

Attitudes Of Public-School Teachers Towards Using Technology And Its Effect On Their Teaching And Student Learning

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Abstract

This study explores the attitudes of public-school teachers towards the usage of technology in education and its effect on their teaching and students' learning. This qualitative research studied public schools in Punjab by conducting semi-structured interviews with teachers. Findings depicted that teachers initially felt disdain towards technology usage but opened up to the idea after training. The results included an example of a public school where technology was integrated into education and produced positive results. The original contribution of this study to the body of knowledge is by depicting the struggle and occasional success of a monolingual teacher trying to make meaningful use of technology, where most of the support is being offered in a foreign language (English). Non-meaningful use of technology due to lack of proper training was also studied and potentially rectified using workshops.

Keywords: Constructive alignment, Outcome-based Education, Lived Experiences, Qualitative analysis.

Introduction

In Pakistan, public schools are defined as schools which are wholly administered by the government. School administrative personnel are hired, promoted, transferred, fired, retained, and trained. Other than charity schools, public schools are the cheapest option available for education in Pakistan. Most public schools do not provide free education at the secondary level, but their tuition fee is low compared to reputable private schools. Public schools include two subcategories: schools run by provincial

governments and schools run by the armed forces.

Previous governments have tried to improve the quality of education in the public schools of Pakistan, but most projects have failed to achieve the intended success rate. One recent project has been a 17 billion rupees Educational Endowment Fund that increases access to education for talented and needy students (Peef, 2018). Although these initiatives are a positive step, more effort is required to steer Pakistan's education system in the right direction (Winthrop et al., 2017). Researchers

have identified that it might take a long time for students to get the same education as students in developed countries. The Government admits that its policies are “not producing the desired educational results” (Education, 2009). It has tried to improve the higher education sector, for example, Allama Iqbal Open University aimed to improve access to education through distance learning programs, and Virtual University was established to use technology to provide distance learning and to enhance the quality of education. However, this effort has not effectively trickled down to school education yet.

In 2010, the state announced that it should ‘provide free and compulsory education to all children aged five to sixteen, and improvement has occurred over time. Total enrolment in public schools is recorded at 12.3 million (PEF, 2017). Basic school facilities in schools have increased to over 96% from an average of 75% in six years (PITB, 2017). The widening gap of males being enrolled in schools as compared to females has been reduced, as the enrolment ratio has improved to 0.93 from 0.89. Similarly, the rural/urban gap has decreased from 10.3% to 4.6% in six years (PMIU, 2017). However, data and statistics show that around 4.8 million children are still out of school. Data by PMIU (2017) indicates that approximately 46% of children enrolled in Grade 1 drop out before completing school. Weak leadership further hinders access as around 78% of school heads have less than one week of formal training (PEF, 2017). Similarly, another report identified two significant deficiencies in the education system: lack of access and low quality of education (Education, 2009).

This research explores the usage of technology in teaching and learning in public schools. Technology can be beneficial in education as it can promote meaningful learning. It can be useful in areas such as experimenting, writing, designing, and figuring out how to

prioritize among data segments in order to improve learning outcomes. Technology can provide a toolkit to teachers who can access it to the best of their abilities. To ensure meaningful learning, the classroom should be engaging, authentic, constructive, cooperative, and genuine (Jonassen et al., 2014). Technology can facilitate the reader by representing ideas or concepts, or compiling data. It can help organize knowledge through multimedia tools and increase connectivity in the globalized world where different ideas can be compared, and best practices can be developed. It is essential to ensure that students are occupied with meaningful tasks and activities that supplement their learning. Technology can help students recognize and learn problems, understand complex ideas, establish new learning methods, and gain the autonomy to regulate their learning at their pace and convenience.

Despite the recent increase in studies about developing countries, there is not enough data available regarding the use of technology in Pakistan’s public schools. This study sought to address the challenges of attempted meaningful use of technology by untrained or in-training teachers in Punjab’s public schools. It also highlighted teachers’ attitudes regarding the use of technology in education. The nature of the research question requires a detailed examination of how the teachers make meaningful use of technology for teaching and learning, as well as their perceptions about its use, which are often influenced by socio-cultural and psychological factors.

Literature Review

The meaningful use of technology in education is essential, as learners in the 21st century must have a number of skills, such as self-direction and an ability to collaborate with individuals and groups (McCoog, 2008). Social networking is built on how people interact with each other

(Zaidieh, 2012). It enables teachers to integrate technology into teaching and learning and makes them aware of the student's problems. The notion of 21st Century skills deals with the idea of students effectively utilizing ICT-based interventions to their advantage. Studies suggest that students currently do not have enough skills in understanding or analyzing information while they access technology and the Internet. While students have developed the ability to effectively communicate with their peers through the Internet and search for information, they lack advanced skills such as processing and evaluating available information. In order to benefit from the real potential of digital media, it is crucial for students to have access to these 21st-century skills. The International Society for Technology in Education has adopted a set of standards for learning and teaching, as they aim to promote meaningful education through the use of technology while incorporating 21st Century skills. For example, the 2016 ISTE Standards for Students include the following aspects: digital citizen, empowered learner, knowledge constructor, innovative designer, computational thinker, creative communicator and global collaborator (ISTE Standards for Students, 2016). These standards raise the expectations of students and teachers to exert more effort into their education.

According to an organization named The Partnership for 21st Century Skills, students must be equipped with the right skills through the right tools and guidance in order to prepare them for the 21st Century. 21st-century students should be able to engage, collaborate and interact with their peers, and communicate ideas effectively with one another. They should be tolerant and responsive to new environments and perspectives (P21, 2013). Communication skills are also necessary, as they allow students to articulate their thoughts effectively, decipher statements and meanings, and benefit from

digital media. When teachers use technology during teaching, students are less likely to get bored. In student-centered learning, faculty must become facilitators and collaborators, and instruction must move from memorization to problem-solving (Jonassen, 2000). Grabe and Grabe (2004) suggested the active use of text, graphics, sound, or animation to help students acquire and synthesize information. Technology-based environments enhance constructive interactions between learners and teachers to share meanings and develop new, more powerful meanings (Novak, 1998). Teachers should strive to understand appropriate ways to support students to learn meaningfully in classrooms.

However, teaching with technology is a complex phenomenon that involves understanding teachers' motivations, perceptions, and beliefs about learning and technology (Woodbridge, 2004). To benefit from technology, teachers should have a firm conviction that the use of technology is more efficient and effective than the use of traditional instructional strategies (Simonson & Thompson, 1997). Generally, teachers are more willing to use new technology when they have a good reason to use it (Scoolis, 1999). Thus, they need to be self-motivated, interested, and willing to integrate technology into their classrooms.

Teachers are often criticized when it comes to reforming education, although they are some of the most influential personalities in any student's life (Cuban, 2001). Teaching in schools is not often a well-paid profession in Pakistan. Many teachers struggle to make optimum use of technology, as their ability to adapt is hindered by access issues, insufficient technical support and strict timetables (Sandholtz, et al., 1997). Over time, they have learned to be more comfortable with technology, but technological advancements have rendered that expertise obsolete. Therefore, the new challenge is to keep up with more contemporary

forms of technology so that they can use them to aid and augment their teaching methods and promote students' learning. A teacher in the modern-day classroom needs to realize that students might have different learning profiles, and knowledge may not be constrained to one particular school of thought. It can be associative, constructive (individual or social), or even situative; thus, the teacher has to cater to the learning needs of all students (Mayes & Freitas, 2007). All of these learning styles have implications for learning, teaching, and assessment. There can be various reasons why schools and teachers struggle to incorporate technology into their teaching practice.

Research has indicated that the quality of teachers is one of the most critical factors in improving student learning and determining the extent to which technology is meaningfully used in a classroom. To enhance learning outcomes, the School Education Department of Punjab introduced a number of policies, such as the teacher rationalization policy that reallocated the existing pool of teachers to schools where teaching staff was scarce (2013). The department also introduced a merit-based teacher recruitment policy. Since 2012, the Directorate of Staff Development has been given the responsibility for training and developing public school teachers to improve the quality of education. DSD has provided pre-service and in-service training to primary school teachers. The Quaid-e-Azam Academy for Educational Development (QAED) launched a program called CPD, Continuous Professional Development of Teachers, which focused programs in primary classrooms on numeracy, literacy, and multi-grade and overcrowded classrooms. The program also included training for teachers through extensive support materials, assessment materials, teacher guides, and learning materials.

Teacher attitudes and beliefs are powerful forces which significantly influence their classrooms. Their beliefs impact professional practice and are crucial in implementing new technologies (Haney & Lumpe, 1995). To successfully implement technology, teachers must develop a positive attitude towards it and be comfortable using it as an instructional tool (Rakes & Casey, 2002). However, teachers do not usually feel positive about the usage of technology in their classrooms, and many are skeptical of the value of technology. They feel apprehensive as the use of technology challenges their current role at the school (Earle, 2002; McKenzie, 2004; Zhao & Frank, 2003). Technology-based projects may require teachers to take on roles they have never fulfilled before, including design, advisement, training, collaboration, monitoring, and team coordination (McGhee & Kozma, 2003). In some cases, they may also find themselves in the role of the "student," as the students may have to teach the teacher how to use the technology (Bowman, 2004). Moreover, technology-related tasks may require teachers to confront their pedagogical beliefs. Teachers who select tech-based projects that closely align with their personal pedagogical beliefs are more likely to be successful. However, technology-enhanced environments need to be more student-centered and more focused on the needs of the students (Groff & Mouza, 2008).

According to Serin and Bozdag, teacher attitudes concerning technology use in education change according to the level of education. For example, the attitudes of graduate teachers toward technology use in educational practices tend to be more positive than undergraduates (Serin & Bozdag, 2020). This is supported by the fact that the frequency of use of technology increases with the level of education (Baltacı, 2005). They also found that teachers' autonomy had a critical role in determining their attitude

towards technology use in teaching. As teaching process autonomy increases, teachers have a more positive attitude towards the usage of technology in education. Teaching process autonomy entails making decisions about teaching and classroom management, the selection of instructional methods and techniques, determining the methods of assessment and evaluation, rewarding students, and evaluating rules (Çolak, 2016). Similarly, professional communication autonomy refers to how teachers can express themselves to colleagues and parents without any anxiety and fear. This autonomy allows teachers to organize the teaching process according to their professional competencies (Çolak, 2016). Both teaching process autonomy and professional communication autonomy positively affect teacher attitudes towards the use of technology in teaching and learning. Moreover, the use of technology adds to this autonomy, as it allows teachers to teach more efficiently.

Methodology

This study analyzed the process of using technology for teaching and learning at a public school. The research evaluated the planned process of technology integration in the selected schools. The study identified the steps involved in this educational change in the public school. Moreover, it explored the hindrances faced by teachers while imparting this change. The study delves into the teachers' perceptions and how these perceptions influence the meaningfulness of the technology integration process. The research questions that guide this study are:

1. How are public schools using technology for teaching purposes?
2. What is teachers' and school administrators' attitude towards the use of technology for teaching and learning?
3. What factors influence their attitude?

4. How is their attitude affecting the schools' teaching and students' learning?
5. What can be done to effectively train the stakeholders in using technology meaningfully for the teaching and learning process?

This research studies an intricate phenomenon of educational change (integration of technology in a public school) the research questions are exploratory in nature (variables cannot always be quantified), and because there is a need to present this topic in detail, the qualitative research design is chosen for this research (Creswell, 1998).

It is important to understand that survey methods alone may not be sufficient enough to assess the notion of classroom implementation. In order to have more 'depth' what is required is insightful interviewing as well as classroom observation, assessing indicators such as nature of instructional tasks, discourse patterns and teachers' opinion related to knowledge and learning (Coburn, 2003).

Therefore, for the purpose of this research an embedded case study approach was chosen. As the main focus of the study is to emphasize how teachers engage and interact with not only each other but the school management and leadership as well. However, the study could focus on restricting itself by failing to analyse the larger unit of analysis which will be the schools in this regard (Yin, 2009).

23 teachers from a large public school were interviewed using a semi-structured interview design. Teacher's claims and assertions were cross-checked for credibility and trustworthiness by analysing official documents (timetables, duty assignment sheets, lesson plans, and textbooks).

Interview questions were piloted with 3 teachers from another but similar public school. The instruments were then improved based on the piloting results.

In order for this research to have trustworthiness several techniques were used to achieve the four criteria of trustworthiness; Credibility, Transferability, Dependability, Confirmability.

a) Triangulation – In order to achieve triangulation data is checked and matched with data from other sources to establish its accuracy. Data from the interviews, textbooks, and policy documents was cross matched to check the validity of relevant themes; thus, achieving triangulation of data.

b) Member checking is another technique used to ensure accuracy of the data collected. According to Lincoln and Guba (1985) ‘member checking is the most crucial technique for establishing credibility’. The collected data is ‘played back’ to the teacher to check for perceived accuracy and reactions either by asking the teacher to verify that the transcript of the interview is accurate or to email the teacher for verification once the transcript is complete. For this study all interview transcripts were provided to the pertinent participants to check for accuracy. Not only did teachers plug in the missing words in their transcripts they also, in few instances, provided further explanation of what they initially stated in the transcript.

The data collected from interviews, and documents, was analysed using “Five-Phased Cycle” suggested by (Yin, 2014). The five stages are, “Compiling, Disassembling, Reassembling (and Arraying), Interpreting and, Concluding.”

Research ethics are of paramount importance in any research but they become even more important when human participants are involved. For the purpose of this thesis the researcher sought guidance from the University of Leicester’s ample resources available on its website. Before starting the process of data collection, the researcher sought formal approval from the University of Leicester’s Research Ethics Committee. This application provided all

the relevant details of the research, including but not limited to, research methods, research participants as well as potential benefits of this research to the participants. This application also stated foreseeable ethical concerns while also stating measures taken by the researcher to counter them.

Findings

The research found that most of the use of technology in Pakistan’s public schools is formal and planned. Besides ICT (Information and Communication Technologies) lessons that are part of the timetable, teachers must seek permission from the principal if they have to use the computers in the computer laboratory. Technology is mainly used for printing out worksheets and examination papers. Every year, the school conducts one technology-based project for Science for Grade 6, 7 and 8, which is reported to the District’s Education Assistant as part of the school’s technology integration plan. Any innovative ideas for meaningful use of technology are faced with resistance from the principal. If teachers utilize their own financial resources to fund these interventions, the principal allows it but also takes the credit for its success. Generally, teachers lack a framework to guide their use of technology. Still, after information dissemination workshops, they can improve their lesson plans to move from entry-level technology integration to higher levels. Most of the technology usage in teaching and learning was done to increase the student’s interest in education.

Initially, the attitude depicted the discomfort, distrust, and disdain of public school teachers for the idea of making meaningful use of technology. This was primarily a result of a trickle-down effect. Since the leadership was not supportive of the increased use of technology in teaching, teachers were also reluctant to be creative. After an information dissemination

workshop, a few teachers found the motivation to try and incorporate meaningful use of technology in their teaching. A few more joined them, creating a healthy competition among the teachers. Seeing how it affected students' involvement in lessons and improved their attendance, more teachers started learning about TIM.

During the interviews, teachers referred to stated their dependence on textbooks, which was forced on them in public schools, and often was a result of a lack of other resources or support materials. Thus, they were an essential factor in determining the extent to which teachers used technology. Therefore, English, Mathematics, Science, Urdu, ICT, Islamiat, History, and Geography textbooks were analyzed. While most textbooks had various independent publishers, they had been selected, approved, and distributed to public schools by The Punjab Curriculum and Textbook Board. Textbook analysis revealed that a well-designed and well-written book allows teachers to become more comfortable with the meaningful use of technology. The end of grade 7 English book includes some exercises asking students to use mind maps. This gives teachers the opportunity to make meaningful use of technology by using mind mapping software. However, such innovation requires the teacher to be trained and experienced in the field of meaningful learning with technology. ICT books in public schools lack the good use of pictures, graphs, flowcharts, diagrams and visual aids. Similarly, policy documents show that raising the social status of the teaching profession will attract more qualified personnel to join this field, resulting in the development of a sense of pride in teachers. This can motivate them to undertake all contemporary technological innovations and interventions to improve their teaching and students' learning.

Teachers' attitude towards using technology significantly affects the overall teaching practice, which involves students' learning. When teachers were forced to use technology, it wasted time as they sought to develop hollow lessons that used technology merely to fulfil the requirement. However, when they were motivated and inspired to come up with suitable ways of making meaningful use of technology, they produced transformation-level projects. Previously uninspired teachers found inspiration and led their students to develop Active, Collaborative, Authentic and Constructive projects at the Transformation level of technology integration. A public school was situated in an area where sewage often seeps into the underground water table, and people end up pumping that water out for drinking and cooking purposes. The school identified this as a life-threatening problem and wanted to take action; the students wrote letters to various science and technology universities in the city. One of the renowned local university's biology and chemistry departments wrote back. They expressed their interest in a collaborative project with the students to test the water and air quality. But the teachers wanted more; they wanted a long-term collaborative project that would eventually enable, educate, and empower the residents to improve their locality. Since 2018, every summer vacation, a team of undergraduate students collaborates with these school students to survey water and air samples and disseminate the survey results to the locals. The students design and execute campaigns to clean up the locality and educate all residents on how to own the neighborhood and keep it clean. Students and teachers have invited non-governmental organizations and private sector philanthropists to donate money to build an improved sewerage system so that sewage can be kept separate from the drinking water.

Many study participants discussed various factors that have impacted their beliefs and attitudes towards using technology in education. These factors were Intrinsic (direct results of participants' perceptions, beliefs, and attitudes) and Extrinsic (not entirely in control of the participants). One of the most common intrinsic factors was the issue of a fixed mindset; wherein many teachers felt like they avoided challenges, gave up easily, saw effort as useless, ignored useful criticism, and felt threatened by others. The Principal of The Public School mentioned four of these traits of a fixed mindset and noted that he does not go out of his way to embrace new challenges and conquer them (Zahid, 2016). He felt threatened by confrontational teachers and noted that whenever teachers suggested any improvements, he took the initiative in executing them. Similarly, the researcher found a mathematics teacher who gave up after trying to find useful educational videos for his classes that his students could understand (without suffering from a language barrier). The social studies teacher had also wanted to use Google Earth and online resources to discuss certain content but was interrupted and disturbed due to poor Internet connection and electricity outages (Javed, 2016).

In addition to this, the study found that participants were hesitant when they had to result in failure. These self-esteem issues were also highlighted when the ICT teacher talked about teachers' inability and unwillingness to learn about word processing software and spreadsheet software (Sohaib, 2016). Similarly, many teachers had a 'Why bother' attitude. Mr Shoukat, the Islamiat teacher at The Public School, has experienced his attitude change from experimentation with technology to absolute avoidance of any sources of content other than the textbook. He undertook a presentation-based approach to empower students to do research but asked them to work in groups and create a

presentation using a medium of their choice. However, some topics were controversial, resulting in calls from offended parents. Thus, when asked if he would ever try to use technology again to augment his teaching, he said, 'why bother!' (Shoukat, 2016).

Learning to make meaningful use of technology and fostering 21st-century skills in students are long-term processes which often do not yield immediate results. This lack of immediate gratification can be frustrating for both teachers and students. It can dissuade students from participating fully, so teachers must keep reminding them about the eventual prize of 'lifelong learning'. Furthermore, the Public School follows teacher recruitment protocol as per the government of Pakistan. Therefore, once a teacher is hired through the government's official channels, their jobs cannot be easily terminated, so the sense of job security is considered a blessing (Rustam, 2016). However, this very job security has affected some teachers' sense of complacency. They are so satisfied with their teaching performance that they see no reason to 'experiment with technology' (Javed, 2016). Some even admitted that they just refuse to do any of 'this computer stuff' to avoid extra workload since they believe that they are an irreplaceable asset to the school and are 'not going anywhere till retirement' (Faisal, 2016).

The study also found some extrinsic factors that had an impact on participants' attitudes toward technology are those factors that are not directly a result of participants' beliefs, thought processes, and behaviours. At the public school, the District Educational Officer can call upon the school's ICT teacher and any other technologically proficient teachers to their office to do computer data entry tasks. Moreover, teachers from public schools lamented the fact that there is a severe lack of mentoring when a new teacher joins the school. New teachers face

a lot of difficulties adjusting here and try to make meaningful use of technology. Such conditions dissuade them from the usage of technology in teaching and learning.

Teachers' attitudes were also influenced by the availability of resources, which included human resources, infrastructure, hardware, and software. The Public School had a computer lab equipped with seventeen fully functional desktop computers. However, all of this was useless without electricity during power outages, especially since backup power systems are insufficient. The School has requested the government to supply solar panels and battery storage so they can carry out uninterrupted computer-based lessons, but this has not yet been approved (Zahid, 2016). The Public School also asked for an ICT teacher and has recruited a part-time local college student to teach ICT until there is an official appointment by the Punjab Government. The Public School has been provided with an Interactive Whiteboard for its computer lab. The English teacher at this School is an avid advocate for the meaningful use of technology to promote 21st Century Skills in students. He is a strong proponent of using tablet computers like iPads or other such brands to integrate technology into his teaching practice. According to him, this will alleviate the pressure on the ICT teacher and the lab in charge (Inayat, 2016).

Discussion

One of the more potent themes to emerge from the literature review and data analysis is that meaningful use of technology is not a trivial process that can be accomplished by merely providing the school with technological tools. It is a rather intricate and complex process which is affected by a bevy of varying factors and actors, including teachers and their perceptions and attitudes towards using technology meaningfully. The complexity of this process is

compounded by factors like teachers' communication skills, language skills, support system, training and the available infrastructure. Even trained teachers struggle to make meaningful use of technology (Slay et al., 2008). Using appropriate technological tools is paramount to ensuring the success of meaningful use of technology. But that is only the start; appropriate teacher expertise is needed to ensure a meaningful use of technology.

To improve and increase the meaningful usage of technology in education, policies should be made to improve teacher training programs at the university level, strengthen teacher recruitment criteria, enhance the teaching profession's reputation, and provide affordable professional development opportunities for teachers and school leaders. Moreover, schools should be equipped with reliable and fast internet connections so stakeholders can learn about Technology Integration Matrix and its support materials. Teachers can be motivated to spread their knowledge about TIM and promote global citizenship by learning from local peers and international teachers.

There are a number of potential benefits of using technology in education. It allows students to learn without being restricted by space and time constraints. Technologies like Web 2.0 enable education to move from pedagogy (teacher centered) towards heutagogy (learner-led) (Blaschke, 2012). Technology and social networking allow students to augment the country's social capital (Ellison et al., 2007). The meaningful use of technology improves the quality of education. It creates an opportunity for students to develop 21st Century Skills such as digital citizenship, creativity, innovation, research and information fluency, communication, critical thinking, problem-solving, collaboration, and decision making (ISTE, 2015). These skills are essential for

students in Pakistan, so they can work together for the sake of the country's future and help in creating reforms that will solve issues such as poverty, illiteracy, corruption, terrorism, sectarian and ethnic violence, famine and drought, and the war on terror. Moreover, as poverty and other economic constraints hinder many Pakistani children from getting a formal education, technology can be beneficial as it enables education to become informal if needed. This increase in access to education allows students to manage their daily schedules in a way that does not affect their livelihood while enabling them to learn.

One of the more robust themes to emerge from the literature review and data analysis is that meaningful use of technology is not a simple process that can be accomplished merely by providing schools with the relevant technological tools. Instead, it is an intricate and complex process, which is affected by several varying factors and actors, including teachers and their perceptions and attitudes towards using technology meaningfully. The complexity of this process is compounded by factors like teachers' communication skills, languages skills, support systems, training and available infrastructure. Often, even trained teachers struggle to make meaningful use of technology (Slay, et al., 2008). Using appropriate technological tools is paramount to ensuring the success of meaningful use of technology. But that is only the start, appropriate teacher expertise is needed to ensure a meaningful use of technology.

Conclusion

Future studies can include parents or students as the research participants to get their input on the use of technology in their own or their children's; curriculum designers can become essential participants in future research in order to get an insight into the process of designing a curriculum document, and teacher training.

Further research can answer questions such as how meaningful use of technology affects students' learning, the impact of collaborative learning on students' and teachers' personality development, which technological tools are more effective at improving student learning, and what factors act as motivators for teachers. It could also explore topics such as the impact of being a multilingual teacher versus a monolingual only, hypothesise about teacher's effectiveness and its relationship to the medium of instruction, and expand on this case study and include more varieties of public schools, for example, a full-time boarding school, a day boarding school, a day school, or an evening school. Pakistan is a country where a lot of school-going students also have to work in order to survive. Therefore, the impact of evening schools can be a relevant study for the future.

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