

Barriers to the Digital Game-Based learning at Secondary level In Punjab: Perceptions of Pre-Service Teachers

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Teachers' main aim is to make the students learn with interest by adding daily life activities and examples to get long-lasting effects on their learning. Introducing digital games in the classroom is a new innovative approach that makes it easy for students to learn new skills and knowledge. However, teachers are not frequently using this approach in their classrooms. The present quantitative descriptive study has explored the barriers that hinder teachers from using digital game-based learning approaches. Pre-service teacher perceptions were sought in the teacher training colleges, i.e., district campuses of Quaid-i-Azam Academy for Educational Development in Punjab. After checking its validity and reliability, a self-constructed closed-ended online questionnaire was used for data collection. The alpha value of the questionnaire was .825. All the pre-service teachers studying in the district campuses of Quaid-i-Azam Academy for Educational Development, Punjab were the population of the study. The online survey remained open for about one month, and 384 responses were received from pre-service teachers throughout the Punjab province. Data were collected based on five-point Likert type scale. Collected data was put into SPSS (Statistical Package for Social Sciences) version 25 and descriptive and inferential statistics were applied to get the study results. Major findings include that availability of insufficient resources, teachers' lack of skills and use of digital tools, and difficulties in managing technology in the classroom are the main barriers to implementing digital game-based learning in the public secondary schools of Punjab. The study benefits stakeholders, policymakers, and decision-makers and has added new knowledge in education.

1. Introduction

Technology has brought magnificent changes in education all over the world. Technology can make children learn in new and exciting ways. Several technologies can be used in the classroom. Research has suggested many types of technology that can be used in the classroom like smartphones, computers, apps, iPads, tablets, and educational toys (Sullivan and Bers, 2016; Sullivan & Strawhacker, 2021). Technology empowers students and can make learning happen in a fun way. Children who continue learning and using technology have more chances to succeed in school and practical life as a digital workforce (NAYEC, 2012; Wolfe et al., 2023). Unfortunately, our education systems are not designed in a way to teach the students of the present era who are more aware of technology like online tools, smartphones, tablets, and computers and their educational demands cannot be satisfied without the integration of recent technologies in the teaching-learning process (Widodo et al., 2023).

The importance of games as a learning tool has been accepted and recognized in all nations (Diefenthaler et al., 2012; Plass et al., 2015; Parker et al., 2021). Play and games affect the learning process throughout man's life as they support and strengthen the learning process (Troulinaki, 2023; Tsai et al., 2012). According to researchers, games and learning have a strong relationship (Zosh et al., 2017; Meyer et al., 2021). At present age, games are being played through digital devices and are known as digital games (Erhel & Jamet, 2013; Igbo et al., 2021). Such games aim to promote student-centered learning by motivating and encouraging them in the classroom (Lampropoulos et al., 2019). Moreover, digital games make the teaching-learning process more effective and smoother to achieve the learning objectives (Lampropoulos et al., 2023) by converting the old traditional teaching methods into new interactive, technology-based, and more learners-centered both in formal and informal educational settings (Pozo-Sánchez et al., 2022). Recent research has proved the fact that digital games help enhance students' attention and motivation to identify their abilities, knowledge, and skills (De Grove et al., 2012; Fokides, 2020; Kaimara & Deliyannis, 2019; Keller, 2016; Megagianni & Kakana, 2021; National Academies of Sciences Engineering & Medicine, 2018; Plass et al., 2015). A smart pedagogical approach uses digital games in the learning process and connects technology and pedagogy (Daniela, 2020).

A learning in which digital games are utilized is called digital game-based learning (DGBL) (Daniela, 2019; Daniela & Lytras, 2018; Erhel & Jamet, 2019; Kiamara & Delianys, 2019; Plass et al., 2015; Prensky, 2007). Several studies have concluded that DGBL enhances outcomes of learning (Clark et al., 2016; Fokides, 2020; Gee, 2008; Girard et al., 2013; Hamari et al., 2016; Hersh & Leporine, 2018; Kiamara et al., 2020). However, some studies are against this approach and conclude that there is no place for DGBL in the school culture and the actual classroom because as compared with the lecture method, it does not have much to offer (Asarta et al., 2021; Becker, 2010; Clark, 2007; Watson et al., 2013). The question arises here what makes digital games educational content? One factor may be that the games are a source of pleasure, motivation, and excitement (Huizenga et al., 2017; Jääskä & Aaltonen, 2022). But there is another perspective of digital games, which is the control over the game that the children cannot do in real-

life situations, and this gives them opportunities to explore their social life as decision-makers without the fear of failure (Hewes, 2016; Janik, 2023). In this way, the children start enjoying learning because digital games allow them to simultaneously learn and entertain (De Freitas & Liarokapis, 2011; Rahmadi et al., 2021). There is no doubt that digital game-based learning is becoming popular because of its potential benefits, there is still a need to research to check its use in the education systems and the potential barriers to its implementation according to both teachers' and students' points of view (Papadakis & Kalogiannis's, 2020).

1.1 Objectives of the Study

The objectives of the present study were to:

1. find out the perceptions of pre-service teachers about digital game-based learning.
2. explore the barriers that the pre-service teachers consider in implementing digital game-based learning in the public secondary schools of Punjab.

1.2 Research Questions

1. What are the perceptions of pre-service teachers about digital game-based learning?
2. What barriers do the pre-service teachers consider in implementing digital game-based learning in the public secondary schools of Punjab?

2. Literature Review

Certain things like teachers' experience, their skills in using technology, and their interaction with students, fellows, and experts play a significant role in developing their attitude toward digital game-based learning (Fokides & Keimara, 2020). Some recent studies have also suggested some barriers to implementing digital game-based learning. The first is the 'lack of resources' like training, financial problems, classrooms, and time. The second one is a lack of interest on the part of students. Third is a lack of knowledge about the subject; the last is classroom disturbance or noise that may disturb other teachers (Sanchez-Mena & Marti-Parreno, 2017).

Results of some other research also support the above findings about the factors that hinder teachers' use of technology and games. These factors include teachers' lack of expertise, lack of confidence to use new technologies, the interest level of teachers and students, non or availability of the games and other resources, lack of planning time, quality of the available resources, and noncooperation or encouragement by the authorities (Papadakis, 2018). Barriers to integrating technology in education have been divided into two main categories. The external or first-order barriers include lack of technological tools, access and training of teachers, and support. In contrast, internal or second-order barriers include teachers' beliefs about students' roles, assessment, and curriculum (Ertmer, 1999). These factors influence teachers' perceptions about digital games in the classroom. Teachers remain reluctant to use technology due to their internal beliefs even if they are trained in technology and the external factors have been removed (Fokides & Kostas, 2020).

According to recent research, teachers were reluctant to use digital game-based learning in the classroom as they thought these activities were not beneficial to enhance their professional development. However, some teachers think digital media has a lot of potential to engage students

effectively (Clark et al. 2010; Kaimara et al., 2021). In the recent past, there were also some other concepts that digital games are a type of entertainment, and it is difficult to judge their potential value in education (Schrader et al., 2006; Urhahne & Wijnia, 2021). Although digital games are considered to focus more on entertainment than on cognitive skills, their role in enhancing cognitive skills cannot be denied as they ignite problem-solving skills and increase attention and memory (Hebert et al., 2021). However, according to some experts, brain training games cannot provide proof of their effectiveness because they cannot focus on a single skill at a time (Mayer, 2019).

Undoubtedly, games enhance motivation and are a source of children's engagement and pleasure. Still, the question arises what are the most essential features required to make a digital game educational (Huizenga et al., 2017)? Suppose games will be introduced in education because they are good motivational starters. In that case, they must be aligned with the methodologies of education (Spiteri & Chang Rundgren, 2020) because digital game-based learning focuses on three major areas i.e. pedagogy, content, and technology and it demands professional training of teachers (Mishra & Koehler, 2006; Spiteri & Chang Rundgren, 2020). Trained teachers can integrate technology and promote good learning practices. Teachers are responsible for implementing the changes and advancements in the classroom (Bell & Grisafi, 2017; Kamara et al., 2019b; OER, 2018). Teachers' attitude plays a vital role in implementing new teaching methods and promoting the motivation level of students (Martin-del-Pozo et al., 2019). However, most teachers do not know and understand the potential benefits of digital games in the classroom because they do not have practical knowledge of using them. Hence, there comes a gap between the students' intention to learn and teachers' pedagogical skills (Green, 2005). The question here is why our in-service and pre-service teachers are reluctant to adopt technology and digital games in the classroom, which provides the rationale for the present study. So, empirical research is needed to address the challenges and barriers teachers may face while implementing the DGBL in the classrooms (Hebert et al., 2021).

3. Methodology

The study was quantitative and descriptive, so the survey method was adopted to collect the data. After checking its validity and reliability, a self-constructed closed-ended online questionnaire was used for data collection. The professors and experts checked the questionnaire's validity to check its content and face validity while the construct validity was checked through pilot testing. The alpha value of the questionnaire was .825. Sampling adequacy was checked through KMO and Bartlett's test which was 0.636 and the significance level was below 0.05, which indicates good correlation in the data. All the pre-service teachers studying in the district campuses of Quaid-i-Azam Academy for Educational Development, Punjab were the population of the study. The online survey remained open for about one month, and 384 responses were received from pre-service teachers throughout the Punjab province. Prior consent of the pre-service teachers was taken while administering the survey. The confidentiality of the information was assured, and

unethical questions were avoided in the survey. Five parameters were given in the questionnaire i.e. strongly agree, agree, neutral, disagree, and strongly disagree. Collected data was put into SPSS (Statistical Package for Social Sciences) version 25 and descriptive and inferential statistics were applied to get the study results.

Table 1: Pre-service teacher's perceptions about the barriers to digital game-based learning in Public High Schools of Punjab.

| Themes | % | SA | A | N | D | SD | Mean |
|--|------|------|------|------|------|------|------|
| Latest computer Labs are available in our public high schools | 1.0 | 22.9 | 16.9 | 52.6 | 6.8 | 2.59 | |
| Internet facilities are available in our public high schools | 1.6 | 16.7 | 8.3 | 55.2 | 18.2 | 2.28 | |
| Teachers have access to the internet in the computer Labs | 5.7 | 44.8 | 8.9 | 37.5 | 3.1 | 3.13 | |
| Students have access to the internet in the computer Labs | 2.1 | 15.6 | 23.4 | 34.4 | 24.5 | 2.36 | |
| Our high schools receive enough funds to install digital devices in the classrooms | 9.4 | 28.1 | 7.8 | 43.8 | 10.9 | 2.81 | |
| Our high schools lack of resources to introduce digital game-based learning | 14.6 | 50.5 | 6.8 | 24.0 | 4.2 | 3.47 | |
| Teachers at our high schools can use digital tools | 1.0 | 30.2 | 19.3 | 40.6 | 8.9 | 2.74 | |
| Teachers at our schools are trained to use digital technologies | 5.7 | 41.1 | 19.3 | 30.2 | 3.6 | 3.15 | |
| Our high school teachers use digital devices to plan their lessons | 0.5 | 35.4 | 9.8 | 30.2 | 24.0 | 2.58 | |
| Teachers at our high schools use digital devices for teaching purposes | 1.0 | 35.9 | 9.4 | 39.1 | 14.6 | 2.70 | |
| Teachers at our schools use digital devices to enhance their professional skills | 3.1 | 49.0 | 9.9 | 34.9 | 3.1 | 3.14 | |
| Teachers at our high school's lack of time to use game-based learning in classes | 3.6 | 31.3 | 20.3 | 41.7 | 3.1 | 2.91 | |
| Teachers lack interest in games | 2.6 | 56.8 | 26.0 | 12.0 | 2.6 | 3.45 | |
| It is difficult to manage game-based class | 13.0 | 49.0 | 14.6 | 19.8 | 3.6 | 3.48 | |
| It is difficult to evaluate students' game-based activity | 3.6 | 44.8 | 21.9 | 26.6 | 3.1 | 3.19 | |
| Games take too much time to play in class | 14.1 | 46.4 | 8.9 | 20.8 | 9.9 | 3.34 | |
| Digital games are very costly | 15.1 | 56.3 | 17.7 | 7.8 | 3.1 | 3.72 | |
| Students cannot focus on learning while using digital games | 18.2 | 46.4 | 16.7 | 14.1 | 4.7 | 3.59 | |

The table No 1 shows pre-service teachers' perceptions about the potential barriers to digital game-based learning in the public secondary schools of Punjab. The table shows that 52.6% of participants disagreed with the point that the latest computer labs are available in our public high schools. 55.2% of participants disagreed that internet facilities are available in our public high schools. 44.8% of participants agreed that teachers can access the internet in the computer labs. 34.4 % of participants disagreed while 24.5% strongly disagreed that students have access to the internet in the computer labs. 43.8% of participants disagreed that our high schools receive enough funds to install digital devices in the classrooms. 50.5% of participants agreed that our schools lack resources to introduce digital game-based learning. 40.6% of participants disagreed with the point that teachers at our high schools can use digital devices. 41.1% of participants agreed that teachers at our high schools are trained to use digital devices. 30.2% of pre-service teachers disagreed while 24% strongly disagreed that our teachers use digital devices to plan their lessons. 39.1% of participants disagreed while 14.6% strongly disagreed that teachers at our schools use digital devices to enhance their professional skills. 41.7% of participants disagreed that teachers lack time to use game-based learning in the classes. 56.8% of participants agreed that teachers lack interest in games. 49% of participants agreed that it is difficult to manage game-based classes. 44.8% of participants agreed that evaluating students' game-based activity is difficult. 46.4% of

participants agreed that games take too much time to play in the class. 56.3% of participants agreed that digital games are very costly. 46.4% of pre-service teachers agreed that students cannot focus their learning while using digital games.

4.1 Discussion

The government of Punjab is trying to equip high schools with resources; however, we are far behind in providing the latest digital resources in our public high schools. Most of our high schools have computer labs but they are old and not being used properly. So, lack of resources and funds appears to be the first major hindrance in implementing digital game-based learning in the public high schools of Punjab. These findings are aligned with the findings of Li, 2017 that financial support is too crucial to implement digital game-based learning in schools. Teachers are the most important component of the teaching-learning process because no innovation can be implemented in the classrooms without teachers. Teachers' lack of interest in using digital tools for teaching purposes and their personal professional development appeared as the second major barrier to implementing digital game-based learning in the public high schools of Punjab. Teachers lack interest in digital games and do not put effort into enhancing their professional development by learning new technologies and digital tools (Hebert et al., 2021). The third major barrier is the technology itself. Our teachers are not trained to use the latest digital tools. Moreover, digital games are costly, and it is difficult to manage and evaluate digital game-based classes, but all this depends upon the teachers' perceptions about digital tools. If the teachers take it as a learning tool, it will become easy for them (Sanchez-Mena et al., 2017a, b).

5. Conclusions

The study's results show that most public high schools do not have the latest digital resources because they do not receive enough funds to install digital devices. Most teachers do not know how to use digital devices and do not use digital devices for their teaching purposes and professional development. Moreover, teachers have a very low interest in games. Technology is a hindrance because teachers think it is difficult to handle digital game-based classes. According to the results, digital games are expensive and difficult to evaluate learning through digital games because students cannot focus their learning while using digital games.

5.1 Recommendations

The following are the recommendations of the study:

1. Researchers may conduct experimental research to determine the effects of digital game-based learning on students' achievements.
2. A pilot study may explore the prospective use of LED TVs for digital games in the ECCE classrooms.
3. A correlational study may be conducted to measure the relationship between the use of technology and the teachers' pedagogical skills.

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