

2021

## A Qualitative Exploration of Preservice Teachers' Preparation to Use Assistive Technology in Saudi Arabia

Dr. Khalid Mohammed Abu-Alghayth PhD  
King Khalid University, Abha, Saudi Arabia., kabualghayth@kku.edu.sa

Follow this and additional works at: <https://scholarworks.uaeu.ac.ae/ijre>



Part of the [Special Education and Teaching Commons](#)

---

### Recommended Citation

Abu-Alghayth, Dr. Khalid Mohammed PhD (2021) "A Qualitative Exploration of Preservice Teachers' Preparation to Use Assistive Technology in Saudi Arabia," *International Journal for Research in Education*: Vol. 45 : Iss. 1 , Article 10.

Available at: <https://scholarworks.uaeu.ac.ae/ijre/vol45/iss1/10>

This Article is brought to you for free and open access by Scholarworks@UAEU. It has been accepted for inclusion in International Journal for Research in Education by an authorized editor of Scholarworks@UAEU. For more information, please contact [j.education@uaeu.ac.ae](mailto:j.education@uaeu.ac.ae).

---

## A Qualitative Exploration of Preservice Teachers' Preparation to Use Assistive Technology in Saudi Arabia

Cover Page Footnote

DOI : <http://doi.org/10.36771/ijre.45.1.21-pp303-327>



المجلة الدولية للأبحاث التربوية  
International Journal for Research in Education

المجلد (45) العدد (1) يناير 2021 - Vol. (45), issue (1) January 2021

Manuscript No. **1571**

**A Qualitative Exploration of Preservice Teachers'  
Preparation to Use Assistive Technology in Saudi  
Arabia**

استكشاف نوعي لإعداد معلمي قبل الخدمة لاستخدام التقنيات  
المساعدة في المملكة العربية السعودية

Received Date  
تاريخ الاستلام

Feb-2020

Accepted Date  
تاريخ القبول

May-2020

Published Date  
تاريخ النشر

Jan-2021

DOI : <http://doi.org/10.36771/ijre.45.1.21-pp303-327>

**Dr. Khalid Mohammed Abu-Alghayth**  
Department of Special Education  
King Khalid University, Abha,  
Saudi Arabia.

د. خالد بن محمد أبو الغيث  
قسم التربية الخاصة - كلية التربية  
جامعة الملك خالد - أبها  
المملكة العربية السعودية  
[kabualghayth@kku.edu.sa](mailto:kabualghayth@kku.edu.sa)

## A Qualitative Exploration of Preservice Teachers' Preparation to Use Assistive Technology in Saudi Arabia

### Abstract

Preparing future teachers for assistive technology (AT) usage is essential for effective and appropriate teaching of students with disabilities. Teacher preparation to use AT in the Kingdom of Saudi Arabia (KSA) is still not thorough and has been linked to teachers' lack of AT use with students. Thus, in this study a qualitative approach was employed to explore preservice teacher preparation to use AT. Utilizing a qualitative survey questionnaire, data were collected from 32 participants from two Saudi universities. Three major themes from the data were obtained for this study: (a) teacher preparation, (b) learning experiences, and (c) perceived needs. The findings revealed a significant paucity of learning experiences regarding AT usage, AT courses, and AT practices, with the participants indicating a pressing need for prior practicum training.

*Keywords:* assistive technology; teacher preparation; preservice teacher; students with disabilities

## استكشاف نوعي لإعداد معلمي قبل الخدمة لاستخدام التقنيات المساعدة في المملكة العربية السعودية

### مستخلص البحث

يعد إعداد معلمي المستقبل لاستخدام التقنيات المساعدة أمراً ضرورياً لتعليم الطلاب ذوي الإعاقة. لايزال إعداد معلمي قبل الخدمة لاستخدام التقنيات المساعدة في المملكة العربية السعودية أمراً غامضاً حيث تم ربطه بقلّة استخدام التقنيات المساعدة مع الطلاب ذوي الإعاقة. لذلك هدفت هذه الدراسة النوعية إلى استكشاف إعداد معلمي قبل الخدمة لاستخدام التقنيات المساعدة. باستخدام الاستبانة ، تم جمع البيانات من 32 مشاركاً من جامعتين سعوديتين. أظهرت النتائج ثلاثة محاور رئيسية من البيانات التي تم الحصول عليها: (أ) إعداد المعلم ، (ب) خبرات التعلم ، (ج) الاحتياجات المتصورة. كما كشفت النتائج عن نقص كبير في خبرات معلمي قبل الخدمة فيما يتعلق باستخدام التقنيات المساعدة ، ومقرراتها ، وممارستها ، حيث أشار المشاركون إلى الحاجة إلى التدريب الذي يسبق مرحلة التدريب الميداني.

*الكلمات المفتاحية:* التقنيات المساعدة؛ إعداد المعلمين؛ معلمي قبل

الخدمة؛ الطلاب ذوي الإعاقة

## Introduction

The integration of technology in classrooms continues to be an essential ingredient of 21st-century education. Authorities have recently been paying more attention to improving technology-driven teaching and learning among the new generation of both students and teachers. In the past decade, public and private educational institutions in the Kingdom of Saudi Arabia (KSA) have developed initiative programs and visions to achieve better integration of technology in Saudi schools. In 2012, for instance, Tatweer Company for Educational Services was established to cooperate with the Ministry of Education with the aim of developing educational services including technology delivery services in schools. Moreover, one of the Ministry of Education's objectives in the Saudi Vision 2030 program is to enhance the adoption of technology among teachers and students. The goal is "raising the efficiency of performance, employing modern support technologies in the education system" (Ministry of Education, 2019, para. 3).

For students with disabilities, using assistive technology (AT) becomes even more significant in that for some of these students, especially those with severe intellectual disabilities, AT is their best means of communicating in the classroom with their teachers and peers. As such, the need for AT in the education of students with disabilities is critical. As the World Health Organization (2017) pointed out, the number of people still in need of AT is approximately 1 billion, and this is likely to double by 2030. However, current research on the integration of AT in Saudi schools shows a lack of teachers' implementation of AT with students as a result of various barriers, one of which is lack of preparation. Michaels and McDermott (2003) stated that researchers are "almost universally in agreement that the success of students with disabilities with AT is related directly to the AT knowledge, skills, and dispositions of special education teachers" (p. 29). Despite Abbitt and Klett's (2007) belief that preparing special education

teachers for the use of AT is colleges' responsibility, Bausch and Hasselbring (2004) alleged that colleges do not usually provide sufficient training at the preservice level. It is necessary that special education programs in higher education prepare preservice teachers to successfully and effectively integrate AT into the classrooms of students with disabilities (Weatherford, 2015).

Students with intellectual disabilities usually experience some issues in classrooms that may influence their learning, such as lack of communication, failure to engage in activities, and/or reading difficulties (Cannella-Malone et al., 2015; Lancioni et al., 2012). Thus, when students face such difficulties, they may tend to depend on peers or teachers for help (Lancioni et al., 2012). AT devices and services can be a great source of help, assisting them to become more independent (Mechling, 2011).

Although existing research has proven the effectiveness of AT with students with intellectual disabilities in classrooms across curriculum areas (Dyal et al., 2009; Parette et al., 2009; Reichle, 2011; Stasolla et al., 2013), studies on teachers' preparation for AT use in higher education in KSA are lacking. One major factor found to influence teachers' integration of AT in Saudi schools is paucity of preparation in college. What is not yet clear is how colleges in KSA are preparing teachers to use AT with students. In the United States and Canada, for instance, a large and growing body of literature details investigations of teachers' preparation for AT in college. In an exploration of how preservice teachers perceive their preparation regarding the embedding of technology into teaching, Hakim (2015) found that the 105 teacher-students who participated in the study indicated that courses at the preservice level had increased their awareness of, and options for, integrating technology into their teaching.

Corkett and Benevides (2015) examined a total of 144 preservice teachers' perspectives on integrating technology into their teaching in

inclusive classrooms before and after they conducted a lesson plan on the use of apps. The results revealed that perspectives became more positive after the completion of the lesson plan and that candidates would prefer to embed the technology into their lessons in future. In one study, Bausch and Ault (2012) examined the extent to which administrators of graduate and undergraduate programs that included special education courses thought that they were preparing their students to integrate the use of AT into teaching students with disabilities. Chairpersons of special education programs, occupational and physical therapists, and speech language pathologists from 231 U.S. higher education institutions participated in this study. According to the findings, most of the participants pointed out that their college programs provided their preservice teachers or specialists with some instructions on AT use but that they did not have adequate, or any, AT devices. In answering the question on the barrier to providing instructions on the use of AT for students who would be working in schools, approximately half of participants indicated a significant lack of financial resources to buy AT devices. Other barriers, such as lack of storage facilities and insufficient time for faculty members to familiarize themselves with the devices, were also reported.

Although teachers are being asked to embed technology into their teaching, they usually feel unprepared for technology integration in classrooms (Judge & Simms, 2009). In a national study of 162 preservice U.S. special education programs by Judge and Simms (2009), about three quarters of undergraduates did not require coursework in the use of AT. Although teachers tend to be highly interested in learning about technology use in classrooms (Jost & Mosley, 2011; Okolo & Diedrich, 2014), this gap in preparation naturally may influence teachers' knowledge regarding, attitudes toward, and use of AT with students with disabilities in classrooms.

In contrast, studies on the use of AT in KSA have tended to be focused more on in-service teachers' knowledge regarding, attitudes toward, and



use of AT with, so far, too little attention paid to the preparation of preservice teachers. Although some research has been carried out to understand factors associated with the integration of AT into teaching students with disabilities at the in-service level, the outcomes of these studies indicate a lack of preparation in the special education preparation programs. This is exemplified in the work undertaken by Abu-Alghayth (2020), in which the researcher identified factors influencing teachers' implementation of AT with students with severe intellectual and developmental disabilities in special education schools. Inadequate preparation and lack of knowledge were found to be barriers limiting teachers' use of AT. Abu-Alghayth (2020), argued that his findings supported Alkahtani's (2013) view that special education preservice teachers should receive adequate training during their college preparation. In the same vein, Alsolmi (2017) argued that special education programs that prepare teachers for the integration of AT into their practice are currently lacking. Together, these recent studies conducted in KSA confirm the findings revealed in a study carried out by Hawsawi (2010). He examined the challenges to the use of AT among 128 teachers of students with intellectual disabilities in KSA and found that lack of preparation in college was a critical factor that limited the integration of AT in classrooms.

These studies provide significant insights into the importance of preparing special education teachers to embed AT into their teaching of students with disabilities. Teacher preparation programs are the cornerstone and starting point for future teachers to learn how to use AT in classrooms. Preparing teachers adequately and appropriately at the in-service level can improve their ability to enhance student performance in classrooms (Rice, 2003; Wayne & Youngs, 2003).

In KSA, several researchers have concluded that there is a lack of AT use among teachers based on their lack of preparation (Abu-Alghayth, 2020; Alkahtani, 2013). It is obvious from the existing research that a gap exists

between in-service teachers' use of AT and their preparation in higher education. To date, not a single study in KSA has addressed this gap through an attempt to understand how future teachers are prepared and trained to integrate AT into the education of students with disabilities. This study contributes to insights into what preservice teachers' programs need to fill the gap between teachers' preparation and their use of AT in classrooms.

The aim of this study was to understand, from preservice teachers' point of view, how their special education programs in higher education have been preparing them for the adoption of AT in classrooms. Moreover, this study was aimed at investigating preservice teachers' perspectives on their learning experiences and needs.

### Research Questions

This study was aimed at addressing the following research questions:

1. How do preservice teachers perceive AT preparation in their special education programs?
2. What types of learning experience have preservice teachers had in college regarding the use of AT with students with intellectual disabilities?
3. What types of AT learning experience do preservice teachers believe are needed in their special education programs?

### Method

A qualitative research approach was employed to explore the AT preparation, learning experiences, and perceived needs of preservice teachers of students with intellectual disabilities at two emerging public universities in KSA. A qualitative approach allows the researcher to see the issue through the eyes of participants, in addition to providing the researcher with opportunities to deeply understand the viewpoints of participants regarding the issue under investigation (Glesne, 2011; Lichtman, 2013).

## Participants

The author deployed a purposeful sampling technique, namely snowball sampling, to recruit final-year male participants from two emerging public universities. This type of sampling is described as “a form of purposeful sampling that typically proceeds after a study begins and occurs when the researcher asks participants to recommend other individuals to be sampled” (Creswell, 2015, p. 208). The rationale behind choosing southern-region universities was that these institutions are called emerging universities, which indicates that such relatively new establishments have been working on the improvement of their programs. The selection of only male preservice teachers in this study was based on the fact that teaching in the intellectual disabilities area is provided only for males at one of the two emerging public universities. Therefore, the researcher selected only male participants for this study from both universities.

After launching the online survey, its link was distributed to two preservice teachers at the first university, who played the role of mediators and forwarded the link to 43 final-year male students in their special education program via WhatsApp groups. Only 11 completed surveys were returned. Again, through WhatsApp, the researcher also distributed the link to 38 final-year students at the second university, with 21 returned completed. Thus, a total of 32 final-year male students from two emerging public universities participated in this study.

## Instrument

The researcher employed an online qualitative survey questionnaire via Qualtrics to gather the data for this study (Johnson & Christensen, 2019). The survey consisted of several open-ended questions under each research question in addition to the demographic questions. The first part of the survey included consent for participation and volunteering demographic information. The remaining parts were focused on participants' preparation

for AT, learning experiences, and perceived needs. Examples of open-ended questions include the following:

1. How do you perceive AT preparation in your special education program?
2. Tell me about the learning experiences you have had in college regarding the use of AT with students with intellectual disabilities?
3. What learning experiences do you believe are needed in your special education program in order to increase your knowledge and skills on the use of AT?

### Data Analysis

To analyze the data obtained from the qualitative survey questionnaire, the author coded and analyzed themes and subthemes from the survey's open-ended question using thematic analysis (Creswell, 2012; Hsieh & Shannon, 2005; Mayring, 2004). The possibility always exists that this strategy may not be conducted correctly for the first coding round (Saldana, 2015). Therefore, the researcher conducted a second coding round to avoid any mistakes. No software was used in the coding process; instead it was performed manually.

In regard to the credibility of the data gathered from the participants, the author conducted an auditing strategy (Creswell & Miller, 2000; Park & Lee, 2010). This external audit technique helps researchers gather feedback from other individuals who review the data (Creswell, 2015). Two Saudi special education faculty members provided their feedback after reviewing the themes and subthemes coded from the obtained data.

### Findings

First, with a view to understanding the participants, the researcher gathered data regarding their college and semester. Table 1 presents the demographic information obtained from the participants.

Table 1

*Demographic Information*

University	Number	Percentage
1	11	34.37
2	21	65.63
Semester	Number	Percentage
Semester 8 (full-time practicum student)	19	57.60
Semester 7	14	42.40

The outcomes of the study into AT preparation for preservice teachers of students with intellectual disabilities will be reported in relation to teacher preparation in college as the first question of this study, AT learning experiences as the second question, and perceived needs as the third research question.

**Theme 1: Teacher Preparation**

The investigator asked preservice teachers, in the survey questionnaire, to talk about their overall preparation for AT usage with students with disabilities. Generally speaking, their responses indicated insufficient preparation in this area. Participants provided further details regarding their preparation, and four subthemes emerged during the data analysis: a) theory-based knowledge; b) basic AT focus; c) mobility and prosthetic devices; and d) absence of practice.

***Theory-Based Knowledge***

The majority of participants (N= 25) pointed out that their programs provided them with some AT knowledge such as definitions, types, theories, and other theoretical information regarding different aspects of AT usage. However, they indicated that preparation on how to technically use AT with students with disabilities was insufficient. More specifically, full-time practicum students felt inadequately prepared for such practice. One such

student teaching students with intellectual disabilities reported: “I thought I knew how to use all strategies of using AT with students until I started teaching in the class, I think we missed the practical aspect of it.”

### **Basic AT Focus**

Students alleged that most of the knowledge they had gained regarding AT usage was basically focused on computers and other low- or mid-tech devices that are generally used in Saudi schools. They also claimed that complicated, high-tech devices were not adequately covered in the topics and courses taken so far. One of the seventh-level students related:

In the class I have taken we were taught Microsoft Office skills and other skills on using computers in classrooms; it was easy to know such skills and it would have been more interesting if we deeply understood the advanced devices that we watch on videos like the ones used with people with cerebral palsy, for example.

### **Mobility and Prosthetic Devices**

A total of 28 participants indicated that one of the classes they took and that is, in fact, a required course in the special education program at both colleges was Materials and Devices Used by Individuals with Disabilities. Most of the participants reported that in this class they learned a great deal regarding prosthetic devices and other AT devices designed to be used for mobility purposes. For instance, one of the preservice teachers indicated:

“I had a chance to understand the lives of those with physical or severe disabilities and I learned how they live and be independent; that was different, I did not imagine the difficulties they have until I took such a class... I did not know the large amount of devices that were designed to assist individuals to be able to live independently; there was a device for each task. I think the videos and pictures we saw in this class taught us a lot”.

Another participant described some topics that were covered in this course: “The book we used for this class talks about the daily living skills and self-care skills and also some topics on the independent skills for children with intellectual disabilities.”

### ***Absence of Practice***

Despite there being a practical part in the Materials and Devices Used by Individuals with Disabilities course, the data obtained from the participants indicated that it was obvious that practice was lacking. One seventh-level student reported:

“In the practical hour we take every week, we go to the lab to practice some of the materials and AT devices to, you know, teach our students next semester in school; we practice some Braille skills and look at some devices designed for people with visual impairments. I did not practice using any devices other than that”.

Further details were offered by a full-time practicum student, who said:

I remember when I took that class last level, it was excellent; the good thing about it was watching YouTube videos on AT devices, but what we did not like about it was not using them in our lab, because we did not have them.

### **Theme 2: Learning Experience**

In the survey questionnaire, the researcher asked participants to talk about their previous learning experiences related to AT usage. Although they believed that their learning experiences were not considered fully adequate given they were about to graduate and teach in schools, they seemed to research and create opportunities for themselves to learn about AT usage. Participants summed up their previous learning experiences in two subthemes: self-directed learning and college courses.

### ***Self-Directed Learning***

“When it comes to technology, I consistently try to find resources to learn new things”: This is one of the participants describing his desire to keep up with technology. Participants indicated that they found it easy to learn about AT thanks to factors such as YouTube videos and the accessibility of some of the technology devices they owned. For example, one of the participants said:

“When I knew, in one of the classes taken related to AT, that it was very easy to access a lot of videos on AT use, I started to search for strategies that I could use on my iPad to teach students... I learned how to connect my iPad to the projector, so I could show students some videos. I learned how to make communication boards on the iPad... I learned other skills myself... It was not as hard as I thought before”.

Although most participants indicated they did not feel they had learned most of the needed skills, they believed that they had learned by themselves how to use AT in certain teaching strategies that could be used with students with intellectual disabilities. Participants reported that they used either YouTube or other websites to improve some of their skills.

### ***College Courses***

Despite preservice teachers indicating a lack of skills and knowledge being provided in the courses taken in their colleges, they believed that the theoretical foundation of knowledge in using AT obtained from the courses assisted them in building further knowledge and developing certain skills later, particularly when they decided to engage in self-directed learning. A full-time practicum student reported:

“I learned first that students with moderate to severe intellectual disabilities experience communication difficulties and that AT can



help with that using some strategies that we took in the class, so after I completed all required courses and being a practicum student, I collected some communication board apps in Arabic that could help my students and started to learn further how to use them”.

The responses indicated that participants who did not join a self-directed learning program had only the theoretical foundation of AT they had gained from courses, and they did not have other learning experiences that improved their knowledge and skills of AT.

### **Theme 3: Perceived Needs**

To fill the gap of preservice teachers being inadequately prepared for AT usage, it is critical and significant to understand what they still need to gain more knowledge and master the necessary skills. The author asked preservice teachers the following question:

- What types of AT learning experience do preservice teachers believe are needed in their special education program?

An agreement was apparent among the participants regarding their perceived learning experiences needs. The data analysis of preservice teachers' responses to this question yielded several major needs that they believed may improve their ability to use AT with students with intellectual disabilities in classrooms. The three subthemes are: a) prior practicum training, b) high-tech devices, and c) AT courses.

#### ***Prior Practicum Training***

As mentioned, most participants (N= 30) reported a lack of practice during their study; thus, it was not surprising that they would mention requiring more attention on skills when asked about their needs. The most reported theme in their responses to the learning experience needs was either training or practicing skills in courses. The point is that they believed

more training on AT usage before taking the practicum class is significantly needed. One of the full-practicum students indicated: "It would be much better if we were trained on using AT before teaching our students; sometimes I feel like I am lost, and I must learn something new to be able to use AT with students."

### ***Advanced Tech Devices***

Preservice teachers indicated that the labs they used in their preparation for AT usage lacked advanced AT devices. Therefore, it was logical that they believed more advanced devices were needed to enhance their knowledge and skills. One participant said: "I think as students we need more than wheelchairs, computers, Braille devices, and communication boards, I think we need devices like the ones we see in videos to understand how to use them before we begin teaching." Generally, preservice teachers reported that the AT devices available in the labs and provided in classes related to AT were not new to them and that they did not need to learn more about them. On the other hand, they believed it was necessary to learn more about advanced AT devices with which they were not familiar.

### ***More AT Courses***

Requiring more AT courses implies that preservice teachers believe their current classes cannot provide them with the necessary knowledge and skills. Thus, to fill this gap, they reported that more AT courses may help them to further understand AT aspects and to practice using some devices prior to graduation. One of the participants related: "I took one class on using computers in classrooms, and another course on materials and devices for people with disabilities and I need other courses in AT in order to use them appropriately with my students in the future."

## Discussion

Notably, preservice teachers' preparation for AT usage and learning experiences related to AT seem to be lacking. Insufficient college preparation and a paucity of learning experiences could significantly influence teachers' use of AT with students (Zhou et al., 2012; Zhou et al., 2011). The findings of this qualitative study further support the outcomes of previous studies, which indicated that teachers' lack of preparation could significantly limit their ability to use AT in classrooms (Bausch & Ault, 2012). In 2013, Alquraini indicated a pressing need to expand the number of AT courses in special education programs to increase teachers' knowledge and skills. In Alquraini's (2013) study, he found that a lack of preparation was one of the major barriers to teachers' use of AT with students in Saudi special education schools. However, he also explored further details regarding preservice teachers' lack of preparation and how this gap could be addressed from the viewpoint of participants.

Participants reported inadequate preparation for the use of AT with students with intellectual disabilities in classrooms. The feeling of being unprepared, found among the participants of this study, was also noticed in another study conducted by Hakim (2015). Furthermore, the data obtained on teachers' preparation match those observed in an earlier study conducted by Alsolmi (2017), who found that preservice teachers in all special education areas in Saudi universities lacked preparation. The current study, however, goes further than such predecessors in that the researcher explored the points regarding which preservice teachers feel unprepared in terms of AT usage in two universities. This, of course, will help deepen our general understanding of the issue. Preservice teachers indicated that one of the main weakness points in their preparation was instructors focusing more on theoretical knowledge than training them on different skills. Maintaining the current situation, in which little attention is paid to practicing AT techniques, will not make a difference in terms of improving

teachers' knowledge and skills as regards AT usage. One possible reason why instructors usually focus more on theoretical knowledge might be the lack of AT devices and apps in colleges. Without AT devices it is difficult to train preservice teachers to master particular skills and use AT devices appropriately. Another issue related to preservice teachers' preparation reported by the participants is a paucity of practice. This may have occurred as a result of more attention being paid to the theoretical part of AT usage. Another possible reason for the absence of practice is the lack of practical classes on AT techniques and strategies. These three aspects are complicated and related to each other; however, the solution might start with providing more AT devices. When advanced AT devices are available in labs, preservice teachers may begin applying their theoretical knowledge and practicing AT before transferring to the field. Additionally, a significant factor that limits preservice teachers' preparation in college is the paucity of AT courses. The outcomes of this study reveal a lack of courses related to AT. This, of course, is a negative indicator that might affect the use of AT with students in classrooms. According to Zhou et al. (2012), one major factor that could lead to a limitation in AT usage by teachers with students is a lack of AT courses in college.

In regards to their learning experiences, the preservice teachers who participated in this study seemed willing to create different opportunities to further understand AT usage and its related aspects. For instance, they pointed out that they are always keen to be self-directed learners as regards technology. These findings further support the idea of being interested in learning about technology. According to Jost and Mosley (2011) and Okolo and Diedrich (2014), preservice teachers are usually interested in learning about the integration of technology in classrooms. Other learning experiences that participants believed were important in developing their knowledge were the courses they take in their programs. Although preservice teachers seemed dissatisfied with their preparation, they acknowledged that courses could provide them with theoretical knowledge,

which they could later use to expand their learning and gain skills relating to AT usage. This is a positive indicator that preservice teachers are willing to gain more knowledge about AT usage with students with disabilities, despite believing that their college preparation is inadequate.

The most interesting part is the perceived needs, whereby preservice teachers provided solutions to bridge the gap between the lack of preparation in college and the lack of AT usage with students with disabilities in classrooms. They indicated that major needs for bridging the gap of being unprepared for AT usage included making more advanced AT devices available and being trained prior to teaching in the practicum semester. Preservice teachers know how the missing part should be bridged. Unlike Bausch and Ault (2012) and Hakim (2015), who also found that the AT devices were not adequate in college preparation, the outcomes of the current study provide solutions and explain preservice teachers' needs from their point of view.

### Implications

First, the results indicate that approaching the problem of the current study through utilizing a qualitative approach is beneficial for addressing the issue investigated. These findings suggest several ways of improving preservice teachers' preparation for effective use of AT with students with intellectual disabilities. First, the results indicate a great need for more AT courses, practice, and accessibility of advanced AT devices. Thus, it is highly recommended that special education programs provide college students with more opportunities to practice AT techniques before actually teaching.

Another way to increase the level of preparation for AT usage entails making available more AT classes during the college years. Alquraini (2013) suggested that Saudi special education programs should place more emphasis on preparing preservice teachers for AT usage and increasing their

knowledge and skills. The findings of this study reveal a shortage of AT courses; thus, it is important that special education programs include more courses on the use of AT.

## Recommendations

### **AT Courses**

The findings of this study reveal a shortage of AT courses at both universities. Moreover, the literature on AT preparation in Saudi colleges is lacking; hence, either quantitative or qualitative research studies could be conducted to further explore preservice teachers' preparation and learning experience needs.

### **Practice**

The lack of AT practice during the college years may affect teachers' ability to use AT with students appropriately and effectively, as the literature shows. Thus, future researchers could investigate possible strategies that might be conducted in special education departments to increase the level of practice and ensure preservice teachers practice AT techniques prior to graduation.

### **AT Devices**

Preservice teachers acknowledged that labs in their colleges had limited AT devices. Further research should be conducted to provide a better understanding of the relationship between the lack of AT devices in labs and the lack of preparation. In addition, reasons behind the shortage of AT devices in special education departments could be studied to provide a clear reflection of the issue.

Moreover, teacher education programs should provide preservice teachers with various AT devices and apps to better prepare them for the necessary skills needed to effectively use AT with students. Examples of AT devices include electronic worksheets, augmentative and alternative

communication devices, screen readers, mobility aids, digital hearing aids, orthotic devices, prosthetic devices, and talking calculators.

### Limitations

This study examined the perspectives of preservice teachers specialized in intellectual disabilities on their learning experiences and needs. It is beyond the scope of this study to examine AT preparation of preservice teachers specialized in other types of disabilities. Preservice teachers specialized in learning disabilities, hearing impairments, or visual impairments may have different experiences and points of view regarding their preparation for AT.

### Conclusion

When factors such as paucity of courses, practice, and AT devices affect preservice teachers' preparation, it is necessary to provide solutions for such issues. Otherwise, teachers' use of AT with students with disabilities in classrooms will be compromised, as evidenced in the literature. In this study the researcher explored: a) the reality of preservice teachers' preparation at two emerging public universities, b) the learning experiences related to AT among the participants, and c) the perceived need for solutions to ensure better preparation prior to becoming a teacher of students with intellectual disabilities. Preservice teachers' experiences, perspectives, and proposed solutions at both colleges might be considered as a roadmap for producing higher-quality teachers who can use AT more effectively.

### Funding

The author extends his appreciation to the Deanship of Scientific Research at King Khalid University for funding this work through General Research Project under grant number (G.R.P-169-41).

### Conflict of Interest

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## References

- Abbitt, J. T., & Klett, M. D. (2007). Identifying influences on attitudes and self-efficacy beliefs towards technology integration among pre-service educators. *Electronic Journal for the integration of technology in Education*, 6(1), 28-42.
- Abu-Alghayth, K. (2020). Teachers' use of assistive technology in Saudi special education schools: A mixed-methods enquiry. *International Journal of Developmental Disabilities*, 1-11. <https://doi.org/10.1080/20473869.2020.1836943>
- Alkahtani, K. D. (2013). 'Teachers knowledge and use of assistive technology for students with special needs.' *Journal of Studies in Education*, 3(2), 65-86. <http://dx.doi.org/10.5296/jse.v3i2.3424>
- Alquraini, T. A. (2013). Factors that affect the use of assistive technology with students with multiple disabilities in their institutes and the attitudes of teachers toward this use. *Journal of Educational Sciences*, 26(3), 582-559.
- Alsolmi, A. (2017). *Teachers of students with visual disability: Their perceptions and knowledge of assistive technology in Saudi Arabia*. (Unpublished doctoral dissertation). Missouri: Saint Louis University.
- Bausch, M. E., & Ault, M. J. (2012). Status of Assistive Technology Instruction in University Personnel Preparation Programs. *Assistive Technology Outcomes and Benefits*, 8(1), 1-14.
- Bausch, M. E. & Hasselbring, T. (2004). Assistive technology: Are the necessary skills and knowledge being developed at the preservice and inservice levels? *Teacher Education and Special Education*, 27(2), 97-104.
- Cannella-Malone, H. I., Konrad, M., & Pennington, R. C. (2015). 'ACCESS! Teaching writing skills to students with intellectual disability.' *Teaching Exceptional Children*, 47(5), 272-280. <https://doi.org/10.1177/0040059915580032>
- Corkett, J. K., & Benevides, T. (2015). Preservice teachers' perceptions of technology and multiliteracy within the inclusive classroom. *International Journal of Psychology and Educational Studies*, 2(2), 35-46. <https://doi.org/10.17220/ijpes.2015.02.004>



- Creswell, J. W., & Miller, D. M. (2000). 'Determining validity in qualitative inquiry.' *Theory into Practice*, 39(3), 124–130.
- Creswell, J. W. (2015). *Educational research: Planning, conducting, and evaluating*. W. Ross MacDonald School Resource Services Library.
- Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research*. Peterson Education. Inc. doi, 10.
- Dyal, A., Carpenter, L. B., & Wright, J. V. (2009). 'Assistive technology: What every school leader should know.' *Education*, (3), 556.
- Glesne, C. (2011). *Becoming qualitative researchers: An introduction* (4th ed.). Prentice Hall.
- Hakim, S. A. (2015). *Falling short: Preparing our pre-service secondary school mathematics teachers to enhance their teaching with technology* (Unpublished doctoral dissertation). New York: Teachers College, Columbia University.
- Hawsawi, A. (2010). Obstacles of using technology in teaching students with mental retardation. Paper presented at the first scientific conference "special education between reality and expectations" of the Faculty of Education: University of Banha. Egypt.  
<https://faculty.ksu.edu.sa/12681/DocLib1>
- Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative health research*, 15(9), 1277-1288.  
<https://doi.org/10.1177/1049732305276687>
- Johnson, R. B., & Christensen, L. (2019). *Educational research: Quantitative, qualitative, and mixed approaches*. SAGE Publications, Incorporated.
- Jost, M. B., & Mosley, B. F. (2011). Where IT's AT? Teachers, assistive technology, and instructional technology. *Journal of Technology Integration in the Classroom*, 3(2), 5-13.
- Judge, S., & Simms, K. A. (2009). Assistive technology training at the pre-service level: A national snapshot of teacher preparation programs. *Teacher Education and Special Education*, 32(1), 33-44.  
<https://doi.org/10.1177/0888406408330868>

- Lancioni, G., Sigafoos, J., O'Reilly, M. F., & Singh, N. N. (2012). 'Assistive technology: Interventions for individuals with severe/profound and multiple disabilities.' Springer Science & Business Media.
- Lichtman, M. (2013). *Qualitative research for the social sciences*. Sage Publications.
- Mayring, P. (2004). 'Qualitative content analysis.' *A companion to qualitative research*, 1, 159-176.
- Mechling, L. C. (2011). 'Review of twenty-first century portable electronic devices for persons with moderate intellectual disabilities and autism spectrum disorders.' *Education and Training in Autism and Developmental Disabilities*, 479-498.
- Okolo, C. M., & Diedrich, J. (2014). Twenty-five years later: How is technology used in the education of students with disabilities? Results of a statewide study. *Journal of Special Education Technology*, 29(1), 1-20.
- <https://doi.org/10.1177/016264341402900101>
- Park, C., & Lee, H. (2010). What makes a case study really qualitative? Show me your evidence, please. *English Teaching*, 65(4), 79-101.
- Reichle, J. (2011). 'Evaluating assistive technology in the education of persons with severe disabilities.' *Journal of Behavioral Education*, 20(1), 77-85. <https://doi.org/10.1007/s10864-011-9121-1>
- Rice, J. K. (2003). *Teacher quality: Understanding the effectiveness of teacher attributes*. Economic Policy Institute, 1660 L Street, NW, Suite 1200, Washington, DC 20035.
- Saldana, J. (2015). *The coding manual for qualitative researchers* (3rd ed.). Sage Publications.
- World Health Organization (2017). 'Global priority research agenda for improving access to high-quality affordable assistive technology.' <http://apps.who.int/iris/bitstream/10665/254660/1/WHO-EMP-IAU-2017.02-eng.pdf> [cited 2017 Apr 21].
- Michaels, C. A., & McDermott, J. (2003). Assistive technology integration in special education teacher preparation: Program coordinators' perceptions of current attainment and importance. *Journal of Special Education Technology*, 18(3), 29-41.

<https://doi.org/10.1177/016264340301800302>

Ministry of Education (2019). *Saudi Arabia education policy*.  
<http://www.moe.gov.sa/Pages/educationPolicy.aspx>

Parette, H. P., Blum, C., Boeckmann, N. M., & Watts, E. H. (2009). Teaching word recognition to young children who are at risk using Microsoft® PowerPoint™ coupled with direct instruction. *Early Childhood Education Journal*, 36(5), 393-401.

Stasolla, F., Caffo, A. O., Picucci, L., & Bosco, A. (2013). Assistive technology for promoting choice behaviors in three children with cerebral palsy and severe communication impairments. *Research in developmental disabilities*, 34(9), 2694-2700.

<https://doi.org/10.1016/j.ridd.2013.05.029>

Wayne, A. J., & Youngs, P. (2003). Teacher characteristics and student achievement gains: A review. *Review of Educational research*, 73(1), 89-122. <https://doi.org/10.3102/00346543073001089>

Weatherford, B. (2015). *The preparation of preservice teachers for integrative technology use* (Unpublished doctoral dissertation). California: University of California San Diego.

Zhou, L., Ajuwon, P. M., Smith, D. W., Griffin-Shirley, N., Parker, A. T., & Okungu, P. (2012). Assistive technology competencies for teachers of students with visual impairments: A national study. *Journal of Visual Impairment & Blindness*, 106(10), 656-665.

<https://doi.org/10.1177/0145482X1210601010>

Zhou, L., Parker, A. T., Smith, D. W., & Griffin-Shirley, N. (2011). Assistive technology for students with visual impairments: Challenges and needs in teachers' preparation programs and practice. *Journal of Visual Impairment & Blindness*, 105(4), 197-210.  
<https://doi.org/10.1177/0145482X1110500402>