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Digital competency in rural schools of Jammu and Kashmir: A case study of Paddar Sub-division

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Abstract

The current era is the era of digital technology. Its inclusion has affected all aspects of society, including education. Digital technology is acting as a means towards the enhancement of learning outcomes and the quality of education, but the integration of such technologies in schools for making changes and innovation is not enough; it requires digitally competent teachers to facilitate the use of digital technologies in education. Digital technology in schools has become an influential strategy for teachers to use in support of their pedagogical practices and student learning. Its integration into education has revolutionized teaching and learning and offered new opportunities to enhance educational experiences and outcomes. The objectives of the study are to identify the problems and challenges in the integration of digital technology in the schools of the Paddar sub-division and to suggest remedies to solve the problems and handle the challenges in the integration of digital technology. A qualitative interpretive research design was applied to identify the problems and challenges faced in the integration of digital technology in the schools of rural areas of Jammu and Kashmir Union Territory. The samples were collected from 28 government (9 secondary and 19 elementary) schools and five private elementary schools. Five students (28×5=140) and two teachers (28×2=56) were selected from each government school, and ten students (5×10=50) and four teachers (4×5=20) were selected from each private school studying in the 10th and 8th classes. The data were collected by employing separate interview schedules for students and teachers, along with participant observations, and checklists were employed to identify the digital facilities in the schools. The findings of the study revealed that the major problems were the lack of digital infrastructural facilities in the schools of rural areas, the inclusion of ICT as a separate subject in the curricula, and the lack of efficiency in using digital technologies among the students and teachers. The lack of digital infrastructural facilities in the schools of rural areas of Jammu and Kashmir Union Territory of India and the lack of digital competency among the students and teachers were the major problems.

Keywords: Digital technology, Integration, Paddar subdivision problems and challenges, School education.

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1. Introduction

In recent decades, digital technology has emerged as a transformative force to disseminate and acquire knowledge in the educational sector [1, 2]. The use of digital technology in a classroom environment has provided various benefits in teaching and learning, such as encouraging student motivation, classwork engagement, collaboration with peers, higher-order thinking, enhanced communication skills, and opportunities for learners [3, 4]. In schools, it has become an influential strategy for teachers to use in support of their pedagogical practices and student learning. Its integration into education has revolutionized teaching and learning and offered new opportunities to enhance educational experiences and outcomes [5, 6]. It works as an enhancing force to increase interest, motivation, and skills, and provides new opportunities among teachers. The use of digital technology in education has a positive impact on the learning outcomes of students, their engagement, and the quality of education. Teachers who integrate technology into classroom teaching enhance children's learning. Their competency and use in pedagogical practices are essential to make the teaching and learning process interesting, motivating, effective, and qualitative (NEP-2020). To develop educational standards in India, the government has undertaken various initiatives to integrate digital technology, such as ICT@Schools, DIKSHA (Digital Infrastructure for Knowledge Sharing), NISHTHA (National Initiative for School Heads' and Teachers' Holistic Advancement), VidyaDaan, MOOCs (Massive Online Open Courses) on SWAYAM (Study Webs of Active Learning for Young Aspiring Minds), and Samagra Shiksha (Department of School Education & Literacy) to make teachers digitally competent and ensure equitable access to quality education [7, 8]. Other platforms like CBSE (Central Board of School Education) and NIOS (National Institute of Open Schooling) have also undertaken various digital initiatives to develop teaching and learning transactions in a classroom setting [9]. The National Educational Policy-2020 [9] also emphasizes the usage and integration of digital technology to improve multiple aspects of education because its interventions will improve the teaching and learning process, support teacher preparation and professional development, and enhance quality education with equitable access [10, 11]. These measures have made education more accessible and convenient for teachers and students across the country.

The above literature has highlighted how digital technology works best in supporting students' achievement when the technology is 'in the hands of the teacher.' Competency in digital technology is a critical factor in student success. However, teachers need to develop competencies that allow them to support learners in developing knowledge, skills, and attitudes related to digital technologies [12, 13] because they play a crucial role in the development of learners' knowledge and skills. Therefore, their digital competence is more important [14, 15]. The present paper aims to explore the digital structure of schools and digital competency among students and teachers in the rural areas of Jammu and Kashmir Union Territory of India. How do the students and teachers of rural areas integrate digital technology in classroom settings? Are they competent in using digital technology? If not, what are the major reasons behind it? What problems and challenges do they face? What will be the ways to implement to overcome such problems and challenges faced by the rural schools, students, and teachers of Jammu and Kashmir Union Territory of India? The main focus of the paper is to find out the problems and challenges regarding the infrastructure of digital technology and competency among students and teachers and to suggest remedies to solve the problems and handle the challenges in the schools of rural areas of Jammu and Kashmir Union Territory of India.

1.1. Objectives of the Study

- To identify the problems and challenges in the integration of digital technology in the schools of the Paddar sub-division.
- To suggest remedies to solve the problems and to handle the challenges in the integration of digital technology in the schools of the Paddar sub-division.

1.2. Research Questions of the Study

- What are the problems and challenges in the integration of digital technology in the schools of the Paddar subdivision?
- What will be the ways to solve the problems and challenges in the integration of digital technology in the schools of the Paddar sub-division?

2. Research Methodology

The present study was qualitative, applying an interpretive research design to identify the problems and challenges in the integration of digital technology in the schools of the Paddar sub-division of the Jammu and Kashmir Union Territory of

India. There were a total of 84 schools, of which 75 were government schools (9 secondary and 66 elementary), and 9 were private elementary schools. The total enrollment of students was 4,706, of which 3,226 were government (1,566 secondary school and 1,660 elementary school) students and 1,480 were private elementary school students. The total number of teachers was 318, of which 259 were government (61 secondary and 198 elementary) school teachers and 59 were private elementary school teachers (Zonal Education Office, Paddar, 2022-23).

The samples were collected from 28 government (9 secondary and 19 elementary) schools and five private elementary schools. From the 28 government schools, 140 students and 56 teachers, and from the five private schools, 50 students and 20 teachers were selected as a sample. Five students (28×5=140) and two teachers (28×2=56) were selected from each government school, and ten students (5×10=50) and four teachers (4×5=20) were selected from each private school. Thus, a total of 190 (140+50=190) students and 76 (56+20=76) teachers were selected for the present study. The data were collected by employing separate interview schedules for students and teachers to identify the problems and challenges in the integration of digital technologies. Observations, as well as a checklist, were employed to identify the digital facilities in the schools. The data were analyzed by calculating frequencies, and after calculation, frequencies were converted into percentages using the formula:

$$\frac{\text{Total No. of Observations}}{\text{No. of Observations}} \times 100$$

After the conversion of frequencies into percentages, data was represented graphically with the help of histograms and line graphs.

3. Analysis and Interpretation of Data

The data were analyzed and interpreted into three sections. Section I dealt with the facilities of digital technologies in government and private schools; Section II dealt with the demographic profile of the parents (occupational status, educational qualifications, and socio-economic status); and Section III dealt with the teachers' knowledge and usage of digital technologies, the use of different sources, the purpose of the use, and pedagogical and technical training and support, as well as the problems and challenges in the integration of digital technologies.

3.1. Section-I

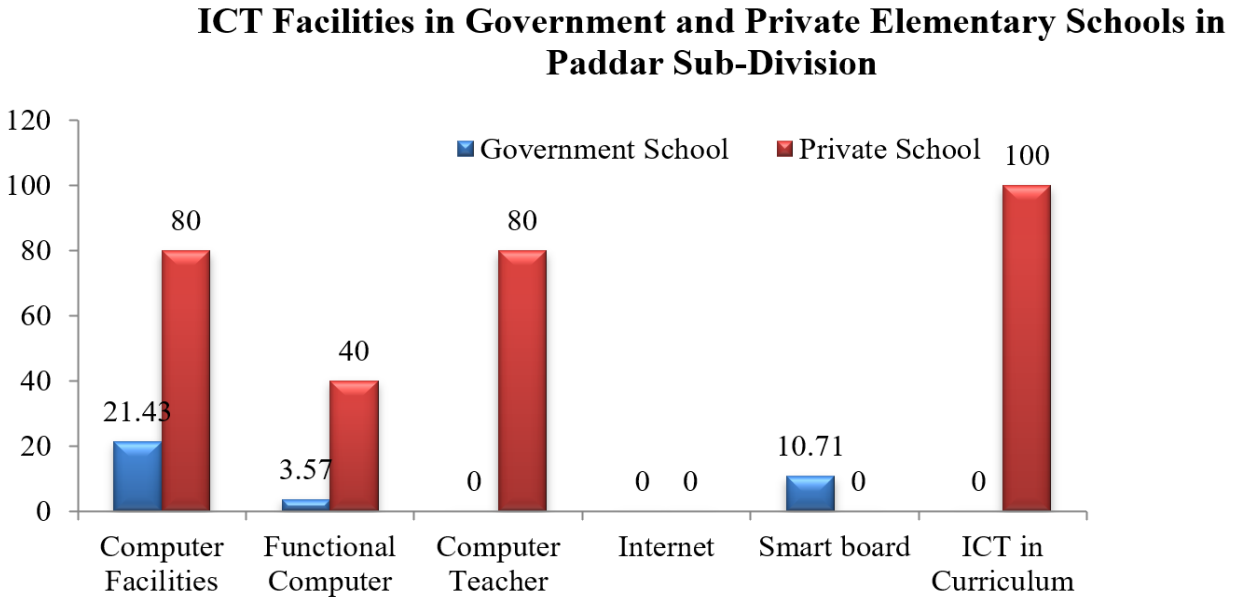

Figure 1.
Percentage of Schools having Facilities of Digital Technologies in Paddar Sub-Division.

Figure 1 shows that 21.43 percent of government schools had computer facilities, of which only 3.57 percent of schools had functional computers. Additionally, 10.71 percent of schools had smart board facilities but were not functional due to the unavailability of internet facilities, as none of the government schools had included ICT as a subject in the curriculum. In contrast, 80 percent of private schools had computer facilities, with 40 percent of schools having functional computers, although they were rarely used for teaching and learning purposes. All the private schools included ICT as a subject in their curriculum. However, all schools lacked internet facilities and smart board facilities.

3.2. Section-II

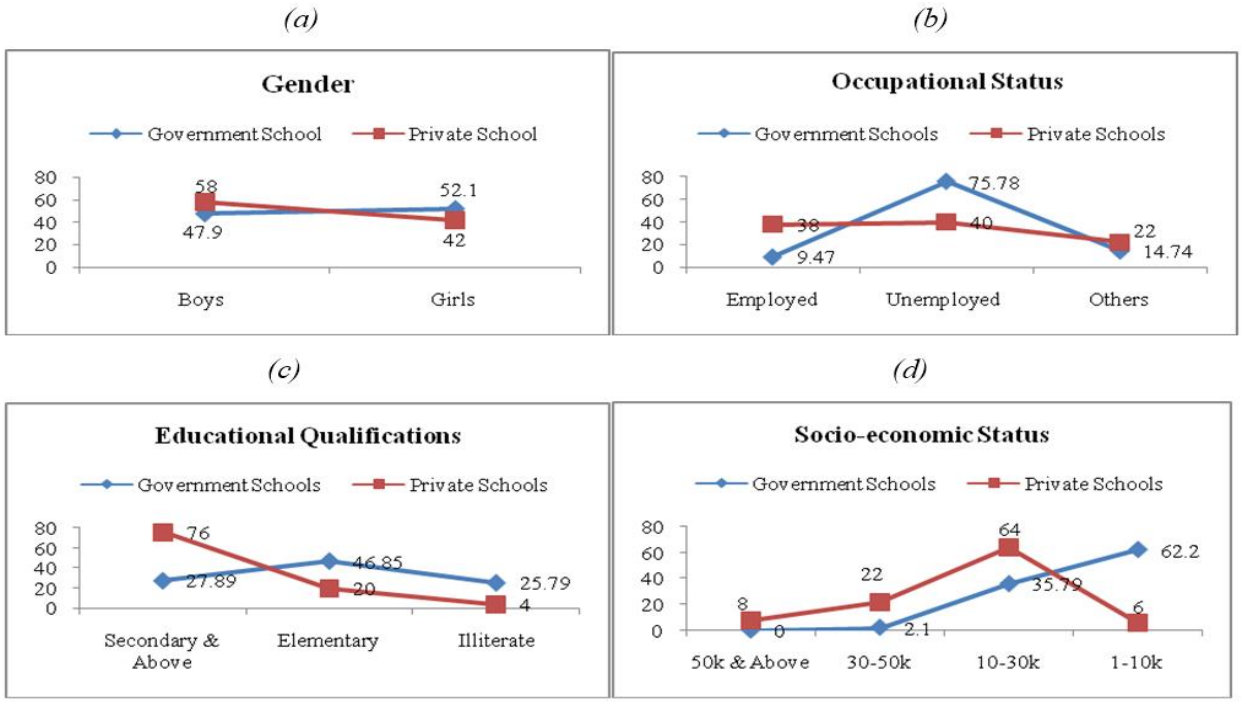

Figure 2.
Demographic Profile of the Parents of the Students Studying in the Schools of Paddar Sub-Division.

The part (a) of Figure 2 shows that in government schools 47.90 per cent were boys, 52.10 per cent were girls, whereas in private schools 58 per cent were boys, and 42 per cent were girl students.

The part (b) of Figure 2 shows that only 9.47 per cent parents of government school students were government employed, 75.78 per cent were unemployed, and 14.74 per cent belonged to other occupations like small business and factory workers. In contrast, 38 per cent parents of private school students were government employed, 40 per cent were unemployed, and 22 per cent belonged to other occupations like small business and factory workers.

The part (c) of Figure 2 shows that only 27.89 percent of parents of government school students completed secondary and above qualifications, 46.85 percent completed elementary education, and 25.79 percent were illiterate. In contrast, 76 percent of parents of private school students completed secondary and above qualifications, 20 percent completed elementary education, and only 4 percent were illiterate.

The part (d) of Figure 2 shows that none of the parents of government school students earned 50,000 and above; only 2.1 percent earned between 30,000 and 50,000, 35.79 percent earned between 10,000 and 30,000, and 62.20 percent of parents earned below 10,000 per month from all sources. In contrast, the parents of private school students, 8 percent earned 50,000 and above, 22 percent earned between 30,000 and 50,000, 64 percent earned between 10,000 and 30,000, and 6 percent earned below 10,000 per month from all sources of income.

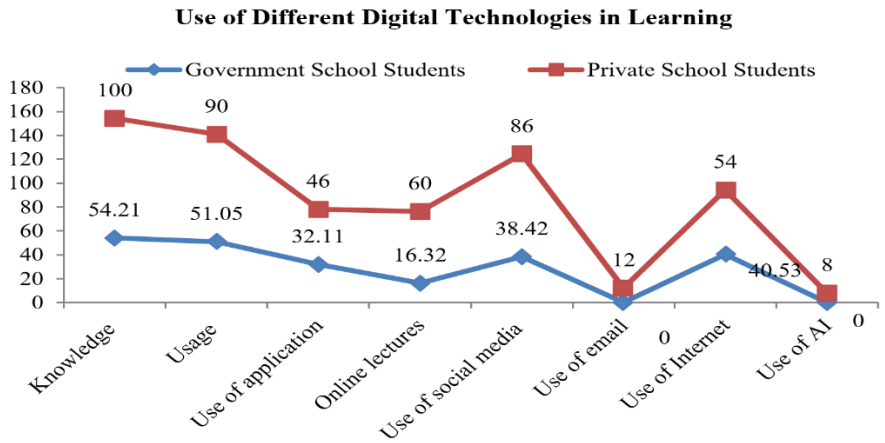

Figure 3.
Percentage of School Students Using Different Digital Technologies in Learning in the Schools of Rural Areas in Jammu and Kashmir.

The Figure 3 shows that 54.21 percent of the government and all the private school students were knowledgeable about digital technologies, 51.05 percent of the government and 90 percent of private school students used digital technologies for learning, 32.11 percent of the government and 46 percent of private school students used mobile applications for learning, 16.23 percent of government and 60 percent of private school students attended online lectures, 38.42 percent of government and 86 percent of private school students used social media for learning. None of the government and 12 percent of private school students used emails for sharing learning content, 40.53 percent of government and 54 percent of private school students used the internet to search for relevant subject content, and none of the government but 8 percent of private school students used Artificial Intelligence (AI) applications for learning. The data shows that only half of the government school students had a basic knowledge of digital technologies, and the majority of the students were unable to use digital technologies due to a lack of knowledge; in contrast, the majority of private school students were knowledgeable about digital technologies, and on average, the students used digital technologies for learning.

3.3. Section-III

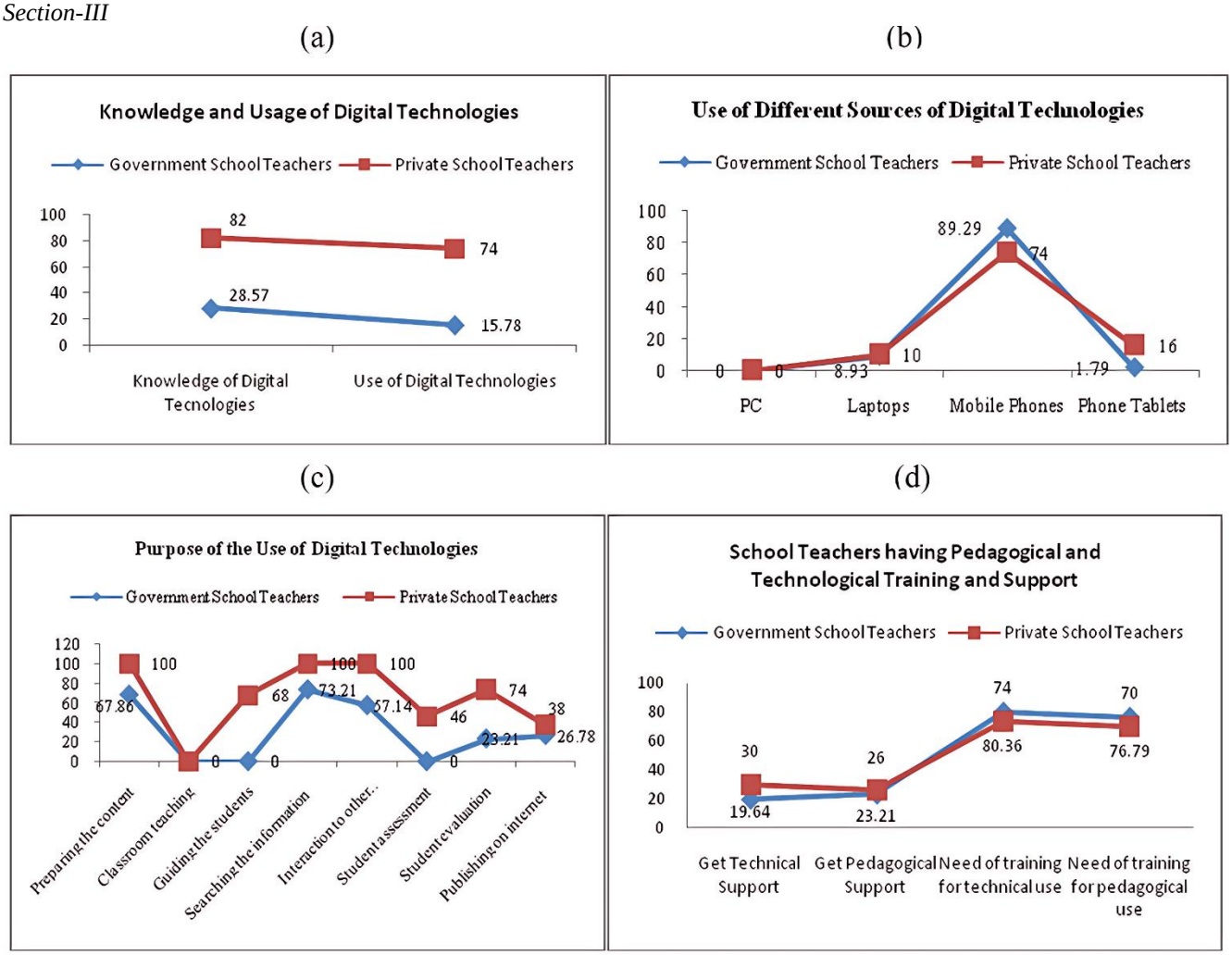

Figure 4.
Digital Competency among Teachers Teaching in the Schools of Rural Areas in Paddar Sub-division of Jammu and Kashmir

The part (a) of Figure 4 shows that only 28.57 percent of government school teachers had knowledge of digital technologies, whereas 82 percent of private school teachers had knowledge of digital technologies. Only 15.78 percent of government school teachers used digital technologies, whereas 74 percent of private school teachers used digital technologies, but none were experts. They were only able to have basic knowledge of digital technologies, such as running PowerPoint presentations on the computer and projectors, but were not able to create and modify ICT-based teaching-learning materials. Almost all teachers responded that the government had not taken any initiative to organize digital technology training programs before the installation of ICT labs in schools. Some of the teachers responded that the higher authorities selected the schools through a lottery method to install ICT labs. They had not inspected the school infrastructure to install ICT labs.

The part (b) of Figure 4 shows that none of neither government as well as private school teachers use personal computers, but 8.93 percent of government and 10 percent of private school teachers use laptops. Additionally, 89.29 percent of government and 74 percent of private school teachers used mobile phones. Only 1.79 percent of government and 16 percent of private school teachers used phone tablets for educational purposes. The data shows that most of the government as well as private school teachers used only mobile phones for educational purposes in the schools.

The part (c) of Figure 4 shows that 67.86 per cent government and all the private school teachers used digital technologies for preparing the classroom content but none of teacher of government and private school were use digital technologies during classroom teaching because of the lack of internet connectivity and smart classroom, none of government teacher were use digital technologies to guide the students but 68 per cent private school teachers were use digital technologies to guide students in teaching-learning process, 73.21 per cent government and all the private school teachers were use digital technologies to search the information from Internet regarding teaching content, pedagogical methods, students assessment and evaluation, 57.14 per cent government and all the private school teachers were use digital technologies to interact with different stakeholders like parents, students, colleagues, higher authorities and seniors, none of the government and 46 per cent private school teachers were use digital technologies to assess the students' progress during the course, 23.21 per cent government and 74 per cent private school teachers were use digital technologies in evaluation process, and 26.78 per cent government and 38 per cent private school teachers were use digital technologies to publish the content on Internet.

The part (d) of Figure 4 shows that only 19.64 per cent government and 30 per cent private school teachers get technical support to operate digital technologies by getting training, 23.21 of government and 26 of private school teachers get pedagogical support by getting training, whereas 80.36 per cent of government and 74 per cent private teachers need training for technical use of digital technologies and 76.79 per cent government and 70 per cent private school teachers need digital technology training for pedagogical use. The data shows that most teachers of government as well as private school need both technical and pedagogical training for the effective use of digital technologies in schools.

4. Discussion of the Results

The school environment plays a crucial role in promoting curiosity, creativity, and enhancing the knowledge, abilities, and skills of children, in which digital technology works as an enhancing force. Digital technology affords teachers and learners the opportunity to fully explore pedagogical possibilities by integrating it into teaching-learning transactions [16, 17]. However, the results of the study revealed that the schools in rural areas (both government and private) of the Paddar sub-division of Jammu and Kashmir (India) were lacking basic digital infrastructural facilities. Only 21.43 percent of schools had computer facilities, of which 3.47 percent had functional computers, and 10.71 percent had a single smart board facility. All the schools were lacking computer teachers, internet facilities, and provisions for online interaction programs; even ICT as a subject was not included in the curriculum at the elementary level of education. Improper digital infrastructure at rural schools, such as small classrooms, inadequate teaching equipment, lack of ICT facilities, and internet availability, are the major reasons driving students away from schools [18, 19]. A total of 86.6 percent of schools have functional electricity facilities, of which only 45.8 percent have functional computers (including urban and rural), and 33.9 percent have internet facilities. Furthermore, if we focus on government schools, only 35.8 percent of schools have a functional computer (including urban and rural), and 24.2 percent of schools have internet facilities [20]. Obstacles such as illiteracy, lack of skills, infrastructure, and investment in rural areas must be tackled if India is to diminish the gap of the digital divide [21]. Only 20.66 percent of rural students and 69.70 percent of urban students used computers for various purposes [22, 23]. The main problems associated with the rural schooling system that are widening the gap between urban and rural education are the lack of skilled teachers and the unavailability of facilities like libraries and labs [24, 25]. Even across India, states have uneven access to ICT facilities [26]. The rural schools in South Africa are also lacking the facilities of digital infrastructure for the teaching-learning process, and the impact of such on learning outcomes has been adverse [27].

A disparity was also observed between the enrolment of boys and girls in government and private schools. The government schools have a higher enrolment of girls and private schools have a higher enrolment of boys, indicating that the parents preferred to send a girl child to government schools and a boy child to private schools. This is due to the low occupational status, educational qualifications, and low socio-economic status of the parents because a total of 75.78 per cent government school students and 40 per cent private school students parents were unemployed, 72.11 per cent government and 24 per cent private school students' parent were not completed more than elementary stage of education and none of government school student parent earned 50,000 or more than that per month whereas only 2.1 per cent parents of private school students earned 50,000 or more than that per month. Even, in India, more than 20 per cent of the population lives below the poverty line, and near about 70 per cent of people live in villages depend on agriculture and related activities for their livelihood; many villages have been discarded from the modern world in respect of roads connectivity, communication, electricity and other means of communication [28]. Whereas, the parents' occupational and socio-economic status and educational qualifications significantly impact their students' academic achievement at the school levels [29] and parents should provide appropriate support for their children at various developmental stages to develop their academic achievements [30]. Moreover, the results of the study revealed that a huge disparity was found between the government and private school students in the knowledge and usage of different digital technologies like learning applications, online lectures, social media, and search engines. Only 54.21 per cent government school students were knowledgeable of digital technologies in which 51.05 per cent used for learning and sharing the content by using learning applications (32.11%), attending online lectures (16.42%), using social media (38.42%), surfing search engines (40.53%), and none of the students were use emails and Artificial Intelligence (AI) but in contrast private school students shows better results. Therefore, the parents' occupational and socio-economic status and educational qualifications are directly affected on the usage of digital technologies among students because the majority of parents can't afford to provide digital gadgets to their children. Further, the digital competency among the teachers was found very low because only 28.57 per cent government school teachers were able to use digital technologies in which 15.78 integrated in teaching-learning (T-L) process. In contrast, private school teachers were better in knowledge (82%) as well as usage (74%) of digital technologies. The main source of usage was mobile phone for both government (74%) and private (89.29%) school teachers for preparing content, to search information from the

internet regarding teaching content, pedagogical methods, student assessment and evaluation, and to assess students' progress. The main purpose of the usage of digital technology of the teachers of government and private schools was content creation, dissemination, interaction, students' assessment, evaluation and publication of the content whereas none of the teacher had used digital technology during classroom teaching. Only 19.64 per cent government school and 30 per cent private school teachers responded that they had gotten technical support, 23.21 per cent and 26 per cent had gotten pedagogical support whereas 80.36 per cent government and 74 per cent private school teacher responded that they had a need of training for technical usage and 76.79 per cent and 70 per cent had a need of training for pedagogical use. Therefore, from the above discussion, it was found that in the rural schools of Paddar sub-division of Jammu and Kashmir Union Territory of India, there is a need to develop digital infrastructure in the schools because the availability of digital technology increased the use of teachers [31]] which motivated the students to provide digital gadgets to the students by the government, and to provide training to the teachers because more than two-thirds of the teachers themselves claimed that they have a need of training regarding the usage of digital technologies in teaching-learning process. This shows that the teachers are least competent because they were not able to amalgamate digital technology. There is a need of training on how to use digital technologies [32] and make the right decisions. Skantz-Åberg, et al. [33] also found that teachers' professional digital competence needs to be directed away from the strong focus on the technological competence and basic hands-on skills of individual teachers to a focus on a collective responsibility and accountability for teachers' professional digital competence [3]. Teachers' digital competence has implications that are more comprehensive, complex, and demanding for the teaching profession than for other professions [34].

5. Conclusions

Based on the above analysis and interpretation of the data, the major problems and challenges were identified. On one hand, the schools (both government and private) located in rural areas of the Paddar sub-division of Jammu and Kashmir Union Territory of India were lacking the facilities of digital infrastructure, such as computer facilities; only 21.43 percent of government schools had computers, of which only 3.57 percent had functional computers, and 10.71 percent had a single classroom with smart board facilities, whereas the other facilities were totally lacking. The other major problem was the exclusion of ICT as a separate subject in the school curriculum. This indicates that the government itself is not focusing on the development of digital literacy among the students. It must be included in the curriculum so that the students can become digitally literate, whereas private schools have already included it. On the other hand, it was found that both the parents of government and private school students had low occupational and socio-economic status and low educational qualifications. Only 9.47 percent of government school students' parents and 38 percent of private school students' parents were employed; more than two-thirds of the parents had not completed more than elementary education, and all the parents earned less than Rs. 50,000 in monthly income, which directly influenced the usage of digital technologies among the students. Consequently, only 54.21 percent of students had basic knowledge of the usage of digital technologies, sswith 32.11 percent and 46 percent using learning applications, 16.32 percent and 60 percent watching online lectures, 38.42 percent and 86 percent using social media, and 40.53 percent of government and 54 percent of private school students using different search engines to search for learning material, respectively. Furthermore, the digital competency among the teachers was found to be very low, as only 28.57 percent of government school teachers were able to use digital technologies, with 15.78 percent integrating them into the teaching-learning (T-L) process. In contrast, private school teachers were better in both knowledge (82%) and usage (74%) of digital technologies. Additionally, 80.36 percent of government and 74 percent of private school teachers responded that they needed training for technical usage, while 76.79 percent and 70 percent expressed a need for training in pedagogical use. Therefore, there is a need to focus on the development of digital infrastructure, digital literacy among students, and digital competency among teachers in the schools of rural areas of the Paddar sub-division of Jammu and Kashmir. This is because technology integration and teachers' digital proficiency are helpful in maintaining discipline, increasing confidence, elevating interest, and developing retention powers in the classroom [25]. Therefore, the government should focus on the installation of digital infrastructure in rural schools in collaboration with local administration, NGOs, and national and international agencies. A provision for the distribution of free digital gadgets for low socio-economic students and teacher training programs should be organized on a frequent basis.

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