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Providing accessible distance learning for students with disabilities in Saudi Arabia

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ABSTRACT

After the COVID-19 outbreak, Saudi Arabia's Ministry of Education transformed the education system from traditional learning to distance learning (DL). The aim of this study is to share the Saudi experience including plans, policies, and programs regarding the use of DL for students at various levels of education. This is the pioneer study from Saudi Arabia, which evaluates DL impact on special students and provides recommendations for such students regarding DL. The Saudi Ministry of Education released one of the most powerful and diverse electronic systems with fully interactive technology options through the following platforms: Madrasati School, the IEN National Education Portal, IEN educational television, and virtual kindergarten. The same platforms are accessible for students with disabilities and we have found that such students can equally benefit from them with some modifications. These modifications are on the individual needs of special students. This article presents the details of various tools and programs available for DL to students in Saudi Arabia. Furthermore, we have analyzed the suitability of these programs for special students in our discussion. Finally, we have made our recommendation and provided future directions to improve the DL experience for students with disabilities.

1. Introduction

During the COVID-19 outbreak that occurred among 193 countries, distance learning (DL) has been a safe solution to ensure continued education (Unger and Meiran, 2020). Saudi Arabia (among other countries) indefinitely closed their schools at the beginning of March 2020 to prevent infections from COVID-19 (Alahdal et al., 2020). Due to these circumstances, over 80% of students worldwide stayed at home from school, and 188 countries undertook this procedure during the outbreak. Therefore, Saudi Arabia's Ministry of Education moved from traditional learning (face to face) to DL in order to support students' continued learning across the country during the pandemic. In doing so, they offered many technological options to increase the DL's benefit for both teachers and students during this difficult period (Al Lily et al., 2020).

Students with all types of disabilities, who make up approximately 10% of the school-aged population, require improved accessibility and are expected to use a DL program, so their abilities and needs must be accommodated. Policies that ensure inclusion and accessibility are necessary for Internet-based educational programs that are geared toward students with disabilities (Al-Mousa, 2010). Due to a lack of studies in this area, including no available evidence of service quality and outcomes, research needs to pay more attention to how countries make DL accessible for students with disabilities (Alsawalem, 2019; Cinquin et al., 2019). It is important to consider legal rights that ensure accessibility, equal opportunity in education, and the value of DL benchmarks in terms of increasing accessibility. Additionally, special education is an area of crucial importance for strengthening the role of DL in the teaching and learning process during the COVID-19 pandemic.

Although countries worldwide have responded to this education crisis in a variety of ways, it is important to discuss the inclusion of students with disabilities in terms of their response and ensure

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that they have equal access to DL platforms and tools. In this vein, the UNESCO Convention came to an agreement in 1960 about isolation in education, which was recognized as a vital key in the process of achieving Education for all (EFA). The convention forbade any form of isolation in education, emphasizing equality among educational opportunities regardless of students' abilities and conditions (UNESCO, 2020). Therefore, sharing the Saudi experience may benefit stakeholders when it comes to rethinking their plans, policies, and programs regarding the use of DL in special education, and this study advises them to work on accessibility issues. Saudi Arabia has the expertise that stakeholders should utilize to increase the quality of distance education services and overcome the barriers that may prevent the use of DL among educational institutions. Furthermore, evaluating this experience can identify areas of excellence that could be utilized to produce a framework for producing quality DL. Overall, this article presents the adaptation of DL by Saudi Arabia as an example for countries that are planning to develop or adapt similar DL programs. The following sections include a literature review in special education.

1.1. Accessibility's challenges and solutions

The advent of assistive technology offers students with disabilities access to a variety of platforms and tools that will assist them in acquiring the required knowledge and skills. For instance, students with mobility impairments have difficulty accessing computers and the Internet unless they are provided with the appropriate input devices, such as keyboards, a mouse, and speech control. For students who are blind, computers must be provided with a screen reader program and voice synthesizers to read aloud the text from webpages, software, and other digital resources. However, this system makes graphic images inaccessible without text explanations.

Communication issues are one of the potential challenges that students with disabilities face when they enroll in a DL program. For example, students with learning/intellectual disabilities may have problems understanding websites' content (e.g., due to the variety of designs) or handling an online task. In some cases, students with hearing impairments cannot contribute to audio conferencing via telephone or any other communication tool unless an interpreter is provided. These challenges directly impact students with disabilities, regarding their level of access and the outcomes that the students can accomplish in a DL program (Alsawalem, 2019).

To avoid some of these challenges involving access, technology must be adapted to assist students with disabilities in a way that allows them to interact with the content. For example, "<alt>" tags can be provided for graphic images, so students who are blind can understand digital content. Also, interrupter services should be provided during a DL program for students with hearing impairments. Concerning those with intellectual disabilities, a DL program should be provided in the simplest format that a designer can manage.

1.2. Legal issues

Even though the Vocational Rehabilitation Act of 1973 (Section 504) does not include online education rules, students with disabilities are included among the beneficiaries of federal educational services (The Vocational Rehabilitation Act of 1973, 29 U.S.C. § 701 *et seq*. in 1973). The Americans with Disabilities Act (ADA), which was established in 1990, prohibits institutes from depriving students with disabilities from utilizing any of their services, including educational programs, regardless of the funding source (Edmonds, 2004). The updated recommendations from the US Department of Justice states, "Covered entities that use the Internet for communications regarding their programs, goods, or services must be prepared to offer those communications through accessible means as well." Thus, online education should be made available for students with disabilities.

1.3. Accommodations and universal design

Although students who enroll in a DL program may have a disability (or several) that influences their involvement, most online programs are designed to provide accommodations only *after* these students are enrolled. This process is more difficult and expensive than simply planning and developing a DL program that already provides access for students with disabilities. In this way, students with different abilities, disabilities, and/or learning styles have a high level of access to this type of DL program; this process is referred to as producing a "universal design".

The Center for Universal Design at North Carolina State University defined universal design as "the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design" (Connell et al., 1997). To assure accessibility to all students with a diversity of abilities (e.g., varying levels of performing, hearing, seeing, speaking, and moving) and characteristics in groups (e.g., height, age, race, ethnicity, and gender), a universal design includes the aforementioned principles and also involves physical environments, communication, and products. Applying these principles means that all students, despite having different characteristics and abilities, are considered and can fully participate in a DL program.

2. The experience of DL in Saudi Arabia

Saudi Arabia was formed after Ibn Saud united the country on September 19, 1932, and afterward, it became the largest country in the Middle East with a

total population of 20.6 million as well as an additional 12.4 million undocumented immigrants (GAS, 2018). In 2015, crown prince Mohammed bin Salman launched a vision for 2030, which included a plan to develop the country's technology-related infrastructure and education system to reach the global standards of developed countries.

In 1960, the first services were provided to students with disabilities in Saudi Arabia, but it was only for those who had visual impairments. Fifteen years later, the Saudi government established a General Directorate for Special Education (DGSE) to further improve special education programs and develop policies for students with various disabilities, including hearing problems, intellectual/learning disabilities, speech problems, autism, and behavioral issues. They also include several other forms of disabilities among students who are considered gifted and talented (Al-Mousa, 2010). Importantly, Saudi Arabia initiated steps to include these students in public schools. For instance, Al-Hofuf and King Saud University were the first institutions to enroll students with disabilities in their kindergarten programs in 1984 and 1989, respectively. Later, many other public schools began enrolling them as well (Alsawalem, 2019).

Saudi Arabia's DL experience could be of practical use to other devolving and semi-developed countries that are working to make DL accessible to students with disabilities. Saudi Arabia was selected to study the DL experience because of its unique qualities, and these justifications include the following:

- Saudi Arabia quickly responded to the COVID-19 outbreak and has continuously improved its effort to provide all students with a variety of flexible options to access quality DL through National e-Learning Center, KSA online resources (https://nelc.gov.sa/en/nelc).
- Since 2016, Saudi Arabia's Ministry of Education has had previous, exclusive experience applying DL to schools on the southern border affected by military terrorism in Yemen. This previous experience served 200,000 male and female students in four territories by providing more than 15,000 virtual classes and training the following groups to manage them: 70,000 teachers, 250 principals, and 200 supervisors (https://www.moe.gov.sa/en/Pages/default.aspx).
- Saudi Arabia's Ministry of Education has had DL experience across all universities (which are segregated according to gender) for over thirty years by providing distance lectures (Alsawalem, 2019; Alturki, 2014).
- All Saudi universities have deanships for e-learning and DL, providing online educational resources, multiple e-learning platforms that are flexible, and training courses in DL for students and lecturers (Al-Asmari and Khan, 2014).
- The development in information and communication technology's infrastructure has grown in Saudi Arabia alongside the number of Internet users and owners of smart devices, which is consistent with the aims underlying the Saudi government's vision for 2030 (according to Communication and Information Technology Commission, https://www.citc.gov.sa/en/Pages/default.aspx).
- There are substantial differences in language, culture, and educational policies between Saudi Arabia and other devolving and semi-developed countries.

2.1. Saudi DL platforms and tools

In 2017, Saudi Arabia established the National e-Learning Centre (NELC) which contributes to ongoing efforts that develop quality standards for using DL (https://nelc.gov.sa/en/nelc). While NELC applied several studies to evaluate the DL experience before and after the COVID-19 outbreak. Since the Saudi authority suspended all school activities indefinitely, they promoted the application of DL to ensure the continuation of education among all students, and the Ministry of Education developed multiple online platforms as a response to the pandemic.

DL is designed so students (along with their parents if needed) can log on to digitally attend lessons, interact with teachers, and track their progress. These online platforms assist in bridging the education gap by delivering digital content to all students, so they can effectively pursue their education with greater flexibility. The Ministry of Education launched the following online platforms: Madrasati School (a unified education system), the IEN national education portal, IEN educational television (with YouTube components), and virtual kindergarten.

2.2. Madrasati platform: A unified education system

The Madrasati platform was developed in 2016 and provides numerous educational services, digital content, and educational activities to assure education's continuation during the COVID-19 pandemic. This digital platform contains a package of educational tools to support the planning and implementation of the educational process through virtual classes and meetings.

To ensure effective communication during and outside of standard teaching schedules, this platform can be accessed by all school principals, supervisors, teachers, students (aged between six and eighteen), and parents across the country. It also allows participants to interact with a variety of digital assignments, tests, discussion forums, questionnaires, and other educational resources (e.g., videos, augmented reality, 3D resources, educational stories/books, email, and Microsoft Office 365 programs). Importantly, this platform is attached to Microsoft Teams, which allows members of the Madrasati platform to use all of its features for free. For students with intellectual disabilities, a platform has been designed that already includes a

digital curriculum and tools that allow them to reach their needs, as they have already been connected to the Madrasati platform (https://edu.moe.gov.sa/Onaiza/About/Pages/madrasati.aspx).

2.3. IEN national education portal

In 2015, Saudi Arabia began an IEN project for students at all levels, and the portal is not only rich in digital educational content, which is useful for students, educational staff, and parents, but it is also a free service. The portal aims to improve teachers' abilities to both teach and learn which is achieved by providing a library with a huge collection of books and digital materials. Likewise, it provides students from various backgrounds with access to a curriculum that is simplified, interactive, and reliable. Furthermore, the content has been made available in the form of two mobile phone applications: IEN suitcase and IEN Quran (https://www.moe.gov.sa/en/mediacenter/Pages/ien.aspx).

2.4. IEN educational television and YouTube

The Saudi Ministry of Education has provided IEN educational television and YouTube channels since August 2015, broadcasting lessons virtually with over 200 teachers and sixty special education teachers. Twenty-three channels broadcast to all school levels, and three are specifically delivered to students with intellectual disabilities and autism spectrum disorder in elementary, middle, and high schools. Also, in general, all the special education classes provide an interpreter for students with hearing impairments. Finally, if students are unable to attend live classes, they can watch them any time through YouTube (https://www.moe.gov.sa/en/mediacenter/Pages/ien.aspx).

2.5. Virtual kindergarten

Virtual kindergarten is a recent Saudi application that was launched for free via Google Play and the Google App store platforms in September 2020. This application adapts the DL methodology and provides digital education content to kindergarten teachers, who teach children between ages three and six. The application includes educational content concerning Islam, learning approaches, cognitive processes, health and physical development, social-emotional standards, patriotism, social studies, and linguistic development in both reading and writing. In addition, it aims to build and develop children's capabilities and skills by using cartoon images and videos as well as providing multiple games that are suitable for their age group, teaching them about social values in a fun, motivating environment. Lastly, this application allows parents to follow their children's progress via reports (https://www.moe.gov.sa/en/Pages/default.aspx).

3. Benchmarks and accessibility

The Institute for Higher Education Policy (IHEP) of Ministry of Education, KSA (https://www.moe.gov.sa/en/Pages/default.aspx) performed a study to obtain the best DL practices that have been used by educational institutions. This study identified several benchmarks to determine the success of a DL program in order to assist university officials (e.g., chief academic officers, presidents, and higher authorities) and benefit colleges, schools, teachers, and students when making rational and informed decisions regarding the quality of a DL program for students with disabilities. These benchmarks were categorized into seven dimensions: institutional support, educational program development, teaching and learning process, educational program structure, student support, teacher support, and assessment/evaluation.

Even though these benchmarks could potentially involve disability-related issues, they were not unequivocally examined, which is a common issue because individuals with disabilities are often overlooked in the educational context of DL (Kinash et al., 2004). Therefore, these benchmarks were analyzed to determine successful experiences of DL, as identified by IHEP, concerning its application in DL platforms and tools for students with disability in Saudi Arabia.

3.1. Institutional support

Saudi Arabia's Ministry of Education attempts to create an environment for quality distance education provisions by adopting policies that promote DL in schools through platforms, tools, and other support systems, which is extremely important for building DL infrastructure. Creating a centralized system for technology-related plans, quality standards, and information makes this an effective strategy that can be applied in the future.

Reviewing the Ministry of Education's policies revealed that they follow local legislation to support the needs of students with disabilities. These policies were developed within the primary Saudi education policy, which clearly emphasized the rights of each person to receive the most appropriate education in the least restrictive environment (https://www.moe.gov.sa/en/Pages/default.aspx).

However, the review also revealed that no reported evidence indicated that these policies either include or meet the commitments under Section 504 of the Vocational Rehabilitation Act and the ADA. To fulfill its obligations to provide access to students with disabilities, the Ministry of Education specifically allows schools to open their doors in support of them and their parents, helping them gain access to DL platforms and tools.

3.2. Educational program development

The IHEP reported that educational programs and instructional materials should be continually reviewed during development, design, and delivery to meet the minimum standards. Meanwhile, the Ministry of Education developed guidelines that encourage accessibility for students with disabilities in every step of the DL process. In addition, a variety of developed platforms and tools aim to meet their different needs by offering them flexibility in terms of when they engage in the learning process. The Ministry of Education also collaborates with experts in educational technology to assure the accessibility of digital content. Furthermore, a professional supervisor (i.e., inspector) from the Ministry of Education also observes teachers' performances before and after the process of teaching and learning to ensure that the design and delivery of the educational program reach the maximum level of accessibility.

The Ministry of Education provides an optional platform that is connected to the Madrasati platform for students with intellectual disabilities (the only category with a specified platform). The main feature of this platform is each step's simplicity when it comes to logging on and signing out. This way, students can receive educational assistance with minimum instructions.

3.3. Teaching and learning process

Teaching and learning benchmarks reported by the IHEP include the availability of interactions between students and their peers as well as their teachers in multiple ways. Based on this, special education teachers provide unlimited support to their students in a manner that allows them to teach both in a group and individually via the Madrasati platform page and Microsoft Teams. In addition, teachers evaluate students' progress to decide if they need to physically visit their school in order to receive that support. Informal training programs for teachers are also provided to promote their high-quality performance with technology platforms and tools.

3.4. Educational program structure

The IHEP reported that the educational program structure is such that students should be aware of the DL process' nature and the necessary technological devices to use. They should also have access to sufficient digital library resources. In the case of Saudi Arabia, the Ministry of Education provides sufficient information about the DL process and its requirements, such as the Madrasati platform, IEN tools, and school staff. In addition, students who are unable to purchase technological equipment to implement DL are provided with what they need by their schools, including assistive technology. This service includes all students whether they have a disability or not. The Ministry of Education also provides the IEN national education portal, which is considered a virtual library that consists of all the educational resources and content, such as digital copies of the school curriculums for every grade level.

3.5. Student support

The student support benchmarks recommended that students with disabilities receive suitable information regarding their curriculum, technology tools, and programs, including having access to student support services and urgent technical assistance. Saudi Arabia's Ministry of Education provides clear, direct information about the DL process and practices via IEN educational television and YouTube channels. In addition, the IEN national education portal supports students with disabilities by offering them access to its library, where they can download educational materials and digital content. They also provide technical support (via their website, social media platform, email, hotline, or Madrasati platform page) to guide students and their parents when they are unable to access a platform or tool. As these services may be considered difficult to students with intellectual disabilities and autism spectrum disorder, upon receiving an agreement from the parents and following health safety procedures, schools provide a schedule of classes to receive a student each hour, solving every potential technological problem that may arise.

3.6. Support for teachers

The teacher support benchmarks demanded that teachers receive ongoing support during the development of their teaching and learning process and that they have access to technical assistance before and after the transition from classroom teaching to DL. Saudi teachers are supported by the Ministry of Education through multiple channels that are similar to the previous benchmark (i.e., student support); however, schools offer them continuous formal professional development not only to understand and use DL platforms and tools but to train them how to solve technical issues without assistance. Before the Ministry of Education designed the Madrasati platform, they consulted with experts in the field of special education to apply universal design principles. In other words, this was done to ensure that every student with a disability had full access to the materials and tools. In this process, they combined Microsoft Teams with the Madrasati platform, so teachers could have more options to support the unique needs of students with disabilities. For instance, special education teachers could pull any students from the main platform and place them in a private room (via Microsoft Teams), where they could be taught individually. This way, special education teachers have full access to technical assistance and a sense of familiarity with the practice of universal design.

3.7. Evaluation and assessment

The overall evaluation of the practical benefits of improvement, learning, and teaching should be conducted by using various assessment tools, as per the institutes' recommendations for higher education. The Ministry of Education worked with NELC, which is an independent agency that promotes e-learning and related tools, including innovations and integration among various institutes. NELC developed a quality assurance review with four standards, which serves as a guide for quality control among schools and public education institutions. Adapting this process ensures that the DL outcomes meet these standards (https://nelc.gov.sa/en/nelc).

4. Discussion and future plans

Other ideas concerning accessibility efforts could improve the practices of the Saudi DL program. First, to increase the accessibility and benefits of technology platforms and tools for potential students with disabilities, it is important to guarantee that special education teachers play a major role in planning, developing, and evaluating the program as well as sharing their thoughts and views with the designers of the technology in question. Second, local policies that support the Saudi DL program should be reviewed to confirm that issues concerning Section 504 issues and the ADA are included and activated in the process. Third, accessibility matters should be continuously discussed, and the solutions must confirm the absence of discrimination in every step of the program. Finally, the Ministry of Education provided a professional team to support teachers in solving access issues as well as students with disabilities and their parents. The Saudi literature indicates that special education teachers should receive training courses that focus on how to use platforms and technological tools to aid students with disabilities. These courses must consider students' needs, skills, and abilities. This recommendation is based on the lack of teachers' integration between their pedagogical and technical skills when it comes to teaching, resulting in access issues for both teachers and students with disabilities (Alharbi, 2014; Alsawalem, 2019).

Even though generating accessibility in a DL program—especially during the COVID-19 pandemic—is a difficult task, this paper demonstrates the Ministry of Education's serious attempt to do so for students with disabilities. They encountered multiple challenges during their attempt, including the absence of Section 504 in the Vocational Rehabilitation Act and the ADA in Saudi education policies. They also faced the complexity involved with providing technical support services to a large, diverse community that contained students with various types of disabilities and learned how to solve technical issues, such as handling PDF files and graphic images.

The Ministry of Education claims that their practices are aimed to ensure that the provided platforms and tools can be equally utilized between students with disabilities and their peers without disabilities. They may also consider addressing the following matters:

- Policy: Review existing national policies that support students with disabilities having access to DL programs, especially in public schools. Although the Ministry of Education practices organized local policies, having a single policy that ensures a formal commitment of compliance with Section 504 of the Vocational Rehabilitation Act and ADA should be required for developing all procedures regarding DL program access.
- Guidelines: Include policies, rights, and procedural statements (i.e., Section 504 of the Vocational Rehabilitation Act and the ADA) clearly in the information that is given to the designers of the technology as well as the teachers, students with disabilities, and their parents.
- Procedures: Platforms, tools, channels, applications, and websites should be combined with the policies and guidelines associated with accessibility.
- Training: Although an online training program for teachers practicing DL is currently available, formal accessibility training should be a requirement of the DL program for both teachers and school staff.
- Motivation/reward: Consistently offer rewards to those giving an extraordinary effort in terms of applying accessibility to any part of a DL program.
- Support: Technical staff and online resources should support students with intellectual disabilities and autism spectrum disorder; otherwise, they risk social contact when they visit their schools.
- Evaluation and assessment: Assure that DL programs are reviewed for any accessibility issues, and improve standards and procedures as needed. Also, special education teachers, students with disabilities, and their parents should be included in this process.

5. Conclusion

DL is a safe solution and can be an option for students with disabilities if accessibility is considered during its design process. To reach the point of equal participation between potential students (with and without disabilities), universal design principles should be applied to DL programs in order to make education services accessible to everyone at any time. Therefore, the Ministry of Education (along with other relevant organizations) should consider these principles while they review and develop their alternative technology platforms and tools. Policies should be adopted that support students with disabilities having access to DL programs, which is covered by Section 504 of the Vocational Rehabilitation Act and the ADA. Also, they

should consider the inclusion of special education teachers, students with disabilities, and their parents in the development process.

To reach complete accessibility in the Saudi DL program for students with disabilities, future research should cover the following questions:

- What are the local and national benchmarks that are essential to achieve DL accessibility for students with disabilities in public schools?
- What are the best practices that promote accessibility worldwide and have been successfully delivering DL to students with disabilities in public schools?
- What factors, tools, and solutions are presently available to support DL designers in making their program accessible?
- Which extant training courses increase accessibility for students with disabilities and focus on the use of platforms and technology tools?
- How can the DL program be improved and evaluated to improve accessibility?

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Compliance with ethical standards

Conflict of interest

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