

AN EXPLORATORY STUDY INTO THE COMPLEXITIES OF REMOTE LEARNING IN THE COURSE OF THE PANDEMIC FOR STUDENTS WITH LEARNING DISABILITIES

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ABSTRACT

With the onset of the pandemic, over 1.2 billion children have been absent from their schools and similarly students from universities. At the same time there has been a transformation globally in the way knowledge is disseminated. There has been a rise in distance/online learning including teachers teaching remotely using various digital platforms. With almost two years of virtual learning, this has led to a demand for both teachers and students to upskill themselves and equip themselves with technological capability. Thus, e-learning has emerged as an area of research particularly in this context of the pandemic. However, the impact or success rate of this mode of learning particularly for students with special needs has not been paid much attention in spite of its relevance. In response, this study explored the effectiveness of this alternate method of teaching on students with learning disabilities from the perspective of parents and teachers. The results of thematic analyses of parent semi-structured interviews and tutor focus group discussions using the Keyword in Context Technique (KWIC) revealed both tutors and children needed preparatory learning activities to help maximise uptake and success of the e-learning approach. Parents felt that the challenges that the children faced during the online phase were often neglected, whereas the tutors identified that the digital platform had limitations and there was a lack of financial support to invest in platforms that could better help children with learning disabilities. A lack of awareness about online learning tools, together with a lack of motivation to identify innovative techniques owing to teachers' workload increasing, were also seen as major drawbacks. These findings highlight both the need for improved learning platforms and for tutors to have access to professional development, so they could master the key online learning tools available. By providing insights into students with special needs' current online learning experience, this research also helps tutors to better understand the challenges these students face. It serves as an eye opener for special tutors to revisit lesson plans, become familiar with online teaching approaches, and explore potential mediums that could better meet learner needs.

Keywords: Covid-19, E-learning, Learning disabilities, Online learning, Online pedagogy, Pandemic teaching strategies, Special educational needs

INTRODUCTION

Any learning must involve students being given the space to produce information across various disciplines and incorporate various perspectives. It is the role of educators to foster students' skills in the process of learning, and most importantly this involves the teaching of critical thinking, problem solving, use of imagination, self-expression and creativity (Duvall,

2020; Pink, 2006; Runco & Pritzker, 2020; Sulaimani, & Gut, 2019). Most online courses and distance education strategies have been able to embrace technologies and adapt their pedagogical approach to continue to build these personal and professional competencies among students thereby continuing to prepare them for the future (Cheng, 2006; Kaiper-Marquez, et al. 2020). Yet, for the unprepared in the pandemic situation, teachers have needed to resort to video conferencing applications in an attempt to reach out to students to keeping them engaged in the learning process (Kristóf, 2020). However, where the online e-learning mode has been well supported recent research has shown students have learnt faster. For instance, Li and Lalani (2020) note that current research “suggests that online learning has been shown to increase retention of information, and take less time, meaning the changes coronavirus have caused might be here to stay . . . [and] whether it is [language apps](#), [virtual tutoring](#), [video conferencing](#) tools, or [online learning software](#), there has been a significant surge in usage since COVID-19” (para 1).

Distance learning was a concept that was initiated by US educators from the University of Chicago during the 1800’s to disseminate content to correspondence program students who resided at different places (Mclsaac, 1996). It is the World Wide Web that has transformed the whole ‘distance education’ approach to learning and has very swiftly contributed to the emergence and growth of online teaching and learning. For instance, the Western Behaviour Sciences Institute offered its first fully fledged online course as early as 1981 (Harasim, 2000). Online learning is an alternate method of teaching students partially or wholly through the Internet. Students engage in learning and complete assessments over a virtual platform. Thus, this style of pedagogy has been an option for education institutions to choose fully or partially for several decades now, although uptake has been greatly varied across the world (Roe, Blikstad, & Dalland, 2021). However, in current times the provision of education totally online has become an urgent necessity because of the sudden outbreak of the COVID-19. The World Health Organization (WHO) had declared this situation a pandemic in early 2020 (Sohrabi, et al., 2020), and subsequently extended lockdowns were implemented across the world and have continued to the time of publishing this research. Most academic institutions were challenged to let go of their traditional face-to-face teaching models and shift overnight to an online teaching/learning mode, which in most cases meant acquiring the knowledge or expertise to select the appropriate hardware and software, and then learning how to use it. Therefore, for many schools and other educational institutions this has been a steep learning curve. Nevertheless, through necessity, students from primary school to college have needed to access their education mediated by the Internet through e-learning and this has included children with special educational needs (Ameis, Lai, Mulsant, & Szatmari, 2021).

On the other hand, online learning today has been shown to help enable students to learn at their own pace, revisit concepts as well as plan their own learning. While the effectiveness varies with age group, high levels of learner agency have been reported in relation to the context of online learning in both schooling and higher education (Chaaban, Qadhi, & Du, 2021; Mbat, 2020; Yates, Starkey, Egerton, & Flueggen, 2020; Yan, Whitelock-Wainwright, Guan, Wen, Gašević, & Chen, 2020). Yet, while online learning has emerged as an area of research particularly in the context of the pandemic, the impact or success ratio of this learning mode for students with special educational needs, including motivation and agency has been neglected. Importantly, as FitzPatrick (2012) noted, the success or failure in any online learning is greatly dependent on the effectiveness of the medium and the student motivation. Further, to this, while Li and Lalani (2020) see promise in the emergent pedagogical approach they highlight how dependency on the Internet and choice of learning system may have a negative impact on the learners’ experience:

While some believe that the unplanned and rapid move to online learning – with no training, insufficient bandwidth, and little preparation – will result in a poor user experience that is uncondusive to sustained growth, others believe that a new hybrid model of education will emerge, with significant benefits (Last para.).

Nevertheless, Boucenna et al.'s (2014) review showed many opportunities were available to support learning through use of technology but further research was recommended. Similarly, more recent research has advocated for additional studies (Yarn et al., 2020; Yates et al., 2020). Thus, with the new demand for on online pedagogy it is even more crucial to explore the impact of students' learning experiences in this context, including the changed medium of instruction. In the midst of educations' need to respond urgently to the pandemic's global spread little has been shared in terms of student and tutor experience and understanding how to help special educators, besides students transition to online. The ability to customise learning to address learning gaps and meet learners' needs in the online learning environment during such unprecedented times depends on tutors/teachers and students having acquired the pedagogical knowledge and skills to mutually use the digital tools involved. Yan et al.'s (2020, p. 2053) study of children K-12 recognised the role of smart phones in their provision of substantial advice for teaching in general, concluding:

educational authorities and schools should provide sufficient technical support to help students to overcome potential internet and technical problems, as well as choosing online learning platforms that have been customised for smartphones. Second, customising the online pedagogy design for students in different school years, in particular, focusing on providing sufficient guidance for young children, more online collaborative opportunity for older children and adolescent, and additional learning resource for senior students who are facing final examinations.

Children with special needs typically have trouble with learning development and physical activities. They also tend to have behavioural, emotional and communication problems (Stake & Hornby, 2020; Misciagna, 2020). These children are typically placed in schools that are able to address their special educational needs (SEN), usually through licensed specialised tutors and therapists (Bryant, 2017), since they require assistance and adjustments in their personal and academic life, and a coordinated approach. In keeping with his social learning theory Bandura (2012) highlighted the importance of the learning environment being able to foster students' engagement with the people around them in their learning. As Miller (2011, p. 236) aptly stated, “[T]he main characteristic of the social learning theory, are the centrality of observational learning, a causal model that involves an environment- person-behavior system, cognitive contributions, and self-efficacy and agency” (cited in Lamport, Graves, & Ward, Miller, 2012, p. 56). Thus, providing the necessary specialist attention within given time constraints can make it challenging for specialised tutors to meet competing demands and ensure inclusive pedagogical practices. Since the pedagogical approach should aim at improving their physical, emotional, social and intellectual capabilities, moving to tutoring in the online learning environment as opposed to regular face-to-face presents a challenge not confronted before. Taking these factors into consideration, this study sought to better understand how this need for impactful learning has been addressed in the switch to online for students with special needs in the context of India.

LITERATURE REVIEW

For addressing social, communication, behavioural, and adaptive skills in those with SEN, effective technology-based programs have gradually gained recognition among both practitioners and researchers. With the uptake of digital communication technologies people with SEN have been found to have a special interest in computerised learning, which can be motivational. There are several reasons for this, as researchers have identified certain advantages that computers provide with respect to the core deficits of Autism Spectrum Disorder (ASD) in particular (Scott, 2018). Reasons include the support of technology for provision of both consistency in clearly defining a task and directing the specific focus of attention thus reducing distractions from unnecessary sensory stimuli, which can include interactions with peers (Lofts, 2018).

Such social demands are often challenging and confusing for those with ASD, thus attending to a computer or other screen technologies (e.g., Smartphone; iPad) can free them from this. According to Stiller and Mößle (2018), students with ASD use screen media as much as their peers, so making this an attractive inclusive option. Moreover, unlike the customary classroom social environment, online learning experiences, e.g., use of Apps, can be located or designed to be dedicated to ASD learners' needs. Digital communication technologies also include the use of robotic; interactive video/DVD; hand-held and touch-pad devices; the use of Internet-based, collaborative, virtual environments; eye tracker-based gaze-contingent visual displays; and shared active surfaces (Daud, Maria, Shahbodin, & Ahmad, 2018; Salemi, Reis, Saifhashemi, & Nikgozar).

While a range of supportive resources are available for teaching and learning, for promoting social, functional, and behavioural skills in individuals with ASD, specific technologies, such as authoring software tools, video modelling and video self-modelling, speech-generating devices, and virtual reality have been evaluated to determine their effectiveness as intervention strategies. Diverse skills that have been shown to be essential for individuals with ASD can be addressed using various innovative technology-based interventions. These innovations can foster student agency and voice in their learning, for example, allowing students choice and the ability to initiate, maintain and end activities. They can support students' daily functional needs, including facial recognition and ability to read non-verbal cues. In addition, they can support students' safety skills, vocabulary development, and reading skills and, as necessary, their speech. In turn, this can facilitate students' confidence and participation. However, even after more than a decade of increasingly intensive research in this field, technology-based treatment is still perceived as "emerging" rather than "established", and its clinical validity is still a matter of debate across the globe (Anoyiannakis, 2013; Kumm, Viljoen, & de Vries, 2021).

A few researchers address technological design issues, while some others report case studies or explore possible usages of technology. Recent studies tend to emphasize the potential of technology more than its seemingly demonstrated effectiveness. (Gillette, et al., 2007). Technology is said to have the power that allows for adaptability and motivation. Rather than the monotonous classroom teaching, which is mostly done verbally, students find it easier to pay attention to technology-based teaching. Students with learning disabilities are often visual thinkers, and technology can help them access information in a visual way and often in a simpler manner. Hence, seeing pictures and listening to various noises and sounds can help their understanding. Sometimes various sounds are used to enable students' responsiveness because they may react differently to different sounds (Lofland, 2018).

Given the fact that computer-based technology usually involves either videos, pictures or sounds, there is no doubt about the fact that computer or technology-based teaching attracts students with learning disabilities. Research has also shown that computer-based technology has a positive impact on students, such that they prefer engaging in technology-based teaching more frequently compared with sitting in a regular classroom setting. It can be particularly supportive for ASD students' who are likely to have shorter attention spans considering their pattern of growth. This is reflected in the results of Dikusar's (2018) study that investigated a range of technologies: tactile and auditory prompting devices, video-based instruction and feedback, computer aided instruction, virtual reality and robotics. Researchers have also discovered there is a need to make things flexible for people with special needs, but as Kumm, Viljoen, and de Vries (2021) emphasise:

these technologies need to be designed from the outset not only with the end-user, purpose, domain and setting in mind, but also with the accessibility, affordability, acceptability and scalability . . . in the specific context and community of the end-user in mind.

Thus, mobile technologies have proved for some time to be the most in demand when it comes to teaching students with learning disabilities in being assistive and adaptive for learning. In Song's (2012) call for more research at that time she describes how early usage of cell phones was able to support children's fine-motor skills development. The touch screen of the first prototype, 'Mocoto', had the capabilities to allow for easy interactions with a comprehensive library of cards that were preinstalled. This software was flexible enough for content to be added along with audio and video clips as well as images that teachers/users might create. Such a strategy allows the creation of a more personalised database where images can be easily managed and sorted for ongoing application to learning needs.

Similarly, for children with ASD and limited speech, iPads have been successfully used as speech-generating devices (SGDs) (Parsons, Cordier, Lee, Falkmer, & Vaz, 2019). They have also been used to support the development of basic literacy skills such as picture/word matching where students are easily able to signal their answer (de Lima Antão et al., 2020; van der Meer et al., 2014; Westerveld, Paynter, Trembath, Webster, Hodge, & Roberts, 2017). This approach was also seen by van der Meer et al. (2014) as being relevant in relation to developing and supporting other academic/literacy skills for ASD students with speech difficulties.

Online learning has also taken advantage of virtual reality to enable students to visualise the learning process and engage and interact with information and multimedia to support understanding and stimulate learning. The visualization process refers to visual representation in computers, auditory components or any other forms of sensory outputs displayed in a virtual world (Wedyan, Al-Jumally, & Dorgham, 2020). Virtual reality as a tool is able to assist the students' learning while at the same time alleviate many of the typical issues associated with the traditional approach to teaching and learning. However, Standen and Brown (2006) note that there are limitations of its applicability to students with extremely limited visual ability but their situation can be enhanced through developing acoustic virtual environments. Thus, technology is able to respond in multiple ways. Students' motivation and agency in their learning can also be enhanced through the use of video games. Hiniker, Daniels, and Williamson (2013) point out their therapeutic qualities particularly for children with autism. Thus, it seems technology can help children with special educational needs in wide range of ways such as gaining an overall understanding of their environment, and learning and practising vital skills like attention skills, expressive communication skills, organisational skills, academic skills, and self-help skills. These all provide support for functionality and learning independence (Mohammad & Abu-Amara, 2019). This is reinforced by the work of

Boser, Goodwin, and Wayland (2014) who established that technology can be used not only as a source of entertainment but also as a tool for education and for the development of social skills so as to increase the learning autonomy of students with learning disabilities (Lampert et al., 2012). In this way the use of digital communication technologies and Web 2.0, in particular, is able to help foster the transition from traditional information transmission views of learning to a more interactive social constructivist model, thus helping to create a more participatory educational environment. As Cochrane (2016) specifies: “it is the potential for mobile learning to bridge pedagogically designed learning contexts, facilitate learner-generated contexts, and content (both personal and collaborative), while providing personalisation and ubiquitous social connectedness, that sets it apart from more traditional learning environments”.

From the perspective of families of children with disabilities, the potential of current technological solutions to support the challenges they face on a daily basis provides much hope. Many families across the world need individually adapted practical support as well as financial support (Kumm et al., 2021). They especially need support that takes into consideration the situation of the whole family as a group.

Research indicates that siblings of children who are autistic tend to take on more responsibility for the family’s wellbeing and may exhibit more maturity than other children of their age group (Anderson, Liang, & Lord, 2014; Ferraioli & Harris, 2009). However, research into siblings of ASD and Downs Syndrome (DS) children suggests that in adulthood their outlook for the future may be somewhat pessimistic depending on several factors. They were generally more positive when their sibling with special needs had higher levels of functional independence, and they had acquired problem-focused coping strategies, and also had relatively easy access e.g., lived in close proximity and had regular contact (Orsmond & Seltzer, 2007). Of note is the growing availability of support to families through the use of technology (McIntyre, 2019). This can support communication, learning and management strategies and facilitate children's social life, thus improving the family’s social life at the same time (Hastie & Stephens, 2019). As Ameis, et al. (2021) show, technology has been vital in supporting evidence-based interventions to address the challenge of COVID-19.

Thus, this literature review shows that current research tends to be focused on how technology can facilitate children's ability to learn and also to manage in school. It highlights the growth and success in the use of applications that are supported through screen and mobile technologies besides computers, such as iPads and Smartphones (Stakes, 2020). While these tools are also applicable to mainstream pedagogical needs the research shows additional technologies are in train that are relevant to the specific needs of students with disabilities, including those on the Spectrum - ASD and ADHD, those with specific learning disabilities, and those with visual and hearing impairment. Munoz et al. (2019, p. 7955) concluded:

technology has allowed the improvement of the lives of many people with ASD. This is because it helps them to compensate for various verbal and interaction problems, as well as facilitating exchanges between people with ASD, family members, experts, and others. Thus, this compensation and facilitation expands new forms of communication, socialization, learning, and employment options.

Nonetheless, few studies focus on how technology can facilitate and improve children's everyday lives. There is a lack of long-term studies on the feasibility of technology, and studies that include the experience of the rest of the family – parents and siblings – and how the technology impacts on the interactions within in the family. There is also a lack of knowledge about which aspects of everyday life impact on successful design and use of technology.

Research Gaps

This analysis of the literature indicates that recent research has shown that there is a growing appreciation of the usefulness of technology to support students with special education needs both in class settings and in the home and out of school environment. However, further research on student motivation and parent willingness to assist in the learning process where technology is involved is important. This particularly applies in the context of special online education in current times of the COVID-19 pandemic when the home learning environment is party to the social situation (Lampton et al., 2012). This includes the potential need for skill enhancement that may have emerged during the challenge of the remote learning scenario, along with the potential to consider the psychological stressors parents may have faced through the extra demands on their parental role. Thus, the present research set out to explore this situation, setting the following objectives to:

1. understand the pedagogical and instructional design adopted by special tutors in the context of remote learning
2. explore the nature of the digital learning tasks performed by students with special needs
3. assess to what extent the lesson plans in use motivated learners to take an active role in their own learning and skill enhancement
4. identify challenges faced by the learners in an online setting.

METHODOLOGY

Research Design, Sampling and Data Collection

As a small case study, the research involved a total of 17 participants; seven were special education tutors of students with special needs and the remaining ten were parents of the children they taught, who attended urban special education schools in India. Special education schools predominantly cater to children with learning disabilities, physical disabilities, and intellectual disabilities. For the current study, the researchers studied the impact of e-learning among children with learning disabilities like dyslexia, auditory processing disorder and dysgraphia. Since the primary researcher is from one of the five schools considered for the study, care was taken to differentiate between the conduct of the research and work role (Galea, 2009). Convenience sampling was used to identify all the special education tutors from the selected schools. Then the snowballing technique was used to reach out to the parents of students studying across these schools in grades 9 and 10. Parents and special education tutors volunteered in response to the researchers' invitation. Consent for participants to join the study was sought using a formal consent form. Prospective participants were informed that the research was being conducted to illuminate and better understand the way special education tutors and children with learning disabilities engage and learn in the online distance learning mode and how online classes were designed to help students with their skill development.

Data were collected through the conduct of semi-structured interviews using WebEx¹, a video conferencing application. Each interview lasted up to at least 40 minutes. Since the participants had reservation about recording their interview data because they were inclined towards discussing the challenges they faced, which included the instructional design and expectations from the institution, all information emerging from the discussion was noted down

¹ <https://www.webex.com/>

by two moderators to ensure accuracy and avoid missing any point. All participants were informed of the purpose of the study, and that data would be processed, analysed and ultimately published. They were assured of their anonymity in any reporting. Data derived from the interviews were analysed using the classical content analysis and Key Word in Context Method (KWIC) (Luhn, 1959a; Luhn, 1959b).

Social learning theory (Bandura, 2001) acted as the theoretical framework for the study because, as noted earlier, it is particularly relevant to special education in underpinning the pedagogical approach to addressing the challenges of supporting students' engagement with the people and the learning process. One of the ways these children learn is by mimicking what they see around them. They observe and interact with their environment, including the people in their families, their special tutors, and peers, and also act on what has been exhibited. In this style of learning, actions may be rewarded or not, thereby making observation and motivation as the key factors that influence learning behaviour.

RESULTS AND DISCUSSION

Tables 1 to 3 provide insights into the challenges that emerged from participants' interview data in relation to the remote learning process, as informed by the content analysis and KWIC. The tables relate to the impact of the delivery of special education online for students, parents and special education tutors, respectively. From the information in these tables it becomes clear that the transfer to online learning presented many challenges, for all involved. The following discussion draws on these emergent themes, which are also overlapping in terms of illuminating the research questions.

In understanding the pedagogical and instructional design adopted by the special education tutors in this shift to remote learning (Objective 1), the research shows that the special education tutors were reliant upon their existing technological skills. Thus, through lack of training to facilitate their transition to teaching online and the lack of appropriate supportive resources to help engage students in the changed learning environment they were forced to apply the same traditional modes of teaching. This included a focus on syllabus completion but in the absence of the support of other specialists, and increased demand for documentation. Similarly, the analyses show that in exploring the nature of the digital tasks performed by the students (Objective 2) the online learning environment was particularly challenging for both teaching and learning. It was reported as lacking in any adaptation to being able to use digital communication technologies in a creative and motivating way. Moreover, students seemed to find it difficult to pay attention or concentrate when the traditional mode of learning in class was merely transferred to online, so much so that they turned their cameras off. The research suggested that the need to attend via the screen technology for long periods of time, and lack of social interaction caused cognitive overload and was tiring. Thus, in relation to research Objective Three, on the extent to which lesson plans motivated learners to take an active role in their own learning and skill enhancement, the online learning environment acted as a barrier to this being achieved. The special education tutors were unable to reach out and connect with students via the online learning platform. The lack of supportive digital resources and provision of professional development to enable them to offer more interactive pedagogy contributed to this, thus confining them to unidirectional or monologic teacher talk where they shared information and gave instructions. This was seen as isolating students as opposed to being inclusive.

In addition, the pandemic forced schools to reduce fees, which affected their funding abilities. Thus, there was a lack of funding for assistive technologies that would have better enabled a more integrative online pedagogical approach. However, tutor training was an underlying issue as some tutors reported they totally lacked technological skills. Demands on

tutors' time was also an issue with school authorities requiring submission of Developmental Learning Plans (DLPs) and students' needing to be prepared for examinations. This was seen as contributing to tutors' inability to focus on skills enhancement. Similarly, the tutors also faced pressure to be able to respond to parents' concerns about the issues they were experiencing with their children's online learning. In response to Objective Four, this illuminates the challenges faced by the students in the online setting. Their lack of participation and opportunity for social interaction combined with the cognitively demanding traditional transmission of information pedagogical approach resulted in irritability and falling back on skills.

Results of Individual Interviews with Special Education Tutors and Parents

Table 1: Challenges faced in relation to students

Emergent theme
Irritability due to sensory and information overload.
Lack of focus in class, distancing from class.
Students keeping their camera off and not responding to tutors/peers.
Lack of response to the current learning format.
No opportunities for outdoor activities; to socialize and communicate.
Students falling back on skills due to focus on academic content.
Students isolated further due to lack of opportunities for inclusion.
Long term exposure to technology and digital screen.

Table 2: Challenges faced in relation to parents

Emergent theme
Rise in work pressure and workload.
Parental stress arising from multi-tasking.
Fear of children falling back.
Lack of opportunities for children to socialise and communicate.
No opportunities for outdoor activities; to socialize and communicate.
Children lacking focus in class due to information and sensory overload.
Helplessness; lack of academic knowledge to support the children.
Uncertainty associated with the pandemic, isolation taking a toll on these children.
Children engaged in producing content that lacks creativity.
Challenges in giving attention and commitment due to workload.
Lack of assistance, shadow teachers.
Problems related to misuse of the Internet.

Table 3: Challenges faced in relation to special education tutors

Emergent theme
Lack of assistants, shadow teachers.
No easy access to speech therapists, school psychologists.
Lack of technical support and knowledge.
Lack of guidelines, cooperation from the organisation.
No investment of instruments for pedagogical assessment.
Rise in documentation with lack of focus on instruction.
Focus on syllabus completion.
Forced to adopt traditional modes of teaching in an online setting.

From the above data, it is evident that there were several substantial challenges faced by parents, students and special education tutors in the context of tutoring and students' learning online during the pandemic. The conventional mediums used involved Microsoft Teams and Webex. Zoom was ruled out by most tutors due to issues with privacy and hacking. While this may not be so surprising since all had been forced to quickly adapt to the use of a medium to which they would have been largely unfamiliar, the tutors would have benefitted from professional development training to utilise available educational technologies. However, school administrators had not been able to organise specific teaching training programs for the special educational needs department due to lack of funds. This appeared to be a problem across all three schools from which participants were drawn. It was found that most lesson plans were created with an intention of covering the syllabus and merely delivering content in the class time. Thus, it was found the classes lacked any activities or learning experiences that promoted skills to enhance students' use of the technology, such that students were reported as being unresponsive. Although some opportunities were created to foster socialisation and communicative interactions, these were seen as not going well, and so the desired outcomes were not achieved.

Importantly, most students with special needs often learn through observation and modelling (Thomas, 2022), however this could not be executed in the online learning setting particularly when students were disconnected and did not engage in class. The reason for this was attributed to the 'online learning experience' causing an overload of information, resulting in students 'shutting off' from the class by turning their cameras off. Thus, with lack of support and access to resources as well as the requisite technical knowledge, the special education tutors were forced to teach students with the camera off. This equated to a pedagogical style more in keeping with delivering lectures involving the addition of presentations to complete the syllabus requirements.

The various challenges that emerged were raised by both special education tutors and parents, and the concern for students' difficulties with learning online was also reinforced by their concern for their progress. The lack of progress was attributed to students' low involvement, special education tutors lack of technical knowledge to make learning online more interesting, and lack of additional technical support from school authorities. In the non-COVID-19 times the special education tutors reported that they often created content using a variety of formats, thereby making lessons lively as it attracted students' attention and increased their retention of information. This was seen as a strength of their pedagogical approach that they were unable to duplicate for students with disabilities/special needs learning online. Moreover, parents

found it extremely challenging to dedicate extra time to their children owing to the rise in their workloads and generally making ends meet in their home situation during the pandemic. One of the main challenges appeared to be a feeling of helplessness because they lacked both the knowledge and also the time to provide extra support to help tutor them. In an offline setting, in the regular classroom, the children typically received individual support classes to help reinforce their understanding, to inculcate skills and to clarify misconceptions, but this research showed that this model was difficult to emulate in the context of learning online. Part of this challenge was also seen as relating to a lack of access to study materials, motivating online accessible technological resources that were available in suitable forms to gain students' interest. The responses in the interviews with both groups also clearly identified that there was a lack of focus on the various skills that students with special needs require in order to function in social situations, of which learning in a less personalised way via screen through WebEx made more demanding. This was seen as impacting on their ability to participate, make connections and collaborate, and also acquire a range of practical skills and analytical skills, as well as problem solving skills. Ultimately, parents saw themselves as unable to seek and approach appropriate support strategies and experts/specialists to help bridge such learning gaps.

Two of the most important skills that were identified as having suffered due to online learning were communicative and social skills. These are often the primary areas of concern for students with special education needs, where modelling and practising such skills are central to good practice. Offline/regular classes are typically designed to tackle these issues and condition students to the environment, peers and special education tutors, thereby enabling them to interact and learn from their surroundings. However, this research shows in the online learning context that is mediated through screen technology, for students with learning disabilities is more challenging to stimulate and maintain communicative and social interactions. This was partly because an abundance of information that was theoretical in nature was delivered in the form of lectures and power point slides, such that students were able to distance themselves from the online 'class' by not responding and turning their cameras off. Although, their assessments were designed to help them secure passing grades to move ahead to the next grade this change of learning mode and the challenges involved for all players was seen as defeating the purpose of implementing assessment of students' progress.

CONCLUSION

From the interviews with special education tutors and parents it is evident that the social isolation and disruptions, such as the unavailability of supportive resources, appropriate technology, development of training workshops, and remote teaching strategies, affected and interrupted the learning behaviour of the students with special educational needs who were the focus of the research. With lack of access to counsellors and speech pathologies, parents were faced with additional demanding responsibilities that they found overwhelming, given the extra pressures of the pandemic. To improve the quality of learning in these pandemic times, parents recommended that schools look into their curriculum and make it adaptable for such students based on their needs as listed in their Individual Education Plans (IEP). Also the use of multimedia was seen as highly relevant to make content illustrative and interesting, thereby to simplify and enhance students' learning experiences to better align with social learning theory.

It was also suggested that institutions should outsource counsellors and psychologists who would be able to work alongside the special education tutors to ensure the children did not regress in the remote learning setting. Although these students attend a special education school that caters exclusively to the needs of children with learning disabilities, it was found that there had been no extra support extended by the Indian government to address the extra challenges

of the pandemic. While policy makers in India often organise education focused conferences and seminars, policies are more applicable to the mainstream model of education. Thus, most education related decisions taken by government during the pandemic did not provide direct benefit to students studying in special education schools and particularly in the context of the schools in this study. However, it needs to be noted that India's "New Education Policy 2020" (NEP) (Nagesh & Chakraborty, 2020), has replaced the previous 1986 policy that has been criticised for its neglect of education for students with disabilities (Kumar, Kumar, & Rawat, 2017; Sanjeev & Kumar, 2007). As the pandemic has helped to highlight existing shortcomings in education of students with disabilities, and as Nagesh and Chakraborty (2020) argue a paradigm shift in how disability is framed is necessary moving forward, these present research findings provide insights at the deeper level of pedagogical challenges faced by special education tutors, parents and students with disabilities, themselves. It is recommended that implementation of the NEP ensures reform policy and practice protects students from being marginalised and stigmatised and schools are provided with the required facilities; and also professional development is provided for educators, such as workshops, teacher training seminars, counselling sessions to support special education tutors in devising new teaching strategies thereby ensuring children engage in meaningful learning.

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REFERENCES

- Ameis, S. H., Lai, M. C., Mulsant, B. H., & Szatmari, P. (2021). Coping, fostering resilience, and driving care innovation for autistic people and their families during the COVID-19 pandemic and beyond. *Molecular Autism, 11*(61).
<https://doi.org/10.1186/s13229-020-00365-y>
- Anderson, D. K., Liang, J. W., & Lord, C. (2014). Predicting young adult outcome among more and less cognitively able individuals with autism spectrum disorders. *Journal of Child Psychology & Psychiatry, 55*(5), 485–94.
- Anoyiannakis, K. (2013). Using technology to support individuals with ASD: A review of the literature. *Honors Projects, 203*. <http://scholarworks.gvsu.edu/honorsprojects/203>
- Boucenna, S., Narzisi, A., Tilmont, E., Muratori, F., Pioggia, G., Cohen, D., . . . Fortunati, L. (2014). Interactive technologies for autistic children: A review. *Cognitive Computation, 6*(4), 72-74. doi:[10.1007/s12559-014-9276-x](https://doi.org/10.1007/s12559-014-9276-x)
- Bandura, A. (2012). On the functional properties of perceived self-efficacy revisited. *Journal of Management, 38*(1), 9-44. <https://doi.org/10.1177/0149206311410606>
- Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology, 52*(1), 1-26. <https://doi.org/10.1146/annurev.psych.52.1.1>

- Boser, K. I., Goodwin, M. S., & Wayland, S. C. (2014). *Technology tools for students with autism: Innovations that enhance independence and learning*. Towson, MD, USA: Paul H. Brookes Publishing Company.
- Bryant, D. S. (2017). Teaching students with special needs in inclusive classrooms. *ELT Journal*, 71, 525–528.
- Cochrane, T. D. (2016). Exploring mobile learning success factors. *Research in Learning Technology*, 18(2), 133-148. <https://doi.org/10.1080/09687769.2010.494718>
- Cheng, W. K. (2006). A research study on students' level of acceptance in applying E-Learning for business courses: A case study on a technical college in Taiwan. *Journal of American Academy of Business*, 8(2), 265-270.
- Daud, S. S., Maria, M., Shahbodin, F., & Ahmad, I. (2018). Assistive technology for Autism Spectrum Disorder: A review of literature. In: *Proceedings of International MEDLIT Conference*, 5-6 March 2018, Kuala Lumpur, Malaysia.
- de Lima Antão, J. Y. F., de Abreu, L. C., de Almeida Barbosa, R. T., Crocetta, T. B., Guarnieri, R., Massetti, T., (. . .) de Mello Monteiro, C. B. (2020). Use of augmented reality with a motion-controlled game utilizing alphabet letters and numbers to improve performance and reaction time skills for people Autism Spectrum Disorder. *Cyberpsychology, Behavior, and Social Networking*, 23(1), 16-22. <https://doi.org/10.1089/cyber.2019.0103>
- Dikusar, A. (2018, August 9). The use of technology in special education. Retrieved from *e-learning industry*. <https://elearningindustry.com/use-of-technology-in-special-education>
- Duvall, R. M. (2020). The relationship between autism and the multiple intelligences theory: Identifying patterns in learning for educational purposes. *Honors Thesis*, 715. Eastern Kentucky University. https://encompass.eku.edu/honors_theses/715
- Ferraioli, S. J., & Harris, S. L. (2009). The impact of autism on siblings. *Social Work in Mental Health*, 8(1), 41-53. doi: [10.1080/15332980902932409](https://doi.org/10.1080/15332980902932409)
- FitzPatrick, T. (2012). Key success factors of eLearning in education: A professional development model to evaluate and support eLearning. *US-China Education Review*, A 9, 789-795. Available at <https://eric.ed.gov/?id=ED537174>
- Galea, A. (2009). Breaking the barriers of insider research in occupational health and safety. *Journal of Health and Safety Research and Practice*, 1(1), 3-12.
- Gillette, D. R., Hayes, G. R., Abowd, G. D., Cassell, J., el Kaliouby, R., Strickland, D., & Weiss, P. (2007). Interactive technologies for Autism. In *Extended abstracts on human factors in computing systems (CHI EA'07)*, San Jose, California, USA, 28 April – 3 May 2007. New York, NY, USA, pp. 2109-2112.
- Harasim, L. (2000). Shift happens: Online education as a new paradigm in learning. *Internet and Higher Education*, 3(1-2), 1st Quarter-2nd Quarter, 41-61. https://www.sciencedirect.com/science/article/pii/S1096751600000324?casa_token=jirfHhH4FMMAAAA:gN8uz74nwTuGrDbnOa0Rtp53LthN2jIbAVL8xwjrfSbgjPVRTbCk34WurgMewmdxyeGGgvGyMJs
- Hastie, J. L., & Stephens, C. (2019). Vicarious futurity: Parents' perspectives on locating strengths in adolescents with autism. *Aotearoa New Zealand Social Work*, 31(1), 89–100. <https://doi.org/10.11157/anzswj-vol31iss1id505>
- Hiniker, A., Daniels, J. W., & Williamson, H. (2013). Go go games: Therapeutic video games for children with autism spectrum disorders. In: *Proceedings of the 12th International Conference on Interaction Design and Children* (pp. 463-466). ACM. <https://doi.org/10.1145/2485760.2485808>
- Kaiper-Marquez, A., Wolfe, E., Clymer, C., Lee, J., McLean, E. G., Prins, E., & Stickel, T. (2020). On the fly: Adapting quickly to emergency remote instruction in a family

- literacy programme. *International Review of Education*, 66, 691–713. <https://doi.org/10.1007/s11159-020-09861-y>
- Kristóf, Zs. (2020). International trends of remote teaching ordered in light of the Coronavirus (COVID-19) and its most popular video conferencing applications that implement communication. *Central European Journal of Educational Research*, 2(2), 84–92. <https://doi.org/10.37441/CEJER/2020/2/2/7917>
- Kumar, D. N., Kumar, P., & Rawat, J. S. (2017). Education of persons with visual disability in India. *International Journal of Development Research*, 7(8), 14757-14761.
- Kumm, A. J., Viljoen, M., & de Vries, P. J. (2021). The digital divide in technologies for autism: Feasibility considerations for low- and middle-income countries. *Journal of Autism Development Disorder*. <https://doi.org/10.1007/s10803-021-05084-8>
- Lampont, M. A., Graves, L., & Ward, A. (2012). Special needs students in inclusive classrooms: The impact of social interaction on educational outcomes for learners with emotional and behavioral disabilities. *European Journal of Business and Social Sciences*, 1(5), 54-69. <http://www.ejbss.com/recent.aspx>
- Li, C., & Lalani, F. (2020, April 29). The COVID-19 pandemic has changed education for ever: This is why. *World Economic Forum*. Retrieved 2020 from
- Lofts, J. (2019, January 15). The future of autism treatment: 4 recent innovations with transformative potential. Healis Autism Centre. Retrieved from <https://www.healisautism.com/post/the-future-of-autism-treatment-4-recent-innovations-with-transformative-potential>
- Lofland, K. B. (2018). *The use of technology in the treatment of autism spectrum disorder*. Indiana Resource Centre for Autism.
- Luhn, H. P. (1959a). Selective dissemination of new scientific information with the aid of electronic processing equipment. In C. K. Schultz (Ed.), *Pioneer of information science: Selected works* (pp. 246-254). New York: Sparten Books.
- Luhn, H. P. (1959b). *Keyword-in-context Index for Technical Literature (KWIC Index)*. University of Michigan, USA: International Business Machines Corporation, Advanced Systems Development Division.
- McIntyre, L. L. (2019). Presidential Address, 2019—Family-based practices to promote well-being: A personal journey of knowledge translation. *Intellectual Developmental Disability*, 57(6): 545–548. <https://doi.org/10.1352/1934-9556-57.6.545>
- Misciagna, S. (2020). *Learning disabilities: Neurological bases, clinical features and strategies of intervention*. IntechOpen.
- Mohammad, H. & Abu-Amara, F. (2019). A mobile social and communication tool for autism. *International Journal of Emerging Technologies in Learning (iJET)*, 14(19), 159-167. Kassel, Germany. <https://www.learntechlib.org/p/217005/>.
- Munoz, R., Morales, C., Villarroel, R., Quezada, A., & de Albuquerque, V. H. C. (2018). Developing a software that supports the improvement of the theory of mind in children with Autism Spectrum Disorder. *IEEE Access*, Volume 7, 7948-7957. <https://doi.10.1109/ACCESS.2018.2890220>
- Nagesh, S., & Chakraborty, S. (2020, September 10). *Blog. Is India's New education Policy sufficiently inclusive of people with disabilities?* Available at <https://www.internationalhealthpolicies.org/blogs/is-indias-new-education-policy-sufficiently-inclusive-of-people-with-disabilities/>
- Orsmond, G. I., & Seltzer, M. M. (2007). Siblings of individuals with autism or Downs syndrome: Effects on adult lives. *Journal of Interllectual Disability Research*, 51(9), 682-696. <https://doi.org/10.1111/j.1365-2788.2007.00954.x>
- Parsons, D., Cordier, R., Lee, H., Falkmer, T., & Vaz, S. (2019). A randomised controlled trial of an information communication technology delivered intervention for children with

- Autism Spectrum Disorder living in regional Australia. *Journal of Autism Development Disorder*, 49, 569–581. <https://doi.org/10.1007/s10803-018-3734-3>
- Pink, D. H. (2006). *A whole new mind: Why right-brainers will rule the future*. New York: Riverhead Books.
- Roe, A., Blikstad-Balas, M.m & Dalland, C. P. (2021). The impact of COVID-19 and homeschooling on students' engagement with physical activity. *Frontiers in Sports and Active Living*, 2. <https://doi.org/10.3389/fspor.2020.589227>
- Runco, M. A., & Pritzker, S. R. (2020). *Encyclopedia of Creativity* (3rd ed.), (Vol. 1, pp. 779-784). San Diego, CA: Academic Press.
- Salemi, B., Reis, J., Saifhashemi, A., & Nikgozar, F. (2005). MILO: Personal robot platform. *IEEE/RSJ, International Conference on Intelligent Robots and Systems (IROS)*, Edmonton, AB., Canada, 3833–3838. doi: [10.1109/IROS.2005.1545566](https://doi.org/10.1109/IROS.2005.1545566)
- Sanjeev, K., & Kumar, K. (2007). Inclusive education in India. *Electronic Journal of Inclusive Education*, 2(2), 1-15. <https://corescholar.libraries.wright.edu/ejie/vol2/iss2/7/>
- Scott, L. (2018). Use of technology for children with Autism: Academic success in the least restrictive environment. *Journal of Educational Leadership in Action*, 5(2).
- Sohrabi, C., Alsafi, Z., O'Neill, N., Khan, M., Kerwan, A., Al-Jabir, A., (. . .) Agha, R. (2020). World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19), *International Journal of Surgery*, 76, 71-76. <https://doi.org/10.1016/j.ijsu.2020.02.034>
- Stakes, R., & Hornby, G. (2020). *Meeting special needs in mainstream school: A practical guide for teachers* (2nd. ed.). London: David Fulton Publishers.
- Standen, P. J., & Brown, D. J. (2006). Virtual reality and its role in removing the barriers that turn cognitive impairments into intellectual disability. *Virtual Reality*, 10, 241–252. <https://doi.org/10.1007/s10055-006-0042-6>
- Stiller, A., & Mößle, T. (2018). Media use among children and adolescents with Autism Spectrum Disorder: A systematic review. *Review Journal of Autism Development Disorders*, 5, 227–246. <https://doi.org/10.1007/s40489-018-0135-7>
- Song, H. S. (2012). Mobile technology for children with autism spectrum disorder: Major trends and issues. In: *Proceedings of 2012 IEEE Symposium on e-Learning, e-Management and e-Services*, pp. 1-5, October, Kuala Lumpur. <https://doi.org/10.1109/is3e.2012.6414954>
- Sulaimani, M. F., & Gut, D. M. (2019). Hidden curriculum in a special education context: The case of individuals with autism. *Journal of Educational Research and Practice*, 9(1), 30-39. <https://doi.org/10.5590/JERAP.2019.09.1.03>
- Thomas, G., & Loxley, A. (2022). *Deconstructing special education and construction inclusion* (3rd ed.). London: Open University Press.
- Van der Meer, et al. (2015). An iPad-based intervention for teaching picture and word matching to a student with ASD and severe communication impairment. *Journal of Developmental Physical Disabilities*, 27, 67-78. doi 10.1007/s10882-014-9401-5 <https://link.springer.com/content/pdf/10.1007/s10882-014-9401-5.pdf>
- Wedyan, M., Al-Jumally, A., & Dorgham, O. (2020). The use of augmented reality in the diagnosis and treatment of autistic children: A review and a new system. *Multimedia Tools and Applications*, 79, 18245-18291. <https://doi.org/10.1007/s11042-020-08647-6>
- Westerveld, M. F., Paynter, J., Trembath, D., Webster, A.A., Hodge, A. M., & Roberts, J. (2017). The emergent literacy skills of preschool children with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 47, 424–438.

- Yates, A., Starkey, L., Egerton, B., & Flueggen, F. (2020). High school students experience of online learning during COVID-19: The influence of technology and pedagogy. *Technology, Pedagogy and Education*, 20(1). <https://doi.org/10.1080/1475939X.2020.1854337>
- Yan, L., Whitelock-Wainwright, A, Guan, Q., Wen, G., Gašević, D., & Chen, G. (2020). Students' experience of online learning during the COVID-19 pandemic: A province-wide survey study. *British Journal of Educational Technology*, 52, 2038–2057. <https://doi.org/10.1111/bjet.13102>