Perceptions of Teachers Regarding Technology Integration in Classrooms: A Comparative Analysis of Elite and Mediocre Schools

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Abstract

The primary purpose and objective of this study was to examine and compare the perceptions of teachers in elite and mediocre schools in Karachi. The secondary objectives included comparing the use of technology in classrooms by teachers and the challenges and barriers that they face in the integration of technology. This study was designed as a small-scale exploratory pilot study using the qualitative approach to address the research questions. To achieve the objectives, eight teachers from eight different schools of Karachi were surveyed through email. Four of these schools fell in the category of elite schools, while the other four fell in the category of mediocre schools. The research instrument was a self-developed open-ended questionnaire, which that was emailed to the research participants. The results of the study revealed key insights into the use of technology, perceptions of teachers towards the use of technology, and various barriers that they face in technology integration in the

classrooms. The study found that the perceptions and attitudes of teachers of both elite and mediocre schools were favourable towards technology integration; however, due to lack of resources, especially in mediocre schools, implementation of technology in classrooms was a challenge.

Keywords: documentary analysis, ICT, secondary level schools, technology integration

Introduction

Technology has infiltrated our society to the point that our lives are now increasingly reliant upon this medium and it has become an integral part of every dynamic society in today's era (Underwood, 2009). The impact of technology, especially on teaching and learning is now growing rapidly. Over the last two decades, evolution and exponential advancement of technology has made traditional teaching methods fairly outdated and obsolete and technology integration has become an important facet of successful teaching (Negi, Negi&Pandey, 2011). Research evidence suggests that technology is effective in improving teaching and learning (Negi, Negi & Pandey 2011; Higgins, Xiao & Katsipataki, 2012).

Information and Communications Technology (ICT) has developed rapidly over the last few decades and continuous efforts are being made to introduce and integrate technology into K-12 education (Gu, Zhu & Guo, 2013). Technology has a great potential as a teaching tool, due to which educational technology has become the bedrock to enhance student's performance at school (Lei, 2010). Technology has been integrated into the curriculum design and its implementation provides a teaching and learning platform that

functions for both educators and learners across the globe (Wardlow, 2014). Educators now have access to a world of new technological tools, transforming the way people teach, learn, and work and have not only made education more accessible, but even more meaningful and customized (Alharbi, 2013).While technology has not left any part of our lives unaffected, its impact on teaching and learning has been evolutionary, rather than revolutionary (Klopfer, Osterweil, Groff & Haas, 2009), especially in the developing countries like Pakistan. However, educators consider using technology in classrooms as an added burden to their already hectic lives and an extra curricular skill that they must learn to effectively teach (Baba, 2014). An important factor that determines whether or not teachers will use technology to supplement teaching and learning is the way they perceive their teaching. Many studies highlight the importance of teacher beliefs (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur & Sendurur, 2012; Kim, Kim, Lee, Spector & DeMeester, 2013), perceptions (Kopcha, 2012; Georgina & Hosford, 2009), attitudes (Buabeng-Andoh, 2012; Alharbi, 2013) and lived experiences (Tuttle, 2012) for successful integration of ICT in the classrooms. To measure how successfully technology has been integrated into classrooms, it is imperative to investigate the acceptance and use of technology by teachers and students while overcoming the digital gap (Gu, Zhu & Guo, 2013).

This study was driven by the realization that the domain of technology integration in Pakistani classrooms, especially with respect to the perceptions of teachers has not been explored to date. The current research is an attempt to fill this gap. The purpose of this study was to gain an insight and understanding of the experiences of teachers, compare the use of technology, analyse teachers' perceptions regarding the use of technology, and the challenges and barriers they

face in the integration of technology in classrooms in elite and mediocre schools of Karachi. The main question developed for the study was:

1. What are the perceptions of teachers regarding the use of technology in classrooms?

Sub questions:

1. How do teachers use technology for teaching and learning?
2. What are the barriers and challenges faced by the teachers in integrating technology in classrooms?

Literature Review

Integration of technology in classrooms has been a hot topic among researchers and educators alike for more than 30 years (Lowther, Strahl, Inan, & Ross, 2008). A plethora of research articles have been published on this topic in the western context, highlighting various factors affecting integration of technology and suggesting effective strategies that educators can use to integrate technology in a meaningful way (to support a curriculum that is student-centred). The majority of these articles suggest strategies to remove the barriers and challenges which teachers face when trying to integrate technology in the classrooms (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur & Sendurur2012). This raises a question, why integrate technology at all?

Technology as a teaching and learning tool

Research provides compelling evidence that technology

does not only lead to better teaching, but also positively affects student learning. In five schools of Oklahoma's Moore Independent School District, curriculum based on computer was used and the results revealed that students had a comparatively better performance (Morgan & Ritter, 2002). In addition, it has been observed that students become highly engrossed and display positive attitude, in particular the highly disruptive ones when technology is used as a learning tool in the classrooms (Morgan & Ritter, 2002). A study conducted in Turkey found that students who were taught using technology exhibited increased levels of confidence, learning, collaboration, cooperation, and readiness to take part in learning activities (Semerci & Batdi, 2015). Another study found that according to students, technology makes schoolwork easier and arouses their interest and attentiveness (Lowther, Strahl, Inan & Bates, 2008).

Contradictory to these findings, evidence collected through OECD (2015) projects reported that the impact of technology on student performance was mixed. Students who engaged in moderate use of computers at school performed slightly better than those who rarely used computers at school, but those who used frequently, performed worse. The most disappointing finding of this study was that technology did not help bridge the divide between the skills of advantaged and disadvantaged students. The study also highlighted that teacher-student interactions were crucial for building deep understanding and higher-order thinking skills, but technology distracted teachers from engaging with the students. It was also noted that this could be due to an ineffective integration of pedagogy and technology and that simply adding latest technology to the same old teaching methods will dilute the effectiveness of teaching. Saba (2009) raised an important point and asserted that the question is not

whether or not to integrate technology in classrooms, the question is what can be done to remove the barriers to facilitate technology integration.

Factors affecting technology integration

Research shows that effective integration of technology is the result of numerous factors. Al-Bataineh and Brooks (2003) assert that it is essential that the teachers must be capable to mould and design instructional technological activities to cater to the students' needs. Schools must provide ongoing training to teachers and technology must fit into the curriculum and match its philosophy and learning theory. Furthermore, computers must be placed inside the classrooms to improve access to technology; however, placing computers in classrooms does not necessarily result in student-centered learning as they may remain unused and dormant (Norton, McRobbie & Cooper, 2000). Kopcha (2012) identified this as a gap between the availability of technology in schools and its use by teachers for instructional purposes. Gray, Thomas, and Lewis (2010) surveyed 3000 teachers to analyse the availability and use of technology in the elementary and secondary public schools of the US and found that less than 50% of the teachers used technology for instructional purposes. Most of the time, technology was used for administrative purposes, that is, grading, attendance, and reporting. Kopcha (2012) noted that the reason behind this gap had to do with the barriers that teachers face in integration of technology in teaching. According to Ertmer (1999), as cited in Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur and Sendurur (2012), the use of technology by teachers is influenced by two orders of barriers: (a) training, financial resources, hardware and software resources, and administrative support; (b) confidence of teachers, their beliefs and perceptions

about how students learn and their perceived value of using technology in teaching and learning.

While first-order barriers create significant impediments for teachers in technology integration (O'Mahony, 2003), the second-order barriers are more challenging to overcome (Dexter & Anderson, 2002). Other than these barriers, Kopcha (2012) highlighted other factors, such as lack of access to technology, a vision for technology integration, teachers' beliefs, time constraints, and lack of training.

Technology in classrooms

Tuttle (2012) conducted a qualitative study in the US to determine if adoption of technology by teachers affected their teaching, work and life. Using purposive sampling, Tuttle (2012) conducted interviews with 20 teachers and found that most of the teachers adopted technology because they were either prompted by the administration or because they believed technology would enhance the learning experience of students. They reported that technology enhances the learning processes and makes it more efficient. It was also found that the faculty used a wide range of educational technology.

Another comparative study was conducted by Celik and Keskin (2009) who analysed student learning outcomes of classes taught with and without educational technology. Results showed that using technology effectively in classrooms reduced teaching time. Of all the factors influencing integration of technology by teachers, the most significant is the development of teachers' positive attitude towards the integration and implementation of technology (Celik & Keskin, 2009). Somekh (2008) also reached a similar

conclusion and asserted that a major factor contributing to the successful technology integration in classrooms is the teachers themselves. Thus, the success of integration of technology in teaching and learning depends vehemently on teachers' positive perception of it (Celik & Keskin, 2009). Cope and Ward (2002) suggest that in order to successfully integrate technology to enhance student learning outcomes, the teachers should perceive technology as part of student-centred and constructivist approach.

Even though there is an overwhelming research investigating the effectiveness of technology for teaching and learning, and beliefs of teachers regarding adopting technology to enhance teaching and learning, there is a sheer lack of research investigating technology integration and perceptions in Pakistani schools. In spite of the importance of the perceptions of teachers that technology plays a key role in determining the successful adoption and integration in teaching and learning, as advocated by Cope and Ward (2002), yet research investigating the perceptions of Pakistani school teachers is evidently lacking.

Methodology

Research design and approach

This study was designed as a small-scale exploratory pilot study as the aim of the researchers was to gain insights, to understand, and compare the perceptions of teachers in mediocre and elite schools of Karachi regarding technology integration. The overall design of this study took the form of a qualitative approach. Qualitative research, according to Holloway (2002), is a social inquiry method

focused on how people interpret and give meaning to their experiences. The aim of qualitative research is to "Understand the social reality of individuals, groups and cultures" (p.3). The researchers' aim behind choosing this approach for this study was to follow the emic perspective to study the views, perceptions, and interpretations of primary teachers of elite and mediocre schools regarding integration of technology in classrooms (Holloway, 2002).

Sample

The sample for this study was selected using non-probability sampling method. Qualitative researchers typically use non-probability sampling techniques to select the sample (Blackstone, 2012) and it is the most suitable technique when researchers want to select small samples (Battaglia, 2008). The sample consisted of eight teachers from eight different schools of Karachi; four from elite schools and four from mediocre schools. Following were the sample characteristics:

1. Fall in the age bracket of 20-35 years
2. Have been teaching for at least one year
3. Use some form of technology in classrooms

Data collection and research instrument

The researchers used open-ended, self-administered surveys to collect qualitative data because the research was designed as a pilot study for a large-scale study to be undertaken in the future; thus, the researches wanted to take a glimpse into the minds of teachers regarding technology integration and their level of readiness before they examined the use of technology in Pakistani classrooms on a larger

scale. The focus of a qualitative survey, according to Jansen (2010), is determine the diversity of a phenomenon or topic of interest. Therefore, Qualitative survey was appropriate as the purpose of this research was to study the diversity of opinion and perceptions among teachers in elite and mediocre schools regarding the use of technology in classrooms. A self developed questionnaire based on literature review and the purpose of the study was designed on Google Forms and disseminated through e-mail.

Data analysis

Survey questionnaires were analysed using manual thematic analysis, which is a categorizing strategy that qualitative researchers use to discover patterns and develop themes by reviewing the data, making notes and sorting it into categories and sub-categories (Harvard University, 2008).

Results and Discussion

Generally, the findings of this study revealed that teachers from both elite and mediocre schools use technology in their everyday lives and are technology savvy. The most frequently cited statement was that technology has made life easy and more comfortable and has made information more accessible. One respondent stated that technology is, " A blessing" and emphasized that technology has "made things easier, efficient, and effective." For others, technology is "an essential and powerful tool to gain knowledge and skills" which is helpful in academics, administration, education, and business. Another teacher said that, "Technology is my lifeline and without technology, I can live, but cannot survive

far". Another teacher commented that equipping oneself with latest technology is a way to prepare children and ourselves to face challenges and to compete in the world. Such a positive attitude towards technology reflects that the level of teachers' readiness towards the integration of technology in classrooms is high, as supported by Celik and Keskin (2009), who claim that the success of technology integration in teaching and learning is strongly dependent upon the positive perception of teachers. Three themes were extracted from the data collected.

Effectiveness of technology

For most of the teachers, the use of technology for teaching is very effective as it improves both teaching and learning and makes teaching easier. One teacher from an elite school reported that her teaching has improved after integration of technology. Another teacher who teaches Urdu at an elite school reported using PowerPoint and documentaries to teach Urdu and believed that this had made her teaching dynamic. For another teacher who teaches English, Math and Science to grade 2 at an elite school, technology has had a great influence on her teaching methodology. Talking about the Smartboard technology, one teacher from a mediocre school asserted that:

> *"Now, with Edmodo and the smartphone, we can interact with our students in a virtual classroom anywhere, any time. It also helps students be more independent and empowered as learners."*

Another key finding of this study was that according to the teachers, using technology engages the students in learning and

encourages collaboration. All teachers upheld the view that children are eager to learn; they enjoy learning, and are more interested and excited about learning when technology is used; they actively participate in classroom activities and discussions and understand more and learn better. Teachers get maximum output from students when teachers teach the way students want to be taught. One teacher asserted that ICT can cater to multiple intelligences and learning, which can be a plus point for the students. Students, according to the respondents, enjoy the use of technology in classrooms and get excited because "it breaks the monotony".

The study also highlighted that today's children are digital natives and regularly use iPads, laptops or smartphones in their homes. They are impatient and their attention span is short; therefore, they must be taught using methods that capture their attention. A teacher expressed her opinion:

> *"It makes lessons interesting to comprehend and teach....I feel students learn more from what is taught and done in the Smart Board class and my students and I look forward to it."*

The study also found that students learn better with technology. Teachers from both elite and mediocre schools believed that students learn better with technology as technology caters to all learning styles and meets the needs of 21st century learners:

> *"I have observed lessons using technology and lessons not using technology and I observe a big difference. Whenever I use technology like showing video or PowerPoint, I observe that students understand better and need less explanation as they understand well when they see and experience."*

However, according to one respondent, effectiveness of technology for teaching and learning depends upon its need and use.

> *"Teachers are always pressed for time and energy. Students are always in need of information in learning. They both need to keep up with the times. Technology if used with a plan and objective during lessons and even for managerial purposes, can yield better learning outcomes as technology is something that was invented for human beings to become more effective."*

In other words, technology improves and facilitates teaching. This finding coincides with the findings of Negi, Negi and Pandey (2011) and Higgins, Xiao and Katsipataki (2012). The study also shows that for teachers, technology saves time and hassle and relieves their burden and is not an added burden to their already hectic lives (Baba, 2014). Moreover, technology as the results suggest, empowers students, allows individualised learning, and encourages the use of student-centred approaches as well as independent learning and inquiry, as suggested by the studies of Lowther, Strahl, Inan and Bates, (2008) and Saba (2009). The findings also indicate that technology does not only improve teaching and student learning, but also the attitudes of students towards learning (Lowther, Strahl, Inan & Bates, 2008; Morgan & Ritter, 2002; Semerci & Batdi, 2015.

On the other hand, the finding that students learn better with technology is not consistent with OECD (2015) report, as mentioned in the literature review. Yet, this could be explained by the

fact that the present study investigated the perceptions of the teachers about how students learn with technology and did not measure their actual educational outcomes; whereas, the study by OECD (2015) measured the performance of students across various learning outcomes. Again, the performance of students who learn with technology could depend upon many factors, such as the competence of teachers and the effective integration of pedagogy with technology. Simply adding more technology in classrooms could potentially result in improved attitudes of students towards learning, but will not necessarily result in improved educational outcomes if the teaching practices are ineffective and outdated.

Difference in technology usage in the two types of schools

Majority of the teachers from both types of schools reported using smartphone in classroom, as well as laptops, projector, and tablets. A teacher who teaches English and math to grade 3 in a mediocre school reported:

> *"We have a separate class room equipped with interactive Smart Board. Each section is allowed to use it as per schedule once a week."*

One teacher who teaches grade 2 in a mediocre school reported using her personal tablet for showing PowerPoint slides, showing videos and documentaries in Learning Resource Centre and using projector for showing videos. Smartphones were found to be more frequently used by teachers from elite schools, while laptops, tablets, and projectors are being used at both types of schools, albeit with varying levels and frequency of use.

When asked about how they use technology for teaching and learning, the most frequently cited uses of technology for teachers in both elite schools and mediocre schools were for communicating with other teachers and designing assignments and worksheets. Other uses included email, communication, creating lesson plans and teaching activitues, personal and professional development, administrative work, interacting with students, and developing assessments and tests. A teacher mentioned:

> *"I teach Urdu, but again I give them research work where technology is needed, also PowerPoint presentations; documentaries have made teaching easier."*

One teacher from a mediocre school pointed out that they have a separate class with the Smart Board which is shared by all other sections, limited to once a week. Lack of support from administration and ICT department for math software installation was also highlighted. She added:

> *"There are overall 60 classes and two multimedia rooms, which I think are not enough, but the management is least bothered."*

Another teacher from a mediocre school said that she uses her personal laptop in her classroom for teaching because of limited resources and equipment. She pointed out that using one laptop for 30 students is not effective. These findings are substantiated by Chen (2008) and Al-Ruz and Khasawneh (2011) who highlighted lack of access to computers, inadequate administrative and technical support as the most common external factors that affect technology

integration. As of 2012, 96% of 15-year old students in the OECD countries were reported to have access to a computer at home; however, only 72% of them had access to a desktop, tablet or laptop at school. The findings suggested that despite the pervasiveness of ICT in their daily lives, technology had not been widely accepted and implemented in formal education (OECD, 2015).

There are two possible explanations for this inconsistency between attitude and practices of school administration in the context of the present study. First, since the attitude of administration towards technology is generally positive, the lack of implementation could be attributed to lack of resources. Second explanation could be lack of clear vision and clearly defined goals for effective implementation of plans. According to Fu (2013), availability and access to technology and overall support are crucial for technology integration and "The higher the support structure and technology availability, the higher the technology integration efforts are made by teachers" (p.117).

As evident from the research findings, mediocre schools have limited resources, thus depriving students of hands-on experience. The use of smartboard in a mediocre school is somewhat surprising, considering how this technology is practically non-existent in Pakistan, at least in the corpus of research. More research is required to investigate the different types of latest technologies being used in classrooms across Pakistan. Apparently, technology is more frequently used in elite schools than in mediocre schools. The reasons may be obvious; elite schools have more financial resources than mediocre schools, or more subtle in the sense that elite schools may actively encourage the use of technology to gain a competitive edge over other schools.

Moreover, it is encouraging that teachers from both types of schools were found to be using technology beyond the basic use. This could partly be explained by the fact that all the teachers that were surveyed were young and fell in the age bracket of 25-32 and were regular users of technology in their daily lives. This may also be due to the fact that all the teachers surveyed for this study were students themselves, so their use of technology as a teacher could have been directly influenced by their use of technology as a student.

Barriers in technology integration

As mentioned earlier in the literature review, Ertmer (1999), cited in Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur and Sendurur (2012) discussed two kinds of barriers that influenced the use of technology by classrooms; first order or external barriers (lack of training, financial resources, technical resources, administrative support), and second order or internal barriers (confidence of teachers, teacher beliefs, perceptions and perceived value of using technology in classrooms). The results of the present study indicate that teachers do not face second-order or internal barriers, since they seem highly confident in their ability to use technology and their beliefs and perceptions about the use of technology as well as about how students learn are both positive. For example, one teacher highlighted that hands-on learning is also important as not all students can or are able to learn through technology, such as those with eyesight problems. Others pointed out that the use of technology in classrooms require monitoring and technology can be a distraction as well and make students and teachers lose focus. Two teachers reiterated that:

"Students in our Pakistani society still have the mind-set that if something is done with technology, it is non-serious and interesting. This perception works both for their interest and also against it. If they take it as a game they tend to lose focus of what they are doing."

"It can be a distraction away from the flow of the lesson. Also, with electricity shortage in Karachi, we can't get multimedia to work smoothly. So that is a problem, and that is why I avoid using a projector in my class."

The teachers that were surveyed for this study indicated that they were primarily experiencing first-order barriers, which prevent effective integration of technology (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur & Sendurur, 2012; O'Mahony, 2003), such as power outages and voltage issues. In a country like Pakistan where electricity failures and load-shedding are a norm, this finding is not surprising. Lack of access to Internet and availability of computers, laptops and other equipment were found to be major barriers reported by the majority of teachers in both elite and mediocre schools, as substantiated by Chen (2008). Su and Bay (2009) differ with this and argue that because of the proliferation of technology in the recent years, educators are noticing that the internal or second-order barriers are actually more critical barriers for effective technology integration. Yet, in the context of under-developing countries like Pakistan that lack financial and technical resources to support the integration of technology, the intensity of external barriers appear to be more critical for successful integration of technology, especially since the use of technologies like smartphones, tablets and laptops have become widespread and teacher beliefs and perceptions appear to be positive

in this regard.

A major and rather unexpected finding of the present study was that the attitude of management towards the use of technology was mostly positive in both elite and mediocre schools, as per the account of teachers surveyed. They encouraged, supported, and motivated the teachers to use technology. A teacher from an elite school reported:

"They encourage it, because we have computers and projectors in all classrooms."

Another teacher from an elite school highlighted that the school has a mission and a vision to become as paperless as possible. However, the attitude often did not reflect in the actions of management of most mediocre schools as they were reportedly not responsive to the concerns of teachers about the problems they were facing in using technology. One teacher from an elite school also echoed this concern:

"They are very pro to the idea, but they do not ensure whether we are well-equipped to use it in our classrooms."

Other challenges pertaining to lack of time and the perceived or actual inefficiency of technology were also highlighted in the present study. Some teachers from elite schools believed that using technology for teaching and learning can be time-consuming and frustrating, while others believed that technology saves time. One teacher reported:

"It is time-consuming initially, but in the long-run, it saves time and makes things efficient."

She further added:

"It depends on how good one is with technological instruments. For people who have stagnated themselves and do not want to evolve with the pace of the world find it burdensome and time consuming, while people with a mind tuned for technology it is efficient and effective."

The findings of this study suggest that using technology for teaching and learning can be frustrating and time-consuming. Using technology in classrooms may be inefficient and ineffective for teachers who are not trained to teach with technology, are not using technology in their daily lives and do not adapt to the changing educational environment. Planning and preparation takes time for novice teachers; however, trained teachers can efficiently use technology. This is supported by Noeth and Volkov (2004) according to whom much of the responsibility for successful and effective technology integration inexorably falls upon the shoulders of the teachers and administrators. The readiness, preparedness, and the skills of the technology by the end-users should be emphasized yet, provision of training is not enough (Kazu, 2011) due to inconvenient timing and location of training.

Overall, the findings of this study indicate that technology is welcomed at the level of teachers and students. The attitudes of teachers towards technology is substantially positive and their beliefs towards the impact of technology on teaching, student learning, and attitudes are also largely favourable. The attitudes of

the administration also looks encouraging, but their positive attitude is not always translated into action, leading to various barriers that prevent teachers from successfully integrating technology into the classrooms.

Conclusion and recommendations

The purpose of this study was to investigate and understand how teachers perceive the use of technology in classrooms and the barriers that they face in the process of integration. The study revealed important insights into the minds of the teachers and helped understand their attitudes towards the use of technology for teaching and learning. Teachers are aware of the importance of technology for teaching and learning and they actively use the technology. Even though technology is more frequently used at elite schools than mediocre schools, yet teachers in both schools use the technology beyond its basic use. Future researchers are required to probe the issue of technology integration as well as the extent to which technology is being utilized for teaching and learning on a larger scale and in different contexts and settings, such as other major cities of Pakistan. Based on the analysis and discussion of the findings, the following recommendations are offered to the stakeholders of education, especially teachers and administrators.

1. All major and relevant stakeholders, that is, administrators, teachers, and parents should be involved in making decisions about ICT integration, so that a consensus can be reached regarding the goals and expected outcomes of technology integration.

2. Along with a proper monitoring system, every plan should consist of the evaluation criteria against which the implementation of

technology can be measured.

3. Since technology integration costs can be very high, all potential sources of funding should be explored, such as school budget, partnerships and collaborations, grants, donations, state funding, and other sources.

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