



## Teachers' perceptions, attitudes and knowledge of online learning for students with disabilities in Saudi Arabia

Ahmed Aldousari<sup>1</sup>

Weili Yuan<sup>2</sup>

<sup>1</sup>Prince Sattam bin Abdulaziz University, Saudi Arabia.

Email: [A.aldousari@psau.edu.sa](mailto:A.aldousari@psau.edu.sa)

<sup>2</sup>Washington State University, USA.

Email: [weili.yuan@wsu.edu](mailto:weili.yuan@wsu.edu)



( Corresponding Author)

### Abstract

This study investigates how Saudi Arabian special education teachers believe about online learning for students with disabilities evaluating their familiarity with the subject and identifying factors affecting their preparedness to adopt this mode of instruction. Researchers aim to understand educators' perceptions of delivering special education through online platforms in Saudi Arabia through a cross-sectional analysis of quantitative data complemented by responses to three open-ended questions. The study involves 130 in-service special education teachers currently employing online methods to teach students with disabilities. The research findings reveal key insights: Firstly, most participants (79%) viewed online learning as beneficial for their students, echoing prior research highlighting its feasibility for students with disabilities. Secondly, many teachers indicated gaps in their knowledge (34%) and confidence (31%) related to online instruction emphasizing the need for tailored professional development. Lastly, challenges related to internet access (36%) and software availability (35%) underline infrastructure barriers requiring attention to facilitate effective online education for individuals with disabilities in Saudi Arabia. These findings underscore the importance of ongoing professional development and infrastructure enhancements to optimize the online learning experience in Saudi Arabia. This paper concludes by outlining practical implications and suggesting avenues for future research.

**Keywords:** Disabilities, Online learning, Professional development, Saudi Arabia, Special education, Teacher perceptions.

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### Contribution of this paper to the literature

This study contributes by examining Saudi Arabian special education teachers' perceptions of online learning for students with disabilities evaluating their readiness and identifying factors impacting adoption. The inclusion of open-ended questions alongside quantitative analysis offers nuanced insights into teachers' perspectives enriching the understanding of online special education in Saudi Arabia.

## 1. Introduction

Online learning also known as e-learning uses internet technology to facilitate education allowing teachers and students to interact without constraints of location, distance or time (Verawardina et al., 2020). Online learning has emerged as a feasible alternative or supplement to conventional classroom teaching especially during the COVID-19 pandemic due to its inherent flexibility. During extended lockdowns, numerous special education programs transitioned to online platforms adapting to the restrictions on traditional in-person learning settings.

Individuals with intellectual and developmental disabilities (IDD) faced distinct challenges during the COVID-19 pandemic as the effectiveness of their interventions such as occupational and speech therapy heavily relied on therapists' physical guidance and interpersonal interactions (Jeste et al., 2020). However, the experiences of Saudi Arabian students with IDD in the context of online treatment delivery remain largely undefined. There is a gap in understanding how to effectively leverage assistive technology to address the learning requirements of this specific group (Toquero, 2020).

Additionally, there are significant challenges in online education for students with disabilities other than IDD such as those who are deaf, have hearing impairments or have complex communication needs. Initial findings by Krishnan et al. (2020) indicate that these students faced inadequate learning experiences even before the pandemic. Their academic performance further deteriorated during the pandemic due to limited opportunities for real-world social interactions (Krishnan et al., 2020). The challenges faced by Saudi Arabian teachers providing virtual instruction to these students remain an area requiring further investigation to determine the specific obstacles encountered.

Increasing evidence underscores the beneficial effects of early intervention on the lifelong development and outcomes of children with disabilities. Such children benefit from personalized services and continuous assessments to track progress and shape their educational and family objectives (Warner-Richter & Lloyd, 2020). However, the COVID-19 pandemic led to the temporary suspension or closure of many early intervention programs, shifting attention to telehealth as a viable treatment option. There remains a limited understanding of teachers' challenges in delivering remote early childhood special programs in Saudi Arabia despite the growing reliance on online education.

Many students with special needs have suffered during the pandemic as they cannot acquire the special services they need for their learning. For instance, some have hearing impairments and have suffered greatly during this pandemic as their social interaction skills were hampered (Krishnan et al., 2020). According to Krishnan et al. (2020), the classroom environment was still challenging for these students even before the pandemic as they could not interact well with other students. However, during the pandemic, these people suffered as a result of the policies implemented which prevented interaction.

### 1.1. Significance of the Study

The significance of the study lies in its exploration of the challenges and perspectives surrounding online learning for students with disabilities in Saudi Arabia. Although online learning has become increasingly prevalent throughout the world, Saudi Arabia has not adopted it and faces significant challenges especially when it comes to K-12 settings (Almusharraf & Khahro, 2020). Existing literature indicates a gap in understanding the readiness of teachers to adopt online pedagogy and the experiences of students with disabilities in navigating virtual learning environments. This study aims to provide valuable insights into Saudi Arabian teachers' perceptions, knowledge levels and readiness concerning online learning for students with disabilities by addressing these gaps (Ali, 2021). This research is poised to inform policy and practice facilitating the development of targeted interventions to enhance the accessibility and effectiveness of online education for students with diverse learning needs in Saudi Arabia.

### 1.2. Research Questions

1. How do Saudi Arabian K-12 teachers perceive online learning for students with disabilities?
2. What is the knowledge level of Saudi Arabian teachers about online learning for students with disabilities?
3. What factors shape Saudi Arabian teachers' readiness to engage in online learning for students with disabilities?

## 2. Literature Review

### 2.1. Perspectives of Teachers and Students towards Online Learning

Numerous studies explore the perspectives of both teachers and students regarding the online learning approach as it continues to expand rapidly. Some research suggests a preference for the conventional face-to-face teaching model over online alternatives (Nambiar, 2020). Although the use of online platforms can overcome geographical limitations, they often lack the structured environment and efficacy of traditional classrooms (Nambiar, 2020). Many students express frustration when teachers are unable to offer crucial technical support. Face-to-face classroom interactions enable teachers to assess the efficacy of their teaching strategies and interpret students' non-verbal signals offering vital insights into their understanding. Numerous educators perceive it as less effective than traditional instructional methods despite the crucial role of online learning during the COVID-19 crisis (Fauzi & Khusuma, 2020).

Teachers highlight various obstacles associated with online instruction including technical problems, student participation, students' socio-economic situations and the overall quality of the online teaching experience (Rasmitadila et al., 2020). System malfunctions or network interruptions can jeopardize entire lessons. Students from economically disadvantaged backgrounds may face issues affecting their educational outcomes. Furthermore, encouraging active engagement from students in an online setting remains a significant challenge for teachers given their restricted ability to influence student involvement on this platform.

Students with disabilities often require more tailored support compared to their peers without such challenges emphasizing the need for close engagement with teachers to meet their specific needs. Although online learning provides convenience, it does not fully address the diverse requirements of these students. Peking University in China took the lead in online education during the COVID-19 outbreak. Nevertheless, the university noted that the efficacy of online courses is notably lower than that of traditional in-person teaching methods (Bao, 2020). Such observations highlight the limitations of online learning in meeting the unique needs of students reducing its attractiveness for both teachers and learners aiming for a holistic educational experience. Chen et al. (2020) conducted a study on user satisfaction regarding online learning. The study established that many students were dissatisfied with online learning. The spread of the virus led to the suspension of classes worldwide which essentially disrupted teaching plans worldwide. Many people moved to online learning where they used platforms such as Zoom, Skype and Facetime. However, these platforms have problems associated with system jams and the inability to offer exceptional learning services to students. Significantly, various students have expressed dissatisfaction with this platform for their studies. Ideally, they need to receive the proper in-person guidance they experienced in the physical classroom. Hence, they do not get the best from the platform.

In their study, Chen et al. (2020) examined student satisfaction regarding online learning uncovering significant discontent with this approach. The worldwide pandemic compelled educational institutions to transition from traditional classroom settings to online tools such as Zoom, Skype, and Facetime. Despite these platforms' convenience, they frequently experienced technical glitches compromising the quality of education.

According to Johnson et al. (2020) the transition to online learning by many institutions has posed significant challenges for students. Students with learning disabilities face particularly daunting hurdles due to their specific needs. Effectively addressing the diverse learning requirements of all students especially those with disabilities remains a formidable task on these platforms. Teachers often express concerns about the platform's limitations in catering to all student needs adequately (Johnson et al., 2020). For example, numerous teachers report that online learning falls short of meeting the complex needs of students with learning disabilities. Consequently, institutions must devise multiple instructional strategies to enrich the online learning experience for students with varying disabilities.

Students with disabilities often face accessibility issues especially when using communication tools in online learning environments. Such challenges can lead to heightened financial burdens given their need for extra assistance (Zhang et al., 2020). Additionally, many of these students depend on ongoing guidance to effectively navigate online coursework. Unfortunately, they often encounter disadvantages when using these digital platforms for educational purposes (Zhang et al., 2020). Consequently, it's crucial to design technology specifically aimed at aiding students with disabilities enabling them to actively participate in online learning and maintain parity with their classmates.

## *2.2. Online Learning Involvement in Saudi Arabia*

In 1978, Saudi Arabia embarked on its e-learning journey with the launch of a distance-learning initiative at King Saud University (Alturki, 2014). Subsequently, King Abdul-Aziz University and Al-Imam Muhammad Ibn Saud Islamic University introduced similar programs in 2002 and 2007 establishing specialized departments to support these endeavors (Alturki, 2014; Walabe & Luppicini, 2020). In 2010, the Saudi Ministry of Education implemented regulations to oversee these distance learning programs (Al-Asmari & Khan, 2014). Notably, numerous students have expressed their dissatisfaction with this platform for learning. Although online education had long been a prospect in Saudi Arabia, the COVID-19 pandemic forced a change from face-to-face to online instruction making e-learning a vital component of the country's educational system.

## *2.3. Perspectives of Teachers and Students on Online Learning in Saudi Arabia*

Online learning and teaching are not widely implemented across Saudi universities and school systems despite their wide acceptance and long history. Accordingly, the implementation frameworks, expertise and relevant knowledge of online learning still need to be improved in Saudi Arabia contributing to the limited implementation of this approach in the Middle East country. Alshamri (2021) examined challenges impacting the teaching methods for children with disabilities using a representative sample of 15 teachers from seven different public schools in northern Saudi Arabia to confirm these claims. The researcher answered the research questions focusing on key variables such as age, years of experience, gender, experiences during the lockdown and preparation for the next school year. From the semi-structured interviews and interview transcriptions, the author found that the COVID-19 lockdown period was challenging for Saudi teachers especially those dealing with students with intellectual incapacitations. A majority of teachers felt underprepared and needed help implementing online pedagogy. The findings affirm the need for board-level implementation of online education in Saudi Arabia. The ministry needs to do more to ensure full implementation of the program and the government is providing limited support to the ministry to support the transition to online learning.

Bahanshal and Khan (2021) surveyed 25 teachers and 75 students from King Abdul-Aziz University to examine the perspectives and readiness of college faculty and students transitioning from in-person to online instruction. The findings revealed that even before the onset of the COVID-19 pandemic, many universities in Saudi Arabia had employed a blend of in-person and online instruction. The research indicated a predominantly positive outlook towards e-learning among both teachers and students with a significant readiness to transition fully online.

Similarly, Almusharraf and Khahro (2020) highlighted college students' favorable experiences with online teaching methods emphasizing the need for further refinement and guidelines. The researchers assessed the

inclinations of 283 students, aged 18 to 30 towards various online teaching methodologies and discovered that the majority of students expressed satisfaction with the university's staff and faculty.

While e-learning has gained considerable recognition in Saudi Arabia, its integration into K-12 school systems remains limited (Alshamri, 2021). Alshamri (2021) conducted semi-structured interviews with 15 teachers shedding light on the challenges they face when teaching students with disabilities. This research highlighted that variables such as age, teaching experience, gender, experiences during closures and preparedness for future academic years influence teachers' self-assessment of their instructional capabilities. A prevalent concern expressed by these teachers was a feeling of being ill-equipped for online instruction underscoring the need for enhanced training in digital teaching methods.

### 2.4. Challenges Among Students with Disabilities

The research by Almusharraf and Khahro (2020) highlights college students' positive experiences with online education. Students with disabilities in Saudi Arabian universities present a different narrative. Aljedaani et al. (2021) investigated the e-learning encounters of eight deaf and hard-of-hearing students from the College of Technical and Vocational Training Corporation (TVTC) in Saudi Arabia and revealed that deaf and hard-of-hearing students faced significant challenges such as limited internet accessibility, insufficient instructional support, content inaccessibility, home distractions, disrupted schedules and feelings of social isolation.

Similarly, Alnaim and Alsarawi (2023) explored the hurdles of distance education for K-12 students with learning disabilities involving 188 teachers from 94 schools in the eastern region of Saudi Arabia. Both teachers and students concurred that e-learning remains in its infancy, citing issues like inadequate educational resources, technological tools and home-related impediments as primary obstacles.

Ali (2021) investigated the perspectives of 70 faculty members across Saudi universities who instructed students with disabilities through e-learning. The research explored faculty views on how e-learning impacted teaching efficacy, curriculum integration, social skill development, time commitments and areas for enhancement. The results indicated a positive relationship between perceived effectiveness and the utilization of e-learning technologies. Additionally, the study underscored the importance of improving access to suitable software, hardware and training to maximize the efficacy of e-learning initiatives.

This study aims to examine how Saudi Arabian teachers perceive online learning for students with disabilities, assess their knowledge level on the subject and explore the various factors that shape their readiness to engage in online learning for students with disabilities.

## 3. Research Design

This cross-sectional study analyzed the quantitative data and participants' responses to three open-ended questions to explore teachers' perspectives on implementing special education curricula through online learning in Saudi Arabia. The researchers aim to use this study to gain a deeper understanding of the dynamics of online instruction that targets students with disabilities. The researcher received human subjects' approval to complete the study. The ethical committee of Washington State University approved this study on December 12, 2020 (Ref. No. 18591-001).

### 3.1. Research Population

A total of 130 in-service teachers who taught students with special needs in Saudi Arabia participated in the study. All participants work in schools administered by the Ministry of Education in Saudi Arabia and hail from different regions. Their gender distribution was 40% male and 59% female with 1 participant preferring not to disclose. The first author recruited participants through Twitter and WhatsApp sharing the research invitation detailing the study and providing a link to the questionnaire. The survey consisted of Likert-scale items and open-ended questions. Responses to the open-ended questions were translated from Arabic into English to facilitate data analysis. The educational levels achieved by the survey respondents are detailed in Table 1. Table 2 describes the disability types of the students in the participants' classrooms.

Table 1. Participants' educational background.

Educational level	Percentage	Count
Bachelor degree	68.70%	89
A higher diploma after a bachelor's	9.92%	13
Master degree	19.85%	26
Doctoral degree	1.53%	2

Table 2. Students' disability type.

Disability type	Percentage
Learning disabilities	25.58%
Intellectual disabilities	33.33%
Hearing impairments	22.48%
Autism	6.98%
Speech or language impairment	1.55%
Visual impairment	0.78%
Multiple disabilities	3.88%
Other health impairments	5.43%

### 3.2. Instruments

The authors developed a 19-question Likert-scale survey to investigate teachers' perceptions, attitudes and knowledge about online teaching (see Appendix 1). The questionnaire was bilingual (i.e., in English and Arabic) and was administered on the Qualtrics website. The survey covers topics such as adequate technique support from



schools, teachers' expertise and confidence in online instruction as well as teachers' perceptions of how students and themselves benefit from online teaching besides the demographic questions.

The survey also includes three open-ended questions (i.e., what would you recommend improving online learning for students in special education programs? What is your level of satisfaction with the services provided to you to teach online? Currently, do you prefer to teach online or in-person without knowing if your students will return in person? and why?) to solicit respondents' input regarding their recommendations on how to improve online teaching for students in special education programs, a description of the participant's satisfaction with the services provided for their online teaching and teachers' preference between online teaching and in-person learning.

### 3.3. Data Analysis

Data were summarized using descriptive analysis for categorical variables of the survey data and calculated as relative frequencies or as means and standard deviations for the sample. The researchers investigated the bivariate relationship of the variables by conducting Pearson correlation analyses for the numerical data. Significant contrasts were calculated and compared about Cohen's effect size with 0.2-0.4 representing a weak effect, 0.4-0.6 indicating a mild effect and 0.6 above suggesting a strong effect. Effect sizes were summarized with 95% confidence intervals. The significance level for Type I error in statistical testing was established at 0.05. The participants' responses to the three open-ended questions were also examined to gather supplementary information on respondents' perspectives on the specific topics.

## 4. Results

### 4.1. Quantitative Data: Survey

The survey data revealed that remote learning is feasible for teaching students with disabilities. However, educational attainment may be influenced by the severity of students' disabilities and teachers' knowledge of how to deliver online instruction. Overall, 79% of the participants claimed that online learning benefited their students, and 7% of the teachers declared that their students could not make the most of remote learning opportunities to gain skills. About 88% of the teachers considered web-based teaching advantageous to themselves and 5% strongly disagreed.

The participants in this study demonstrated varying degrees of disability severity with 30% identified as having mild disabilities, 57% as moderate and 20% considered severe.

While the majority of the participants indicated frequent to very constant access to various types of software, devices and specific online platforms, a significant portion reported insufficient knowledge of delivering instruction online (34%), a lack of confidence in online classroom management (31%) and a deficiency in expertise in team-based problem-solving (40%). Additionally, approximately 24% of the participants were unclear about their students' rights in distance learning preventing them from advocating for them.

The primary challenge to overcome was delivering the interventions as 42% of participants indicated that they needed more information. Additionally, about 27% of the teachers felt unprepared for lesson planning, a crucial aspect of teaching practice.

The online instruction delivered by respondents took place on various platforms representing the latest technologies applied in virtual learning. The majority of participants (52%) used Microsoft Teams for online instruction followed by Zoom (30%). Six participants used a blackboard to teach students online. Approximately 13% of the participants claimed to use other online teaching platforms including the Saudi Ministry of Education's platform and Telegram.

In terms of service provision and technology accessibility, about 36% of the participants were affected by an unstable internet connection. Around 35% of the participants faced difficulties accessing the software needed to complete online teaching and 30% needed clarification about how to use related software. In addition, only 33% of the participants faced barriers to accessing supplemental or specialized equipment for online instruction. The rest of the teachers experienced a greater or lesser extent of difficulty accessing such devices. Roughly 66% of the participants experienced varying levels of difficulty with using the online platforms employed by schools and a similar proportion of the participants (63%) complained about the complexity of the school-adopted online platforms to some extent. 42% of the participants were concerned about their technology competency despite most teachers' comfort with using technology. Technical support was only available to some participants. Only 18 teachers were satisfied with the technical services that they had requested. Although it did not occur frequently, about 24% of the participants voiced that the technical services needed to be more responsive to their requests. Approximately 58% of the teachers found it hard to obtain support when encountering technical issues. In addition, securing teaching space is another obstacle for some of the teachers. Roughly 45% of the participants expressed a certain level of difficulty in this regard.

Correlation analyses between variables were conducted. The following variables demonstrated a statistically significant and positive relationship with each other. Using an alpha of 0.05, the researchers found that accessibility to school-dominated online platforms not only has a relatively strong correlation with teachers' ability to use software ( $r = 0.42$ ,  $p = 0.02$ ) but also demonstrated a strong and positive correlation with the provision of specialized equipment to facilitate course instruction ( $r = 0.5$ ,  $p = 0.04$ ). The results indicate that schools that allow easier access to their online platforms will likely provide more opportunities to enhance teachers' tech-savviness and are inclined to get specialized devices ready for use.

A moderate positive relationship was identified between teachers' accessibility to electronic instructional devices and teachers' awareness of students' rights in their online learning experience ( $r = 0.35$ ,  $p = 0.05$ ) indicating that the more adequate support that teachers received, the more likely that teachers are aware of students' rights in e-learning.

The bivariate relationship between accessibility to computerized devices and the teachers' knowledge level in instruction delivery is positive but shows a weak effect size ( $r = 0.27$ ,  $n = 93$ ,  $p = 0.01$ ). Moreover, the online learning practices including team-based problem-solving procedures and online intervention provision are weakly

correlated ( $r = 0.23, p = 0.03$ ). In addition, the ease of navigating schools' online learning platforms correlates with teachers' knowledge about students' benefits offered by online learning ( $r = 0.22, p = 0.02$ ).

#### 4.2. Results from Open-Ended Questions

None of the three questions attained a response rate over 50%. In terms of teachers' satisfaction with the service provision for web-based learning, 33 out of 62 respondents were highly satisfied. Twelve participants spoke negatively about the service provision for e-learning. The rest expressed moderate or acceptable levels of satisfaction. Teachers' dissatisfactions were manifested in the quotes below:

*I am not satisfied due to the inability to provide computers to some female students because the parents were not aware of the importance of web-based learning including marginalized females.*

*The teacher needs training to improve awareness of the platform tools (for online teaching). We need to practice to master it.*

In response to the question that sought teachers' preference between face-to-face instruction and distance learning, most teachers favored in-person teaching over online teaching. Only 5 out of 65 respondents unequivocally chose to teach online. Their reasons include: 1) online teaching can empower families and reach students who have no access to special education programs in their areas. 2) Students with less severe disabilities are more likely to benefit from online learning as compared to those with moderate and severe disabilities. 3) Some courses are best held remotely to teach specific subjects or target certain grade levels.

One respondent commented on the benefits of virtual learning:

*I prefer teaching through the Internet. It opens new horizons for me.*

For the teachers who opt for online teaching, the rationale includes: 1) tangible means are indispensable to special education which can only be accessed in brick-and-mortar classes. 2) Some students' learning outcomes are compromised due to their specific disability types such as hearing impairments that require cochlear implants. 3) Special education classes count on motor activities that are either inaccessible online or require a high level of family involvement. 4) Teachers experience difficulties controlling distractions in students' environment during online instruction. 5) Conventional classes are more accessible for teachers to understand students' needs by observing their behavior more closely.

The response rate to teachers' recommendations on improving special remote education was low (23%). Thirty participants commented on the possible means to optimize online education and the following three themes emerged: 1) the availability of devices for students is the premise for the success of online learning. 2) It is essential to improve family awareness of continuing education and foster school-family cooperation. 3) Although e-learning is feasible for many students with special needs, a hybrid learning model (i.e., 1-2-day face-to-face learning combined with web-based learning) may help achieve better outcomes. One teacher mentioned:

*I recommend opening the camera for the teacher and the students so that he or she can look at the teacher's body language. I also recommend that the student attend school at least one day a week.*

4) Teachers need training (e.g., take courses) to facilitate online instruction. 5) There is a call to action to develop special education e-learning programs to serve students with special needs.

*Customizing programs that suit their abilities and meet their needs is different from the study platforms used by non-disabled students.*

*We are developing programs that serve special education.*

## 5. Discussion

The results of this study shed light on several crucial aspects of Saudi Arabian teachers' perceptions of online learning for students with disabilities, their knowledge levels related to this approach and the factors influencing their readiness to engage in such educational practices.

### 5.1. Perceptions and Knowledge of Online Learning

Most participants expressed that online learning benefited their students. The findings align with the studies by Bahanshal and Khan (2021) and Ali (2021) which indicated that most students and teachers held positive attitudes towards online learning. Our findings are important as they suggest that online education can be a feasible means of teaching students with disabilities. However, it is noteworthy that some teachers believed their students could not make the most of remote learning opportunities indicating the need for further investigation into the specific challenges faced by this group.

Various teachers reported feeling insufficiently knowledgeable about delivering instruction online and unconfident about online classroom management. This finding highlights the importance of providing professional development and training to enhance teachers' skills and confidence in online teaching especially when working with students with disabilities.

Many participants expressed concerns about their knowledge and confidence levels in delivering online instruction despite their overall positive attitude towards online learning. This finding is critical especially given the increasing demand for telehealth and virtual intervention for individuals with special needs. This study underscores the necessity of ongoing professional development programs tailored to teachers' needs to improve their overall preparedness for online teaching.

### 5.2. Teacher Satisfaction and Challenges

The results also provide insights into teachers' satisfaction with online learning services. While a majority expressed moderate to high levels of satisfaction, a notable minority expressed dissatisfaction primarily due to issues related to access and awareness. Additionally, most teachers favored in-person teaching over online teaching, citing various reasons including the belief that some students benefit more from face-to-face instruction.

Access to stable internet connections, software and specialized equipment emerged as a significant challenge. Many participants were affected by unstable internet connections and had difficulties accessing the necessary software highlighting the infrastructure issues that must be addressed to support online education effectively. Our

finding is consistent with existing evidence that lockdown periods posed significant challenges for students in special education in Saudi Arabia as the online mode did not support the necessary physical responses (Alshamri, 2021). This study underscored the country's weak educational infrastructure for professionals emphasizing the crucial role of teacher input in special education and the inadequacy of the online mode in meeting the needs of children with disabilities. Another study by Aljedaani et al. (2021) also explored the e-learning experiences of deaf students at the TVTC college in Saudi Arabia. The authors focused on challenges and concerns arising from the abrupt shift to online learning employing a mixed-methods approach with surveys and interviews. The findings revealed significant issues including problems with internet access, inadequate support and difficulties accessing content from learning systems. These findings emphasize the critical need for infrastructure improvements to enhance the effectiveness of online education for students with disabilities in Saudi Arabia.

The correlation analyses shed light on several vital relationships. The positive relationship between access to online platforms and teachers' tech-savviness and the provision of specialized equipment is notable suggesting that schools that make it easier for teachers to access online platforms are also more likely to support their technological needs. Additionally, the relationship between teachers' accessibility to electronic instructional devices and their awareness of students' rights in online learning emphasizes the role of adequate technical support in increasing teachers' advocacy awareness.

## 6. Limitations

Several limitations were observed in this study. Firstly, the data collection took place at the end of 2020 implying a significant time lapse that may have led to changes in the landscape of online learning in Saudi Arabia. Additionally, the exclusive reliance on questionnaires as the sole data collection method represents another limitation. No supplementary approaches or evaluation methods were employed to assess the quality and effectiveness of online learning services in Saudi schools. This approach yielded valuable insights from the participants' perspectives. It is crucial to acknowledge that a more comprehensive evaluation could benefit from a multi-faceted methodology incorporating various data sources and observational techniques to gain a more holistic understanding of the e-learning landscape within Saudi educational institutions.

## 7. Future Research

Future research should focus on longitudinal studies to track the evolving landscape of online education in Saudi Arabia particularly for students with disabilities. Employing mixed-methods research can offer a comprehensive understanding of the experiences of teachers, students and families in online special education. Investigating the effectiveness of specialized e-learning programs and comparing regional contexts can provide valuable insights while exploring strategies for enhancing family engagement in online learning is essential for improving overall educational outcomes for students with disabilities.

## 8. Recommendations for Improvement

Participants offered valuable recommendations for improving online special education. These recommendations included ensuring device availability for students enhancing family awareness and collaboration providing teacher training opportunities and developing specialized e-learning programs tailored to the needs of students with disabilities. These suggestions highlight the importance of a multi-faceted approach to improve the effectiveness of online education for this demographic. Previous work has provided similar insights regarding enhancing family involvement in instructional decisions and providing distance education training for students and their teachers (Alnaim & Alsarawi, 2023).

## 9. Implications

The study underscores the need for robust professional development programs to enhance teachers' confidence and skills in online instruction especially for students with disabilities. Policymakers should prioritize investment in training initiatives to better prepare teachers. Additionally, addressing infrastructure challenges is essential to ensure equitable online education such as internet stability and software accessibility. Providing tailored support to teachers and acknowledging the diversity in instructional preferences are critical considerations for enhancing the quality of online special education.

## 10. Conclusion

Findings from the current study strongly affirm that online learning is a viable means for educating students with disabilities. They also highlight the challenges faced by teachers in delivering effective online instruction, particularly those lacking access to professional development opportunities. School administrators must strive to provide adequate training to teachers focusing on areas such as technology integration and accommodation provision within virtual classrooms to enhance the comfort and confidence of teachers engaged in online teaching for students with disabilities. Other important approaches to addressing the barriers to online special education include bolstering the infrastructure of the educational system to ensure timely and effective responses to the evolving needs of teachers using online teaching methods and enhancing the advocacy capacity of individuals with and without disabilities. Implementing these strategies will guarantee the provision of necessary infrastructural support and acknowledgement of advocacy endeavors enabling prompt adjustments in service provision to effectively address the educational needs of students with disabilities.

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## Appendix 1. Survey questions.

Question number	Question
1	Do you have sufficient knowledge about delivering instruction online?
2	Do you have sufficient confidence in your online classroom management skills?
3	Are you able to exchange information regarding online teaching with colleagues to solve problems collaboratively?
4	Do you know how to do online lesson planning?
5	Do you have the knowledge to conduct virtual interventions?
6	Do you know your students' rights to their online learning?
7	Do you know how your students can benefit from online learning?
8	Do you know how to decide if online learning benefits your students?
9	Do you know how to decide if online teaching benefits you?
10	Is the online platform that your school uses accessible?
11	Is the online platform that your school uses easy to use?
12	Are you comfortable with the technology used for your online courses?
13	Did you have access to reliable internet when courses were offered online?
14	Can you access all the software needed to complete your online instruction?
15	Can you access a device (e.g., laptop, desktop computer, tablet) to complete your online instruction?
16	Can you access supplemental or specialized equipment (e.g., microphone, web camera, stylus) to complete your online instruction?
17	Is technical support from your school available when needed?
18	Do you have adequate teaching space?
19	Overall, are you satisfied with your online teaching experience?