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Digital Multi-Grade One-room Schoolhouses for underprivileged communities in rural Pakistan

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Abstract: Despite extensive global efforts to make education accessible for all, one out of every five children are out-of-school. The situation demands re-thinking of learning strategies, particularly in underprivileged context. Continued advancements in learning technologies may offer novel solutions. The one-room schoolhouse is a centuries-old proven educational system, which has yielded promising results for rural areas. Using a multi-grade teaching method, the one-room schoolhouse provides a resilient model for educating children at locations that lack quality teachers and resources. This paper outlines doctoral research focused on identifying ways to develop adaptable and sustainable approaches to educate underprivileged out-of-school children in rural and remote areas of Pakistan through digital one-room schoolhouses, and suited to their local dynamics.

Keywords: Rural Education, Out-of-school children, ICT, one-room schoolhouse, Multi-grade teaching, underprivileged

1. Introduction

The development of any society can be determined by assessing the measures taken to provide quality education to every child, and to eradicate educational inequality that may be prevalent. Global initiatives such as 'Education for All' (EFA) and 'Sustainable Development Goal-4' (SDG-4) focus on this (UNESCO, 2015). Despite such initiatives, global statistics show that one out of five children is out-of-school. Furthermore, a decline in efforts from participating governments, progress in decreasing the number of out-of-school children, adolescents, and youth has significantly reduced in recent years (Statistics U. I., 2018). The Gender Gap Report also indicates significant difference in the average attainment of education by girls in South Asian Countries such as Pakistan, India, Afghanistan and Bangladesh (Forum, 2017).

Mobile and ubiquitous Information and Communication Technology (ICT) tools have enabled new ways to teach and learn where they are no more dependent on a specific time, place, or teachers (Hussain, Wang, & Rahim, 2013). Innovative e-learning solutions are also emerging in remote and rural areas in developing countries; however, the sustainability of sometimes-disruptive innovations create a challenge for governments and policy makers (Badar, Mason, & Khan, 2018). The one-room schoolhouse offers a practical and adaptable approach for 21st-century learning where student-centric learning is focused within a multi-grade student class (Goodlad, 1996). They provide a positive alternative to social promotion, stigmatizing, a traditional form of ability grouping, and grade labelling while encouraging personalised learning (Bennet, Hare, & Lee, 1983; Pratt, 1986; Veenman, 1995).

2. Out-of-school children and contribution of digital technology for education

263 million children and youth are out-of-school from primary to upper secondary (UNESCO, 2015). Children from economically and educationally disadvantaged families tend to have weaker educational base compared to their advantaged counterparts within the society, and the gap only widens during the school years (Hutchinson, et al., 2017). There are several factors leading to this gap including learning environment at home, opportunities to hear and read more words, and access learning activities outside the home (Smees & Sammons, 2017). The gap often leads to a higher number of dropouts. The main

reasons behind out-of-school secondary level children are poverty, location, and gender, and learning models based on mobile technology can provide access to "people who live in a remote location where there are no schools, teachers and libraries" (Ally, 2009).

2.1 Role of classroom, ubiquitous and mobile technologies in spreading education

Education in developing countries could be transformed by e-learning through mobile technology (Badar, et al., 2018). With mobile-learning, learners have more flexibility of what, when, where, why and how to learn, making it an individualized, personalized and highly interactive learning (Cobcraft, Towers, Smith, & Bruns, 2006). Ubiquitous technologies such as mobile phones are widely considered as the optimal solution for delivering education in developing countries, because of their usability, accessibility, and affordability (Grimus, et al., 2013; Ford & Leinonen, 2009). Mobile technology has the potential to shift the teaching focus to the learner (Grimus, et al., 2013).

2.2 Pakistan; education and out-of-school children status

Pakistan is the sixth most populated country in the world, with 63% population under the age of 25 years and has the fourth largest pool of out-of-school children (UNESCO, 2017). Most of the out-of-school children are residing in remote, rural or underprivileged city areas where prevailing challenges in providing quality education include a shortage of good teachers, the hidden child labour challenge, affordability and cultural barriers to pursuing educational goals (Titola-Meskanen, 2014). Education quality and standard are declining in rural areas and increasing urban/rural disparities and inequalities, which is creating a learning crisis in low-income rural areas (Agarwal, 2014). Funds granted by international funding agencies are not utilised effectively and hence the education sector is badly affected in the last few decades (Khan, Lurhathaiopat, & Matsushita, 2016).

3. One-room Schoolhouses

3.1 One-room Schoolhouses

One-room schoolhouses have been common all around the world and operating for the last 300 years (Williams, 2005). However, while these schoolhouses became popular in the nineteenth century, they were also used as community centres. In addition to being used for educational purposes, they were used for church services, Christmas parties, community suppers, lectures, etc. After completing the school year, students were examined orally covering their spelling, arithmetic problem-solving competence, and other subjects, based on which teachers determine the students' future level of studies.

The one-room schoolhouse has traditionally provided an integrated approach to the curriculum, often mixing age and aptitude. As a method for a 21st-century education, it is distinguished from conventional curriculum design because it revisits this older approach. Interestingly, recent research indicates it improves the non-cognitive abilities of students, giving them the opportunity to mentor relatively less advanced students (Cundra, Benzel, & Schwebach, 2017). The one-room schoolhouse encourages and supports peer-mentoring between relatively more and less experienced students. This pedagogical approach helps students to access challenging course material when someone among them has more relevant knowledge and provided the opportunity to educate the less knowledgeable ones (Bhuiyan, Supe, & Rege, 2015). Methods such as one-room schoolhouse integrate peer-mentorship into the curriculum design directly and provide a more conducive learning environment as compared to the traditional learning approach (Cundra, Benzel, & Schwebach, 2017).

4. Research Description (Research aim, question and significance/contribution)

4.1 Research Aim

The aim of this research is to explore and develop adaptable and sustainable approaches for providing digital education to out-of-home children through one-room schoolhouses in the underprivileged context in Pakistan, suited to their local dynamics and limitations.

4.2 Research Questions

- In what ways can approaches be developed for 'digital education through one-room schoolhouses' for children in underprivileged contexts in Pakistan?

- What factors are needed to be considered to test whether these approaches are adequate?

4.3 Significance/contribution of Research

This study aims to identify new ways to educate out-of-home children in underprivileged contexts using educational technology. Significantly, it will explore approaches capable of understanding local surroundings affecting the underprivileged children's educational opportunities and provide an acceptable and adaptable solution. The approaches will also be able to assess the varying needs based on their localized socio-cultural dynamics and can propose the optimally suited educational technology and pedagogy in that particular context. To develop such approaches, a significant understanding of the factors affecting the educational opportunities is required.

5. Research methodology and research progress

This research is supported by a mixed methods approach because the complexity of the problem suggests that disparate data may yield new insight. There are several components to this research:

1. Review of 'stand out' educational technology initiatives during the last two decades.
2. An exploratory study of 'One-room Multi-Grade Schools' operating in rural and remote areas of Pakistan along with the impact analysis of introducing education technology tools to students studying in these schools. Approximately 10 one-room schoolhouses will be visited.
3. Qualitative research (interviews/focus groups) involving relevant stakeholders of students studying in one-room schoolhouses in rural areas of Pakistan to understand local socio-cultural factors for not sending their children to school prior admitting them in one-room schoolhouses.
4. Quantitative research (survey questionnaire) involving secondary stakeholders of out-of-school children to understand their point-of-view regarding the socio-cultural drivers for out-of-school children and efficacy of one-room schoolhouses. These include parents of school-going children in remote and rural areas of Pakistan, principals, teachers and administration staff of schools operating in remote and rural areas of Pakistan, and local influencers in remote and rural areas in Pakistan.
5. Qualitative data analysis using NVivo software, and quantitative data analysis through SPSS software. Subsequently, comparative analysis of data related to the drivers for out-of-school children gathered from parents of out-of-school children through qualitative and that from other stakeholders through quantitative method
6. Developing adaptable approaches in light of the comparative analysis outcome and one-room schoolhouses study, for educating out-of-school children in remote and rural areas of Pakistan through educational technology tools, suited to their local dynamics.

6. Research findings and future directions

Field visits to one-room schoolhouses in rural areas of Sindh, Pakistan and discussion with the stakeholders of these schools including parents of students, the teachers and the management of these schools provided insight regarding the local dynamics of these schools and the challenges these schools are facing. One of the major challenges is availability of qualified and experienced teachers in these areas. The rooms for improvement surfaced during the visit and discussion provided an opportunity to

integrate the contemporary educational technology tools with the traditional learning methods presently in practice to educate the children studying in these schools according to global standards, and to help them overcome their challenge of attracting quality teachers for these schools. A pilot project to implement these technologies into their educational system is underway to observe the pathway and the efficacy of Digital One-room Schoolhouses in rural Pakistan.

Transcription of conducted interviews with the parents of out-of-school children is in progress. After transcription of data, the collected data will be analysed through NVivo. Afterward, quantitative data collection and analysis will be completed as mentioned in the previous section. These analyses are likely to reveal the local dynamics and challenges faced by thee underprivileged communities in educating their children, and subsequently provide adequate understanding to find ways to develop adaptable and sustainable solution for out-of-school children in the underprivileged children, suited to their circumstances.

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