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APPLICATION OF DIGITAL TOOLS TO MAGNIFY LEARNING: PAKISTANI PRIVATE HIGH SCHOOLS PERSPECTIVE

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Abstract

Digital integration facilitates to enhance learning and stimulates students to attain success in their academics as well as enriches the quality of education. This enhanced learning process employed a questionnaire to survey the teaching staff and the students of Pakistan Private High Schools respectively. Digital approaches were extensively used by both the respondents and their responses divulged utilization, motivations or discontinuation of digital tools. The teaching staff used textbooks, and other media to enhance the learning process. On contrary, student survey demonstrated their perceptions regarding digitalized education that influenced their learning, their preferred digital tool, and their progress. Eighty-one percent students agreed that digital integration enhanced their learning. Moreover, their use and inclination for digital tools proposed that students are in favour of resources that are used by teaching staff to enhance learning. Interestingly, the outcomes revealed that technology facilitated student's learning because it increases communication skills, accessibility and inclusion to learn independently. Digital integration, monitoring and evaluation will offer a strategic planning process and help in developing institutions prevailing learning procedures.

Keywords: Digital Technology, Higher Education, Enhanced Learning, Digital Integration.

Introduction

The success of an institution relies on the students and the teaching faculties of the institution, which is however, possible if an institution integrates technology. Allen et al. (2016), Courts and Tucker (2012), Lewis et al. (2013), Simkins (2002), Zucker and Light (2009) argued that incorporating technology will boost academic success and also improve the quality of prevailing offerings by institutions. Similarly, Raman and Thannimalai (2019) pointed out that advanced technology especially evident in the period of Industrial Revolution 4.0 has greatly influenced every aspect of our life comprising education setting and leaderships globally. Moreover, Artificial Intelligence and Internet has transformed school leaderships, teaching methodologies and also remodelled

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classrooms. Besides, technology also facilitates us with a blended learning atmosphere that enhances teaching expertise and develops social and cognitive skills (Gaddis, 2020).

However, integrating technology in the learning environment requires proficient teaching staff and institution support to encourage learning and attain the desired goal (Mbati & Minnaar, 2015; Quillerou, 2011). Blau and Shamir-Inbal (2017) stated that today use of digital mode has given the challenge to all educational institutions and made it essential for them to incorporate innovative technologies in their learning and teaching environment along with competent and adaptive teaching staff. Digital competence refers to the expertise, knowledge, and attitude that enables learners to use digital mode to participate, work and solve incurring problems independently and this ultimately collaborates all to deal with others easily, responsibly and creatively in a critical situation. Thus, it is equally important for both teaching staff and students in the educational institutions especially, High Schools to become adaptable in this challenging world. Koh and Kan (2020) highlighted experiences regarding quality e-learning. According to them, it must be student-oriented and interactive. Correspondingly, practitioners of educational technology at higher education e-learning environments requires re-conceptualization because the upcoming generation of digital learning environment will be interoperable and accessible systems would be designed for personalized, collective, and analytics-driven learning (Brown, Dehoney, & Millichap, 2015).

Thus, it is crucial and very essential to enhance digital integration to increase learner's learning skills in their respective disciplines. It is essential for the teaching staff and students to increase their digital intellect because these skills are required to sustain and succeed in the 21st century. Wekerle et al. (2020) suggested that the digitalized higher education systems are considered a very powerful way of promoting student's learning. However, promoting student learning does not mean what types of digital tools used rather how it is utilized and implemented is of main concern. Moreover, acquiring institutional technology is a process of administration, and its implementation process unfolds in different classroom environments. It is seldom noticed that why or how the teaching staff adopts and select technology, although we believe in the fallouts. The main problem is that there is a lack of monitoring protocols to ensure whether teaching staff integrate digital tools to verify subsequent learning procedures for the students.

Thus, observational study illustrates a clear picture of how the teaching staff and learners of different high schools in Pakistan interact and implement the best use of available digital tools (Chang et al., 2016; Schmid et al., 2014; Tamim et al., 2011). Moreover, to provide guidelines for monitoring its implementation Lancaster and Lundberg (2019) suggested that there is a correlation between teaching staff's attitude and student learning gains. Theoretically, adult learners use technology as they are self-motivated and utilize it for practical reasons. Similarly, Knowles Holton and Swanson (2011), Merrill (2002) discussed Andragogy Theories to comprehend the importance of practicality and self-motivation in real-life, which are considered crucial adult learners. Therefore, the perception of a student regarding using technology enriches their learning that requires monitoring of technology integration in the learning atmosphere. Yurtseven Avci et al. (2020) mentioned that technology integration comprises activities such as

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constructing instructional strategies that hearten learners to generate their own knowledge. Additionally, teachers must examine work of student so that he or she may act as a catalyst for their mentors because integrating technology and sharing student's work within the environment of professional learning would raise both qualities of teaching and learning power of students. Besides, making available opportunities for teachers to share their student's work within the learning community will help professors to make connections between their stated intentions and eventual student outcomes

Since, there is limited synchronized effort for digital integration and supervision across most of the high schools, therefore, the surveys dispersed to the teaching staff and students congregated procedural and insightful data about employment of digital tools to enhance learning process. The survey excluded student's assessments, undertaken during learning process. Experimental conditions were also not established prior to accumulating information. The qualitative facts explored enhanced learning through digital integration. Similarly, Quillerou (2011) investigated whether students prefer tools that are accessible in their studying environment. Learning is considered procuring knowledge therefore, the prevailing study observed teaching staff or student's perception about digital tools; whether they enhance learning. Thus, the perception resulted in a positive sign of learning. The survey results described the digital tools adoption among the teaching staff and students. Moreover, the results also describe the limitation of digital integration at the Pakistani High Schools. Finally, the study summarized perceptions of the students to weigh up digital integration to their learning experience. Hence, administration may characterize the portrayed current values that education institution already support. The teaching staff would be given opportunity to groom professionally by sufficient use of educational innovations. Thus, the outcomes have identified gaps between student perceptions and teaching staff preferences for innovative accessible digital learning tools.

Literature Review

Digital Integration

Digital integration aims to enhance learning and different scholars have also discussed about the tools adopted by educators to facilitate learning processes (Garrison, 2016; Laurillard et al., 2013). Innovative learning facilitates through developing the course material that provides chances for undergraduates to participate with the content of the course distinctly, actively and independently (Laurillard et al., 2013; Simkins, 2002). Similarly, Math studies depicts a dynamic change from teaching direction to student-centered (Abdulwahed et al., 2012). Moreover, digitalized teaching has mutated traditional learning to automated and self-paced studying (Crall et al., 2010; Butler-Pascoe, 2011; Gagnon et al., 2015).

Instructive visuals are best used for conveying message for health experts, nurses and citizen scientists (Crall et al., 2010; Cheng et al., 2014; Serna et al., 2016; Gaddis, 2018). They easily spread their knowledge, procedures and perform related actions. Digital learning motivates participants to execute self-directed learning (Gagnon et al., 2015). Working students, adults, parents, who encounter other obstructions have found online

education more flexible because it has averted traditional learning (Johnson et al., 2015; Yamagata-Lynch, 2014).

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Digital Integration versus Implementation

Pakistani high schools observe a systematic digital integration in its education system, but integrating digital tools and implementing the same are two different things. Integrating digital tools refer to its easy application while implementing digital tool is concerned with the utilization of technology in the institution's philosophy and planning (Keengwe and Onchwari, 2009; Mbati & Minnaar, 2015; Russell, 2014). Digital integration as well as its implementation aim to obtain productive learning (Courts and Tucker, 2012). Digital learning integration and implementation are quiet challenging because it alters traditional framework of education into effective learning system. Mostly, teaching staff is encouraged to implement digital tools in their respective classes, but due to management's failure to explain its benefits leaves teaching staff with its inefficient use. Thus, implementing proficiently may resolve this issue by developing such a digital learning community that enables teaching staff to share their best practices and experiences (Johnson et al., 2012). Competencies of teaching staff still remains consistent in this study because their grooming prospects for students are somehow to facilitate by providing comfortable learning atmosphere (Ajjan and Hartshorne, 2008; Allen et al., 2016; Moule et al., 2011; Roney et al., 2017). It is observed that implementing and integrating digital tools enhance technical knowledge of both teaching staff and the students. Furthermore, it strengthens their competitive skills globally. The following research discloses digital integration by teaching staff and students to enhance learning process by making productive efforts. It also assess various characteristics of digital tool being integrated and implemented by their self-efficacy (Roney et al., 2017). Hence, this investigation monitors and self-assess digital integration and ensures its implementation process through the perceptions and practices of teaching staff and students of Pakistani High Schools.

Technology in Pakistani High Schools

The economic and socio-cultural context of high school has a substantial impact on the way technology embrace teaching practices. However, it is found that with well-established and reliable technological infrastructure educator exhibits diversity in using technology while teaching (Shah et al., 2020). Studies suggest that instructors use technology to enhance their teacher-centered practices, for instance, to present and transfer study material and information to students for developing technical skills for administrative purposes. It is also observed that teachers find digital education challenging and daunting (Ghavifekr et al., 2016). The Digital teaching-learning process is widely acknowledged and has a positive influence on both teaching staff and students (Mahmood, 2009). Teachers use technology for delivering their content, reinforcing student's skills, complementing the curriculum, transforming ideas, experimenting, employing, and refining new approaches (Ertmer et al., 2012).

Studies investigating regarding digital technologies, explain specific access types, but they have not sufficiently reported in the context of high school of Pakistan in the existing literature. Moreover, research in developing countries like Pakistani high school is unreservedly absent in the literature. Further, the focus of existing work is limited to certain digital devices that are easily accessible. Currently, we examined Pakistani high

school teaching staff and student's access to technology. This study particularly focused on the digital gap in terms of their access to technology and their adoption to new challenges to enhance their learning process with respect to their gender, age, and level of school they teach and study. Since there is not sufficient literature available that provides much evidence on technology practices in the high schools of the country, therefore, the study surveyed the teaching staff and students of different high schools to know the practices of digital education and their impact on the education system.

Methodology

This study investigated through two adapted survey questionnaires (Gaddis, 2020). First survey interrogated the teaching staff and the second interrogated the students. Survey forms were circulated through high school e-mail servers or posted on the institutions internal Web portals respectively. Duration of the responses was approximately a month. It was intended to enquire semi-annually for accumulating longitudinal statistics for digital learning integration and implementation process at the Pakistani high schools.

Results

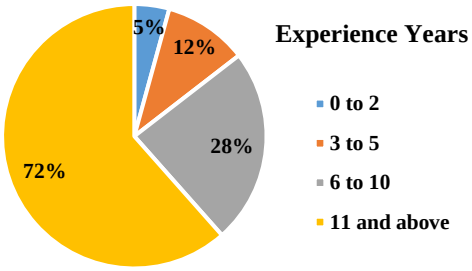
The teaching staff questionnaire gathered information regarding their use of digital tools and teaching service experience. Whereas, student's survey enquired about their perceptions regarding enhance digital learning process and its influence on their studies. Moreover, their predilections for specific digital tool, and their progress after implementation. The respondents were required to select from multiple options of their choice in the closed-ended questions. There was an opportunity to write response in the blank provided if respondent could not find their best option. The survey included a common list of tools in the questions, but there was a possibility that teaching staff might be using tools beyond the offered options. On contrary, student's survey form included one open-ended question to find out whether or not digital tools enhanced student's learning process. Thus, every digital tool used was defined as a valuable resource to enrich and boost the teaching and learning experiences.

Teaching staff Survey Results

Approximately 750 teaching staff responded to the survey questionnaire. The respondents were qualified and well-versed in their field. The majority of teaching staff was female 60% and male 40 %. Teaching staff of about 72 % had 11 or more years of teaching experience. About 28% respondents had 6 to 10 years' experience, 3 to 5 years 12%, and 0 to 2 years 5%. Figure 1 briefly illustrates the discussed statistics. This data indicates that the teaching staff had substantial teaching experience at their respective high school.

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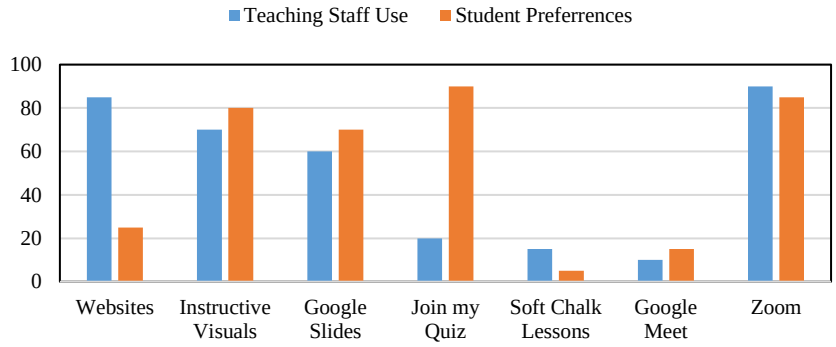
Figure 1. Teaching staff Teaching Experiences



The questions enquired teaching staff about their technology use and introduction of digital tools. Teaching staff responses were well-aligned with the student responses. As illustrated in Figure 2.

Teaching staff reported that they used Websites (85%), Instructive visuals (70%), Google slide (60%), Join my quiz (20%), Soft Chalk Lessons (15%), Google Meet (10%) and Zoom (90%). There are other different tools used in lower frequency which includes Facebook and Proprofs. In open-ended queries, YouTube, Khan Academy and Kahoot were mentioned by the teaching staff. Digital tools selected for investigation were the tools freely available and accessible to promote teaching staff professional development. The majority of teaching staff used up to four technology tools per session.

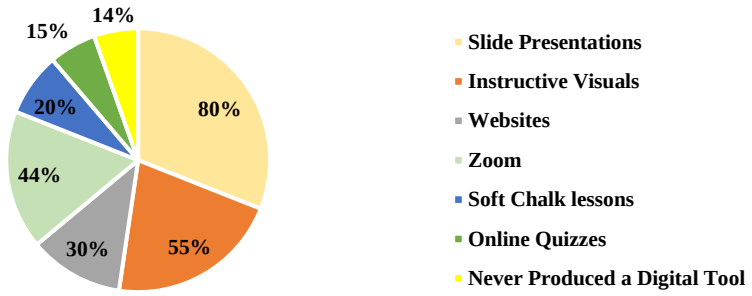
Figure 2. Teaching staff Use of Digital Tool and Student Preferences



The study also ascertained that teaching staff stopped using digital tools, therefore, the survey proposed student preferences against it. Time-consumption while setting-up devices rated high 60%, not productive 50%, exhausting to set-up according to students 40%, hard to incorporate into the learning process 30%, and expensive 10%. Overall teaching staff replied according to their digital tools being introduced. Teaching staff created their own Google Slide 80%, Instructive visuals 55%, Websites 30%, Zoom 44%, Soft Chalk lessons 20%, and Online Quizzes 15%. Other tools offered were Google Classrooms, Facebook and WhatsApp groups. Teaching staff also wrote that they used real virtual environments. Only 14% never produced a digital tool illustrated in Figure 3. The outcomes depicted that educator was imposing their own instructional resources instead of employing digital devices. This became evident that there exist technology integration because majority favoured technical education.

The tools used by the majority of teaching staff respondents included Websites, Instructive visuals, and Google Slide. The percentages of teaching staff who suggested Websites were 45% and Instructive visuals 56% was less than the percentage of teaching staff that used each tool (Figure 2 and Figure 3). However, 80% used Slides, but only 60% reported using them. Perhaps, Google Slide are made by almost all teaching staff but in this combined learning, they have explored more appealing resources. This was purely speculative since, no open-ended questions queried teaching staff motivations for their growing choices. Whereas including open queries in the teaching staff survey would have improved analysis of the data.

Figure 3. Types of Digital Tools Teaching staff Introduced

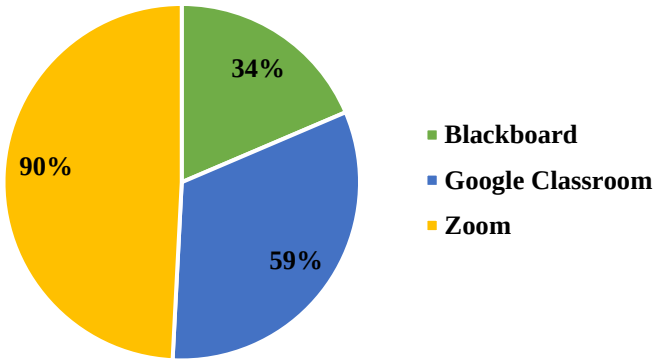


It is interesting to see how the trend shifted over time. This is considered an open-source for instructive materials introduced or created by teaching staff for students. Additional open-queries in the teaching staff survey would have strengthened interpretation by proposing insights into the motivations following teaching staff behaviours regarding using their digital tools. Teaching staff also learned the use of technology by teaching themselves by means of training resources 71%, by attending workshops 63%, peer based learning 52%, viewing instructive tutorials 46%, or by learning from their competent to professionally self-development 30%. Few of the teaching staff were self-taught or used trial-and-error approach. Most of them learned through

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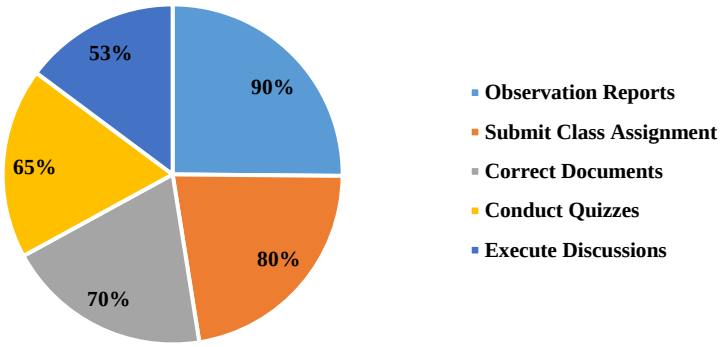
participating in development courses. For example, teaching staff used Soft Chalk more than any other technology besides Instructive visuals, Websites, and Google Slides. It is a reasonable assumption that the high use of digital tool is related to accessing opportunities. Adding queries that identified personal development would contribute valuable information about program efficacy. As illustrated in Figure 4 respondents also used Blackboard 34%, Google Classroom 59% and Zoom 90%. Thus, the study adds value in predicting the potential ease. However, in retrospect, the study does not only aim to depict how technology enhances learning but also what the institution uses when they are enrolled along with controlling measures to attain productive outcomes.

Figure 4. Integrated Digital Tools Used by Teaching Staff



There were 72% educators, who used an enhanced version of learning process in the classroom for 11 years or more years, while only 45% of educators taught for up to five years used the same. This shows that enhanced learning process makes capable enough to build confidence with thorough self-practice. Using open-ended questions have illuminated these motivational factors. In Figure 5, faculties of Pakistan High schools used enhanced learning process to manage the observation reports 90%, submit class assignment 80%, to correct documents 70%, to conduct quizzes 65%, and to execute discussions 53%. In addition, they used the enhanced learning process to ascertain goals and allow student to select best alternative learning activity. Teaching staff noted that they this to enhance their speaking skills, attendance for regularity, posting schedules, exams syllabi, class notes and writing skills.

Figure-05. Approaches Teaching Staff Adopted to Enhance Learning Process



The questionnaire consisted several questions to interrogate teaching staff using electronic textbooks. 25% of teaching staff used e-books and 28% were against textbook. Availability of digital resources with manuals supports textbook as it ensure validity and reliability of work done independently. 49% Teaching staff used both textbook and google slides, instructive visuals 48%, test-banks 47%, learning objectives 29%, enriched study programs 13%, and virtual labs 10%.

Student Survey Results

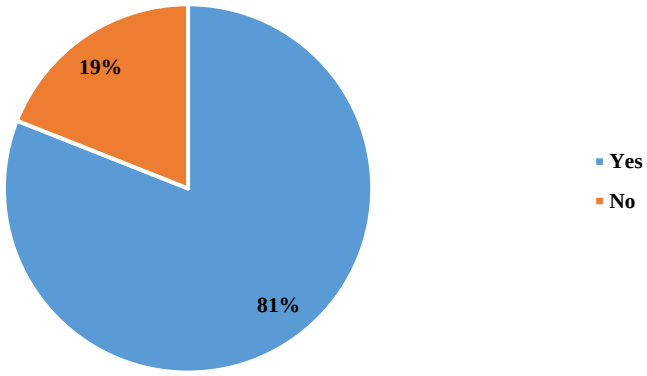
To check the progress in education process, an enquiry to know student's perception regarding instructor's digital tool took place. 6786 students responded to the survey. Respondents of first year were 30%, second year 20%, third year 26%, and fourth year graduates were 24%. The majority of respondents were in the Science group 53%, Commerce 23% and Humanities 27%. To determine the learning environment of students and their experience of technology integration it was observed that 85% students favoured online sessions, and 66% preferred traditional face-to-face learning. Almost, 38% respondents completed online classes to date, 34% never took online courses and studied privately on tuitions, 12% completed three to six online subjects, and 8% completed either six to ten online subjects to date.

This study confirms enhance learning where the student survey contained one open-ended question such as "How digital devices enhance your learning process? Briefly describe and also explain if it does not enhance your learning." The responses to this query were qualitative and explained that how digital education enhanced them. Additional queries explored the technical details regarding use of digital tools and their educational progress. 81% students implied that digital tools heightened their learning process whereas, 19% students claimed that online education requires independent study that every student can't do independently moreover, they find it difficult because they do not have sufficient resources or well-organized platform provided by the teaching staff or institution to overcome different challenges as illustrated in Figure 6. Respondents in favour of digital

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education replied that digital education facilitated self-paced learning and enabled them to manage time adequately. Moreover, technology increases interface with the subject matter, makes material accessible and enables to do research work. Furthermore, they added digital tool is just a part of the world, but in real it refers to how we access information and become adaptable towards it. Digital learning makes some processes more effective. Similarly, digital education is a routine necessity. It helps to execute business or convey information. Several students described that technology helps them to learn, explore, think and access a variety of information and enables them to complete their assignments. Few students interpreted that digital enhancements facilitate them to attain strategic goal for their respective institutions.

Figure 6. Student's Perception Regarding Digital Learning Enhancement



Students discussed that digital education provides an opportunity of extra communication and enable us to access content such as instructive visuals, audio and other interactive tools with solutions. When they were asked about their favourite digital tools so it was observed that they prefer instructive visuals 65%, Websites 60%, and google slides 55% preferred by teaching staff too. These 81% and 19% Yes and No comments confirmed scholarly research and indicated that combined learning facilitates cognitive development. Lancaster and Lundberg (2019) also concluded that when they enquired teaching staff and students to investigate relation between teaching staff attitude and student's perceptions towards learning so they preferred digital learning and very few wanted their old traditional approach. As this learning makes them alert and quick in their work.

Discussions

The sample represented that respondents were permanent teaching staff. The respondents were qualified and were experienced in higher education. The majority of teaching staff was female 60% and male 40 %. Teaching staff survey excluded open-ended queries but it included an open field to allow respondents write their own opinions regarding the subject if their option does not exist. This clearly depicted that certain digital

tools used in high schools were not directly supported by them. Continuous monitoring of digital use would help teaching staff and students to early detect new digital tools to be adopted in future budgets to sustain quality education. Open-ended queries of teaching staff elucidates the motivational factors and their behaviours. Interrogations that related to use of digital tools, its introduction, and offering by teaching staff did not accompany those open-ended queries of not using, introducing, and offering digital tools to the respective students. Survey also revealed teaching staff's reluctance to use digital tools and ignored to probe into their motivation with respect to other parameters.

Similarly, efforts to integrate digital tools in learning were made equally by students and teaching staff. This indicated that students are comfortable with the tools their subject teachers are using. For example, students do not prefer using Twitter, WhatsApp and Facebook in an educational context, but only two or three teaching staff members reported using Twitter, Facebook and WhatsApp in this teaching and learning context. Hence, majority used tools that were easily approached and understood by the students, if not, then they were provided with the tutorials to make them understand and well aware of those tools.

Implication and Conclusions

This study focused on teaching staff and student of Pakistani High Schools from 11^{th} standard to 14^{th} standard i.e. graduation of the private sector. The study revealed the current digital tools integration includes teaching staff and student perceptions and preferences of their own enhance learning gains. The teaching staff survey described their use, introduction, and offerings of different digital tools according to their teaching experiences. On contrary, the findings from student's responses revealed their perceptions regarding enhanced learning based on their knowledge and academic progress. 81% students enhanced their learning through digital tools. These perception were not assessed through experimental methods therefore, it neither confirmed nor contradicted student's feedback regarding digital learning. Moreover, the institution's efforts to offer and support digital education were valued by the students. More or less teaching staff and students preferred the same digital tools, including instructive visuals, interactive websites, and slide presentations. Teaching staff strived to facilitate their students with these resources. However, there were tools that were not continued. Experienced teaching staff employed a combination of two approaches in their class. The majority of teaching staff had 11 or more years of teaching experience signified that digital learning reflects their attitudes and groom professionally. This harmonized analysis of digital education integration is an opportunity for high schools in Pakistan. The data is informative and needs to be focused wide-wide. However, a substantial capital investment is required to engage and support this integration. Thus, this integration has the potential to promote learning, measure strategic goals, and protect institution's capital investment. Since, new digital tools have become accessible, so to attain sustainability digital integration is a commitment to continuous development.

Although, this study observed few responses against digital education, most of the current online educational methods adopted by institutions are not enough to improve the

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academic skills. Furthermore, the teaching staff is not trained enough to motivate students towards online learning. Therefore, government must incentives and motivate our high schools to make more efforts to continue to improve online technology that fosters self-motivated learning opportunities for students through online education. For example, acquaint students with mobile or ubiquitous learning style of digital education. The result of the study exposed that digital education creates curiosity among students and help them learn essential computer skills but it is advised that digital education must persist to support students by providing additional learning opportunities for instance, web-based instructional modules because students are motivated to learn. Thus, this provides better distance learning or first-class digital classrooms that enhances learner's motivation level and respond adaptively moreover, enable them to re-think creatively.

Digital integration is a continuous process that assures its reliability through monitoring and evaluating program. The surveys were intended to be used semi-annually with a reasonable cost for monitoring digital integration. They have potential to provide details regarding digital integration comprehensively. Moreover, the data would help to attain strategies for different learning institutions.

Future Research

The study recommends to empirically test the views of both the respondents through PLS SEM and predict the impact of enhance digital learning on students and teaching staff. This can be done by converting the Nominal scale to Likert scale. Moreover, a chi-square analysis can also well assess and compare digital tool alternatives. This would require paired queries to select the best option in the survey such as *"check all that apply"*. Thus, understanding the causal associations would offer rational evidence regarding digital trends in high school education.

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