of the digital technologies in the education system.
7. Schools can come up with a plan to establish digital societies consisting of teachers and learners. These societies can trace the ongoing activities among students and can channelize them in the right direction.

8. Schools can also form an online parent-teacher community to share their experiences, feedback, and challenges regarding the digitalization in education and its impact on their wards.
9. Schools can also promote technology-supported collaborative activities for helping the students to engage collaboratively to work on different assignments and projects.
10. Organizing training programmes will also benefit schools in enhancing digital literacy skills.

CONCLUSION

The trend of education is changing with digital transformation. So, it becomes really necessary to focus on the important skills required in this digital world to succeed in related field. The present study identified that the current status of the majority of the students is at good and very good level but still none of them outperformed and done exceptionally well in terms of their digital literacy. Also, findings of the study revealed that with the enhancement in the digital learning environment of the students improves their digital literacy in all the four dimensions of functional skills, psychological skills, critical skills, and ethical skills. Moreover, the performance of boys varies considerably under the varied digital learning experiences whereas the girls' performance shows no major variation. Also, the study concluded that the students of the different classes performed consistently well with the enhancement in their digital learning experiences. Lastly, as schools are the key players for the development of digital learning environment to their students, the study will prove quite helpful to plan their learning environment in such a manner that can produce the effective results in developing the most important skills for digital world i.e. digital literacy.

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