Article

The potential for utilizing virtual reality technology in educating students with learning disabilities

Mohamad Ahmad Saleem Khasawneh

Special Education Department, King Khalid University, Abha 62521, Saudi Arabia; mkhasawneh@kku.edu.sa

Abstract: This study aims to explore the feasibility of using virtual reality technology to educate students with learning difficulties in the Asir region. To achieve the study aims, the researcher employed a descriptive design and deployed a quantitative technique, depending on the questionnaire as the main instrument for data collection. The research was carried out on a cohort of 240 educators hailing from the Asir region who were enlisted through a process of random sampling. The results of this study show that factors like infrastructure, human resources, administrative regulation, and student population have an impact on the use of virtual reality technology. The results suggest that there are no statistically significant differences in the development of using virtual reality technology among teachers of students with learning disabilities in the Asir region when taking into account factors such as experience and level of qualification.

Keywords: utilizing virtual reality technology; students with learning disabilities; Asir region

1. Introduction

Students who experience learning difficulties are considered a unique subset in the field of education, deserving of specialized services and special attention. The primary objective of these services is to mitigate the obstacles that hinder their academic, psychological, and cognitive progress (Alenizi, 2019). The scholarly notion of learning difficulties concerns deficiencies that arise from an individual's inability to systematically cultivate their cognitive abilities, leading to deficiencies. The individual exhibits a conspicuous disparity between their cognitive capabilities and scholastic achievements, in addition to struggling to attain proficiency in reading, writing, and numeracy. It is critical to specify that this discrepancy or hindrance cannot be ascribed to sensory or physiological variables (Cahyana et al., 2021; Matter, 2022). The study primarily examined the preventive and therapeutic dimensions of difficulties in academic and developmental learning. To achieve this, a variety of medical, behavioral, neuropsychological, cognitive, and integrative frameworks were utilized (Manja et al., 2022).

Over the span of numerous decades, there has been a discernible surge in worldwide progress in various fields that have a profound influence on the way humans live. The unprecedented information revolution that has resulted from this development is unlike anything in the annals of human history (Algrni, 2020). The aforementioned cognitive and technological developments have substantial ramifications for educational systems across the globe, in addition to other facets of society. To effectively harness the potential of these advancements and maintain alignment with them, educational institutions must implement essential modifications and improvements (Cosentino and Giannakos, 2023). Academics strive to create an

atmosphere that encourages students' active involvement and converts them into proactive contributors to the educational journey, thus departing from the traditional passive position and the detrimental consequences of indoctrination (Unwin et al., 2021).

Education is a fundamental component in the construction and development of nations. Schools play a fundamental role in disseminating scientific knowledge and achieving societal progress and development (Al-Ahmari, 2021). They aim to prepare individuals who are academically and professionally competent, capable of meeting the needs of their communities, and equipped to address the challenges posed by civilization, culture, and science (Ofosu, 2021). Ultimately, schools strive to lead societies towards desired future outcomes. For any nation that intends to shape its future based on a forward-thinking scientific approach, it is crucial to have a thorough understanding of the current situation, taking into account the various aspects of change. This is because the future will differ drastically from the present (Al Farsi et al., 2021). To do this, the initial step is to prioritize education, as it acts as a crucial strategic element that validates the identity of a society and safeguards its future among transformations, obstacles, and advancements. Schools must adapt their structure, curricula, and research to align with these changes and advancements. Due to increased integration with their communities, schools have a greater capacity to meet the expectations of society (Boyle, 2021). This relationship also necessitates school education to be intricately intertwined with individuals' lives and issues, so transforming it into the primary objective of school education is to attain the revival and advancement of society (Flynn, 2020; Stavroulia and Lanitis, 2019). The field of education has successfully adapted to the rapid advancements and transformative changes brought about by information technology. It is now imperative to utilize and implement it both in and outside the classroom due to its profound and significant influence on students in fostering understanding and knowledge, as well as reinforcing it within them to motivate their engagement in problem-solving, confronting challenges, and surmounting them (Khukalenko et al., 2022).

The foremost challenges include the widespread outbreak of the Corona pandemic, the mandatory implementation of social distancing, the significant economic and human toll it has inflicted, and the consequential transformative changes in various domains, notably in the realm of education (Chițu et al., 2023). In addition to the closure of schools and colleges, there were significant and advantageous changes, particularly the pandemic's role in implementing the distant learning project in numerous educational institutions. The transition from traditional classroom-based learning to remote learning, the proliferation of educational platforms, and the dependence on technology and contemporary methodologies in education, including video conferencing and interpersonal communication (Tatale et al., 2019). Distance learning has emerged as a key focus in educational policies worldwide. Significant resources and efforts are being dedicated to enhancing and advancing this mode of education, with the aim of optimizing its role in supporting and enhancing the educational process, and keeping up with global events and advancements (Al-Ahmari, 2021).

Virtual education is a form of educational technology that plays a crucial role in shaping modern global civilization. It is rooted in scientific advancements that align

with current changes, allowing for the adaptation and enhancement of the educational system to meet the evolving demands of technology and communication (Ofosu, 2021). Virtual reality technology, which emerged in the early 1980s, is one of the most notable of these technologies. It is a digital representation of reality. It represents the actual conditions in the surroundings, which encompass a collection of objects that the student engages with as if they were tangible. However, in actuality, these objects are intended to convey the learner's wishes and desires by physically manipulating and interacting with them, creating a sense of dealing with genuine reality rather than a simulated one (Al Farsi et al., 2021).

One can harness the potential of virtual reality to accomplish seemingly difficult tasks. Several investigations have demonstrated that incorporating virtual reality into the classroom setting enhances student engagement with the subject matter and promotes more profound learning (Boyle, 2021). Research conducted by Flynn (2020) and Khukalenko et al. (2022) has revealed a significant absence of modern educational and technological methods in teaching, particularly for students with learning difficulties. This is despite the presence of resources and state-of-the-art technological laboratories. Instead, there is a heavy reliance on traditional theoretical approaches to education. The purpose of this study is to uncover the perspectives of teachers in Asir schools regarding the feasibility of implementing virtual reality technology (VR) in the instruction of students with learning disabilities.

2. Research questions

The aim of this research is to examine the concerns that were raised in the previous discussion, as delineated below:

1) What are the perspectives of teachers who instruct students with learning disabilities in the Asir region regarding the potential implementation of virtual reality (VR) technology?
2) Do the responses of sample members on the potential application of virtual reality technology vary significantly based on criteria such as educational qualification and years of experience?

3. Literature review

According to the Regulatory Guide for Special Education by the Ministry of Education in the Kingdom of Saudi Arabia, learning difficulties refer to disorders that impact the basic psychological processes involved in understanding and using written and spoken language. These problems are evident in multiple domains, including auditory perception, cognitive processing, verbal expression, reading comprehension, written composition, and transcription. The realms of expression, calligraphy, and mathematics, as specified by the Ministry of Education (2015), are not affected by variables such as mental, hearing, visual impairments, learning difficulties, or familial duties. Learning difficulties refer to the inability to progressively gain cognitive abilities, leading to an academic disadvantage primarily evident in reading, writing, spelling, and math skills. These issues do not arise from mental or sensory deficits. In addition, it tackles the discrepancy that arises between a child's academic achievement and their cognitive capacities (Volpe and Gori, 2019). Vedadi et al. (2019) define the

word as a wide-ranging group that includes persons of different ages who have a lack of uniformity in their issues, both in terms of their nature and how they present. These individuals exhibit a significant disparity between their expected and actual performance in one or more academic areas. Moreover, these difficulties can be ascribed to disturbances in the operation of both cerebral hemispheres. People who have fully functional cognitive and emotional abilities generally do well in surroundings that have a modest amount of cultural, social, and educational stimulation. In addition, they do not have any type of mental, emotional, physical, auditory, or visual disability. Furthermore, individuals within this category do not display notable mental problems or suffer from compromised physical well-being. Individuals may exhibit some prominent behavioral characteristics, such as increased motor activity, attention impairments, and a feeling of inferiority (Garzotto et al., 2019).

Many experts and stakeholders in the field of learning challenges acknowledge the crucial need to classify these difficulties. Ponticorvo et al. (2019) argue that this classification facilitates the research of this phenomena and enables the development of effective methods for diagnosing and treating it. This is particularly important because children with learning difficulties exhibit a diverse array of challenges. Efforts have been made to classify learning difficulties in order to improve teaching methods. It is important to customize the diagnosis and treatment techniques for each distinct group, as the methods that work for addressing a specific learning difficulty in one context may not be applicable to another case (Boardman, 2020). Therefore, drawing from comprehensive educational studies and research in the domains of psychology and neuroscience, scholars have extensively classified learning difficulties into two essential categories:

• Developmental learning difficulties: The present difficulties are intricately linked to the cognitive abilities and neurological processes that are critical for the academic achievement, personal growth, and professional adjustment of a child. This specific challenge pertains to the fundamental skills that a child is required to have in order to participate in academic endeavors (Alenizi, 2019). The aforementioned cognitive processes or abilities comprise reasoning, attention, sensory perception, memory, and language. Developmental learning challenges are evident in three core domains: the acquisition of visual-motor skills, the development of linguistic abilities, and cognitive abilities. It is imperative to recognize that inadequacies in a single component do not restrict themselves to that specific element alone; instead, they affect other interrelated facets as well (Cahyana et al., 2021). Cognitive impairments affecting attention, perception, memory, and reasoning can have a substantial negative impact on the acquisition and progression of reading, writing, and arithmetic abilities. This is because the reception of sensory stimuli, which is essential for these cognitive processes, is inextricably linked with attention (Matter, 2022). On the contrary, a deficiency in the attentional process undermines the benefits obtained from various stimuli, such as visual, tactile, and auditory indicators. Concurrently, it hinders the capacity to participate in impactful dialogues with others, a skill that is intricately linked to social adaptation (Manja et al., 2022).

- Academic learning difficulties: Academic learning difficulties are predominantly the result of developmental learning challenges, which are characterized by cognitive function deficits including thinking, perception, attention, and memory. Therefore, the aforementioned conditions are linked to critical academic domains, encompassing difficulties in spelling (dysorthography), writing (dyslexia), and performing mathematical operations (dyscalculia) (Algrni, 2020). The aforementioned difficulties stem from barriers to development. An example of this would be a child who struggles to retrieve previously learned letters and words due to insufficiencies in visual or auditory memory, or the capacity to organize bodily sensations. Therefore, a correlation has been established between the cognitive abilities and reading, writing, and mathematics proficiency of children with learning disabilities (Cosentino and Giannakos, 2023).

Many attributes are associated with pupils who experience learning difficulties, including: It is not uncommon to observe hyperactivity in individuals with cognitive disabilities, as they frequently engage in aimless and excessive motor activities. Individuals diagnosed with hyperactivity disorder frequently demonstrate an impaired ability to promptly adjust to changes in their environment or may manifest delayed responses to said changes. A propensity for diversion is a defining feature of attention deficit disorder, which is distinguished by an inability to maintain sustained concentration (Unwin et al., 2021). The classification of synergy presents obstacles pertaining to the synchronization of motion, in addition to problems concerning visual, motor, and tactile differentiation. Visual discrimination is a cognitive impairment characterized by difficulties distinguishing visual stimuli through visual perception alone, in addition to difficulties with visual closure (Alenizi, 2019). It is not possible to complete absent portions of a document or object when only a portion of it is observed. Certain individuals may demonstrate difficulties with visual recognition, sequential memory recall, and visual memory. Auditory perceptual difficulties comprise a variety of obstacles, such as impaired ability to distinguish between distinct sounds, limited capacity to discriminate between sounds, deficiencies in both auditory reception and comprehension, and an incapacity to deduce meaning from words, sentences, and sounds (Lee and Li, 2016). Language difficulties comprise a variety of obstacles, such as speech development that is delayed or lethargic, challenges in sentence formation and construction, and an inadequate ability to arrange words into appropriate phrases, paragraphs, or sentences (Broadbent et al., 2018).

Learning difficulties are characterized by a multitude of definitions that incorporate various explanatory theories, one of which is the neurological theory. According to this hypothesis, injuries or dysfunctions of the brain are significant contributors to the onset of learning difficulties. It is noteworthy to mention that the neurological theory was among the first conceptual frameworks to explicate the manifestation of learning challenges in individuals. For the purpose of identifying instances of learning difficulties, proponents of this theory utilize a diagnostic methodology (Barutchu et al., 2019). This methodology entails conducting a battery of neurological examinations, including fundamental assessments of neurological functionality and the application of criteria that evaluate the characteristics exhibited by individuals with brain injuries. In addition, an electroencephalogram is utilized in the diagnostic procedure. According to the behavioral theory, learning difficulties can

be attributed to various extrinsic factors. These factors encompass the social environment, the child's prior learning experiences, parental perspectives on success and accomplishment, nutritional deficiencies, instructional methods utilized, and the child's cognitive learning style. Therefore, success challenges can be avoided by modifying the educational environmental factors that have an impact on the child (Suryaratri et al., 2019). The primary focus of this theoretical framework is to comprehend the precise elements that contribute to the disparity between the academic achievements of a child as observed and as expected, with a special emphasis on the intrinsic difficulties that accompany the process of learning (Rostan et al., 2020). Learning difficulties may result from the acceleration of cognitive development, as suggested by developmental theory. In such cases, learners may be assigned tasks that are not suitable for their present stage of development. Before advancing, children must effectively consolidate and stabilize their behavior and thought processes at each developmental stage, according to Piaget. In order to engage in more advanced activities, it is essential to achieve maturation, as this developmental progression is a prerequisite for moving on to the next stage (Volpe and Gori, 2019). Learning difficulties occur when individuals struggle with the fundamental functions and processes required to organize, analyze, store, retrieve, classify, and apply knowledge, according to cognitive theory. The learner who is encountering difficulties in the learning process exhibits deficiencies in the effectiveness and efficiency of cognitive representation. As a result, a considerable portion of the ideas obtained or studied through the cognitive framework demonstrate shortcomings in both retention and recall (Vedadi et al., 2019).

The concept of virtual reality originated from the notion that an individual could vanish from his position and enter an alternate realm, a fantastical world where his deepest desires materialize. Our intention is not the cessation of physical existence but rather the departure of the soul and mind from a created reality that is in a state of wandering within it (Stavroulia and Lanitis, 2019). The individual can perceive his movements within the respiratory system and between the vocal cords, all of which occur with his body positioned on the chair in front of the computer. This is what we refer to as "virtual reality," which functions to transmit human consciousness to an electronically generated virtual environment by allowing the mind to engage in the execution of imagination in a location other than the body. Given its existence and interactions with its surroundings, it is a realm that is both physical and non-corporeal. Within it, occurrences transpire in a hypothetical reality rather than the actual one (Khukalenko et al., 2022).

Virtual reality is achieved when computer simulation surpasses its boundaries, enters the realm of the imagination, and becomes entirely realistic. Constant advancements in the precision of audiovisual components will eventually enable increasingly precise simulations of reality in all its facets and elements (Chițu et al., 2023). Without prior preparation, virtual reality enables the learner to engage in self-expression regarding the material presented. This enables the learners to participate actively, exchange ideas and thoughts, and observe the operational mechanisms of the virtual reality environment (Tatale et al., 2019).

Boyle (2021) provides a definition of virtual reality (VR) as a computer-generated reality that enables users to interact with and experience an unreal three-

dimensional world through the use of a head-mounted display, stereoscopic 3D sound effects, and technology to generate a believable immersive experience that permits exploration of the computer-generated virtual world. According to Al-Ahmari (2021), virtual reality technology consists of a computer-generated, three-dimensional virtual environment accessed via virtual reality glasses, specialized applications, and sensors. Within this environment, the user perceives a seamless transition from one location to another, simulating the sensation of physical displacement. The user interacts with a virtual environment through the simulation of multiple modalities, including sight, hearing, and touch. Based on the aforementioned definitions, virtual reality technology (VR) can be characterized as a digital environment in which a learner experiences a lifelike reality through the use of specialized technological tools and methods that enable the learner to visually, aurally, and tactilely engage with the subject matter at hand, thereby immersing themselves in it as if it were real.

According to Ofosu (2021), the subsequent are some of the most critical elements and components of virtual reality (VR):

1) The virtual world: The content refers to the specific elements inside an environment, which can either be a tangible reality or a product of the creator's mind. It can be intentionally constructed to engage others and encourage their participation.

2) Immersion: Immersing oneself in an alternate reality or adopting a certain perspective, refers to the ability to perceive something outside the current world in which an individual exists. He either has awareness of an alternate reality while acknowledging that he exists in a different one, or he becomes conscious of the one he now resides in. Alternative perspectives distinct from his own viewpoint.

3) Sensory feedback: Virtual reality provides a means to experience an imagined reality by engaging several physical senses (sight, hearing, touch) without relying on our imaginative capacity.

4) Interaction: Virtual reality provides an authentic and immediate response to the user's motions and interactions, hence enhancing the overall user experience. Undoubtedly, the inclusion of the computer in this system greatly facilitates the attainment of the necessary interactivity, enabling the user to actively engage with the items, characters, and locations in the simulated virtual world.

As Al Farsi et al. (2021) emphasizes, virtual reality technology (VR) has many uses in education. Some of the more notable examples include:

• Virtual laboratories: Virtual laboratories replicate authentic laboratory environments, and their utilization has become widespread across various disciplines, driven by the necessity to address the limitations associated with conventional laboratories. It facilitated the acquisition of knowledge about abstract concepts and enhanced their understanding by creating vivid mental representations that closely resemble real-life experiences. Additionally, it aided in mitigating the hazards and repercussions that learners may encounter during laboratory experimentation, including experiments and chemical reactions.

• Virtual rounds: The Internet has become a powerful tool for exploring ancient sites, tourism destinations, and museums through virtual tours. They can also be effectively utilized in the realm of education and employed within educational settings, as they facilitate learners' comprehension of certain topics that are

challenging to convey or elucidate using symbols and words, such as historical events or a journey into outer space.

- Virtual museums: These museums depend on audio-visual technology. Museums are established online with the purpose of introducing them. This museum does not require a physical location on the ground. The objective is to conserve artifacts, investigate their historical background, acquire knowledge about them, and distribute them for the purpose of gaining advantages from their use.

- Virtual theaters: Virtual theaters, such as theatrical theaters, use computer-based simulation to create interactive virtual environments that the audience may explore in real time or pre-recorded time. These environments can represent both actual and fictitious settings. The theaters are showcased on an actual stage, utilizing display displays, video cameras, and other multimedia. The audience experiences these acts by donning virtual reality glasses.

- Virtual educational games: Virtual reality provides learners with the opportunity to explore their creativity through a wide range of games and applications. It also gives tools to facilitate creative learning activities and experience design.

- Virtual reality in libraries: The utilization of virtual reality in libraries appeals to individuals from many cultures by enabling them to immerse themselves in alternate temporal and spatial contexts. Moreover, it facilitates collaborative learning and the construction of historical and literary artifacts by fostering openness to the perspectives of others. Several book consumers also borrow books virtually and infrequently visit the physical library.

Chițu et al. (2023) advocated for the use of virtual reality technology with kids who have learning challenges. Therefore, it is crucial to modify teachers' views and attitudes and provide them with training to effectively utilize virtual reality technology. Additionally, it is advisable to develop academic curricula that incorporate virtual reality technology and leverage it as a successful educational approach. The positive stance conveys the teacher's endorsement of virtual reality technology and its implementation with pupils facing learning challenges, whilst the negative stance reflects his resistance towards this technology.

Previous studies

Al-Ahmari (2021) undertook a study to determine the actual usage of virtual classrooms during the Corona pandemic, specifically from the perspective of female students at King Khalid University. The researcher employed the descriptive analytical approach in this study, utilizing a questionnaire as the study instrument. The questionnaire was administered to a sample of 400 female students who are affiliated with the University King Khaled. The study findings indicate that the sample participants expressed favorable views towards virtual classes. This is a positive and satisfactory outcome, particularly for female students. Virtual classes have emerged as one of the most effective educational solutions during the Corona crisis, enabling uninterrupted learning in times of crisis. The findings also indicated a low incidence of challenges related to utilizing virtual classrooms for this group.

In addition, Ofosu (2021) performed a study with the objective of determining the perspectives of educators who employed virtual reality/augmented reality (VR/AR)

technology in their classrooms. The study sought to assess the effects of these technologies on student learning, explore their various applications, and identify any challenges encountered in their implementation. The researcher employed a qualitative methodology, utilizing interviews with teachers as the primary research instrument to get insights about the utilization of virtual reality and augmented reality (VR/AR) technology by students in the pre-kindergarten to grade 12 educational setting. The findings demonstrated that virtual and augmented reality (VR/AR) possess the capacity to generate partially realistic ecosystems, thereby facilitating the convergence of theoretical and practical knowledge. Additionally, they have the potential to foster innovation, particularly in the realm of virtual indoor human space flights. This is especially relevant in the context of the COVID-19 pandemic and the rise of remote learning. The study also revealed the primary impediments to the implementation of virtual reality technology (VR), which encompass the requirement for endorsement from educational authorities at both regional and school levels, as well as the presence of educational regulations and official protocols to develop virtual and augmented reality. Furthermore, the instruments of virtual reality not only assist in classroom preparation, but also contribute to the adoption of this technology by teachers.

Turan and Atila (2021) examined how augmented reality technology may assist students with a particular learning disability in grasping scientific topics. All of the subjects were tested using a multiple-probe approach. Four sixth graders who had received a diagnosis of particular learning impairments from general hospitals made up the study's sample. The pilot study included one of these kids, whereas the main study included the other three. Overall, the research found that students with a particular learning disability were able to benefit from using augmented reality technology to supplement their learning, and that these students were also open to using the technology because they found it appealing. The effects of augmented reality on pupils' affective processing need further research. It is also possible to investigate the steps used to create augmented reality-based educational resources.

Khukalenko et al. (2022) presented the findings of an extensive survey examining the perspectives of teachers on the utilization of virtual reality (VR) in education. The poll investigated the correlation between the teachers' level of integration of virtual reality (VR) technology and their educational methods, as well as the frequency at which they utilize VR. In addition, the poll obtained responses regarding the correlation between the presence of information technology (IT) staff and the frequency of virtual reality (VR) usage. In general, teachers held fairly favorable views toward the utilization of virtual reality (VR) in the field of education. There was a lack of significant link between instructional approaches and the degree of virtual reality (VR) integration. However, a higher prevalence of traditional teaching approaches was observed in cases where VR integration was less pronounced. The findings demonstrated a direct and positive relationship between the degree of virtual reality (VR) integration and the frequency of VR utilization. Nevertheless, the frequency of virtual reality (VR) usage exhibited a limited link with the presence of information technology (IT) staff.

In their study, Chițu et al. (2023) explored the feasibility of utilizing virtual reality (VR) technology to enhance the educational experience of children with impairments.

A qualitative study utilizing the Focus Group approach was conducted among 31 specialists who work with children with disabilities. The purpose was to explore the potential advantages and limitations of utilizing virtual reality (VR) technology in the teaching of this particular group of children. The research findings indicate that the majority of the interviewees found the VR application to be a novel experience. They recognized the potential of this technology to enhance the educational process for children with disabilities and viewed it as a valuable tool to help their education. These findings have the potential to positively influence the actions of policymakers, academics, and the economic landscape as they work towards implementing measures that enhance the inclusive education system.

4. Methodology

This study used quantitative methodologies and a descriptive research strategy to present the population's features and data in an orderly, comprehensive, and accurate way. In descriptive quantitative research, the overarching goal is to provide a detailed description of the subject or environment under study (Saunders et al., 2016). Data is collected, processed, and then presented after extensive analysis.

4.1. Population and sample

In the second semester of the 2023 academic year, 380 special education instructors from the Asir region participated in a study. Krejcie and Morgan's (1970) data indicate that a sample size of 191 is thought to be adequate for population representation. The principal aim of the research was to conduct a comprehensive survey among educators to guarantee that the sample fairly reflected the community as a whole. In addition, the study sought to minimize any possible biases in the findings while simultaneously gathering a sizable amount of data from the participants (Blumberg et al., 2014). Because of this, a digital distribution strategy was used to make the survey available to all teachers. There were 250 questionnaires found in all. Out of the 250 surveys in the first sample, 10 were selected for analysis and left with more than 50% of the questions unanswered. A total of 240 questionnaires from the research were found to be legitimate and reliable.

4.2. Research instrument

The questionnaire was developed as the primary research tool with assistance from a prior study conducted by Yaqoup (2019) in order to achieve the research objectives. There were two separate portions of the survey. The first section of the questionnaire collects data regarding the participants' "years of experience" and "educational qualification." Section 2 had a comprehensive set of twenty-four tasks that were specifically created to assess four different facets of virtual reality technology. The previously indicated categories comprise the following: infrastructure (items 1–6), human resources (items 7–12), administrative legislation (items 13–18) and students (items 19–24).

4.3. Instrument validity

Ten specialists in educational technology and special education who work at Saudi Arabian universities and are knowledgeable about language development, scientific accuracy, and clarity were tasked with evaluating the validity of the research tool. It has been determined through expert evaluations that every component has been deemed appropriate, albeit with some minor language adjustments.

4.4. Instrument reliability

One approach used to examine the reliability of measurement is evaluating the consistency of results by using similar samples and devices while keeping all other variables constant. The Cronbach's alpha coefficient was employed to assess the internal consistency of the responses. According to Saunders et al. (2016), the evaluation of a survey's reliability is based on its credibility, which is considered achieved when it meets or surpasses a minimum threshold of 60%.

Table 1. Cronbach alpha test.

Variables	Value
Infrastructure	0.843
Human resources	0.821
Administrative legislation	0.804
Students	0.815
Total	0.836

The measurements in **Table 1** fall within the range of 0.804 to 0.843, suggesting a strong level of consistency in the investigation. Additionally, it is crucial to recognize that every portion of the questionnaire produced a Cronbach's alpha coefficient above 0.60, indicating a substantial level of dependability. As a result, there were no discrepancies among the various elements of the study instrument.

5. Data analysis

The study issues were thoroughly addressed by doing statistical analyses using the SPSS program. The study utilized the independent sample *t*-test to compare groups and calculate the means. Cuevas et al. (2004) suggest that the independent sample *t*-test is a suitable statistical method for comparing the means of two groups. This section provides a detailed explanation of the results obtained from using different research methods to assess and characterize these outcomes. An item is categorized as having a low grade if its average score is 2.33 or below. The item is categorized as moderate, with a mean score ranging from 2.34 to 3.67. A mean score of 3.68 or higher indicates that the item exhibits a high level of significance.

6. Findings and discussion

The researchers employed descriptive analysis to provide a comprehensive depiction of the participants' attributes, with particular emphasis on their years of experience and educational qualifications. Based on the data, 65.0% of the participants

were instructors with professional experience of more than 5 years, whereas 35.0% of the participants indicated having less than 5 years of experience. According to the data presented in **Table 2**, it is clear that most of the participants, precisely 71.3%, have obtained an undergraduate degree, whereas 28.7% have achieved a postgraduate degree.

Table 2. The respondents profile.

Variable	Category	*N*	*%*
Years of experience	Less than 5 years	84	35.0
	More than 5 years	156	65.0
Educational qualification	Undergraduate	171	71.3
	Postgraduate	69	28.7

To investigate the first research question, we will calculate the mean and standard deviations of all factors related to the extent of potential adoption of virtual reality (VR) technology. This will be done from the viewpoint of teachers who teach pupils with learning difficulties in the Asir region.

Table 3. Means and standard deviation.

No	Items	Means	St.devs	Results
	Infrastructure			
1	The school has computers and technical equipment for the latest technological systems and techniques	4.65	0.40	A
2	The software is up-to-date, adaptable, and simple to edit.	4.30	0.53	A
3	The school has modern and specialized information networks linked to internal and external institutions	4.10	0.60	A
4	Databases are constantly updated to suit developments and changes	4.28	0.50	A
5	Availability of learning resource centers in the school equipped with VR technology and communications services	4.45	0.46	A
6	Technical devices and equipment are proportional to the number of students in the classroom	4.40	0.48	A
	Total	4.36	0.35	A
	Human resources			
7	Availability of technical cadres with high skills in using technological and digital systems	4.25	0.48	A
8	The school regularly holds training courses and programs that enable technicians to confront urgent technical problems	4.40	0.43	A
9	Providing technical support and training for teachers on the latest technologies	4.51	0.40	A
10	The school conducts a comprehensive survey of teachers' VR technology needs	4.34	0.52	A
11	The school offers incentives to encourage teachers' academic achievements	4.36	0.42	A
12	The school organizes scientific exchanges and hosting for those with experience and competence in the field of modern technologies and smart devices	4.61	0.38	A
	Total	4.42	0.35	A
	Administrative legislation			
13	The school updates legislation in line with the requirements of technological progress and quality assurance standards	4.65	0.53	A
14	Commitment of senior administrative leaders to implement plans regarding integrating information and technological technologies into education	4.68	0.51	A

Table 3. (*Continued*).

No	Items	Means	St.devs	Results
	Administrative legislation			
15	The school adopts modern scientific and technical projects and translates them into reality	4.43	0.58	A
16	Conduct periodic evaluations of curricula and their quality	4.38	0.59	A
17	Allocate sufficient financial funding to implement the latest technologies in the education process	4.58	0.57	A
18	Participation between the school, public and private sector institutions, and civil society institutions	4.33	0.62	A
	Total	4.51	0.35	A
	Students			
19	Students' proficiency in using and dealing with modern VR technologies	4.15	0.45	A
20	Students' commitment to legal and ethical behaviors related to technology and technologies	4.30	0.40	A
21	Students' eligibility to conduct research and manage projects using modern technology and techniques	4.41	0.38	A
22	Students create intellectual products using modern technology and digital materials	4.33	0.49	A
23	The school encourages students' creativity and motivates them	4.25	0.39	A
24	The school organizes student scientific forums and cultural exchanges with Arab and international schools	4.50	0.35	A
	Total	4.32	0.30	A
	All instrument	4.40	0.25	A

The data presented in **Table 3** indicates that the average score for the level of possible acceptance of virtual reality (VR) technology among teachers instructing students with learning difficulties in the Asir region was found to be 4.40, with a standard deviation of 0.25. The sample members' estimates are likely influenced by the current implementation of e-learning and its modern technologies in schools due to the Corona pandemic. Additionally, their personal academic experience with distance teaching and the future plans of schools to modernize their electronic educational system in accordance with the Ministry of Education's current plan may also contribute to their estimates. Blended education refers to the integration of distant learning into the traditional school system, particularly during emergencies. It involves the use of current technology to help and facilitate the learning process, particularly for students in schools. The study ascribes the causes to the schools' present endeavor to implement e-learning as an instructional method in line with the most recent technological advancements, as well as their incorporation into plans, particularly following the outbreak of the Corona epidemic. This finding is consistent with the research conducted by Al-Ahmari (2021), Chițu et al. (2023), Khukalenko et al. (2022), and Ofosu (2021).

The infrastructure level for prospective use of virtual reality (VR) technology, as perceived by teachers who instruct students with learning challenges in the Asir region, was found to be 4.36, with a standard deviation of 0.35. The aspect labeled "The school has computers and technical equipment for the latest technological systems and techniques" (item 1) has the highest mean value among all infrastructure elements, scoring 4.65. The item 3 mean score, which corresponds to "The school has modern and specialized information networks linked to internal and external institutions", presents the lowest value among all items, measuring at 4.10. The observed outcome

can be ascribed, as per the estimations of the sampled individuals, to the existence of technological laboratories within schools and the presence of state-of-the-art information technology buildings and centers that operate based on contemporary systems and programming, which are regularly updated. This outcome can be attributed to the substantial surge in student enrollment resulting from the implementation of institutionalized educational programs. Consequently, the teaching of certain courses in laboratories is impeded, leading instructors to rely on theoretical instruction in classrooms, particularly for educational and humanities subjects.

Furthermore, **Table 3** displays a mean of 4.42 and a standard deviation of 0.35 for the human resources sector. Item 12 exhibits the greatest mean value, pertaining to "The school organizes scientific exchanges and hosting for those with experience and competence in the field of modern technologies and smart devices." The item listed earlier achieved a score of 4.61. The item labeled 7, pertaining to the "availability of technical cadres with high skills in using technological and digital systems," exhibited the lowest average score (4.25) in comparison to all other items. The sample members' estimates suggest that the credentials of the laboratory and information technology workers are responsible for this outcome. This is likely due to the presence of highly skilled engineering staff and experienced programmers with relevant qualifications. The majority of them have also gained job experience in the Arab Gulf countries, and they are currently pursuing courses that align with their interests and goals. The researcher may ascribe this result to the Ministry of Education's method of selecting and appointing computer laboratory and information technology employees, specifically by choosing individuals with technical competencies, expertise, and experience rather than recent graduates. The sample members ascribe this outcome to schools' organization of scientific workshops, courses, and conferences, as well as their practice of sending staff to Arab or international nations and facilitating exchange visits. The researcher may also ascribe the cause to the Corona epidemic and its resultant impact on schools, which necessitated the cessation of all activities and meetings over the past two years due to the implementation of extensive prohibition measures. The schools have implemented partial security and safety measures, including closure during previous periods. Additionally, employees are working on a rotation system with only 50% of their usual hours. There are also restrictions and conditions in place for travel and organizing events, as well as consequences for violating the defense orders in the Kingdom of Saudi Arabia.

Moreover, **Table 3** displays a mean of 4.42 and a standard deviation of 0.35 for the administrative legislation. Item 14 exhibits the greatest mean value, pertaining to the "commitment of senior administrative leaders to implement plans regarding integrating information and technological technologies into education." The item listed earlier achieved a score of 4.68. The item labeled 18, pertaining to the "participation between the school, public and private sector institutions, and civil society institutions," exhibited the lowest average score (4.33) in comparison to all other items. This outcome can be ascribed to the sample members' estimations, which were influenced by the abrupt shift to distance learning prompted by the Corona pandemic and the prevailing epidemiological circumstances. Additionally, the teachers' proficiency in utilizing contemporary technologies like ZOOM technology for conducting classes, creating remote electronic assessments, and engaging in

electronic communication with students both domestically and internationally played a role. Both within and beyond the Kingdom, both public and private schools are currently being instructed to implement e-learning and emergency learning strategies. The researcher may also attribute the reason to the approval of the Ministry of Education to include the integrated education policy as an official curriculum for teaching in schools. Additionally, strategic plans were prepared following the quality assurance standards approved by the Ministry of Education, and in response to changes, challenges, and scientific advancements.

Finally, **Table 3** displays a mean of 4.32 and a standard deviation of 0.30 for the students. Item 14 exhibits the greatest mean value, pertaining to the "The school organizes student scientific forums and cultural exchanges with Arab and international schools." The item listed earlier achieved a score of 4.50. The item labeled 19, pertaining to "students' proficiency in using and dealing with modern technologies," exhibited the lowest average score (4.15) in comparison to all other items. These reasons can be attributed to the sample members' assessments of students' technology use skills and their engagement with modern technologies when tasked with preparing scientific projects. It could also be due to their development of innovative technological applications that showcase their inclinations, skills, and enthusiasm for learning and utilizing technology. This is in contrast to traditional teaching methods that focus on indoctrination, memorization, and the sole goal of achieving a high grade and success in the course. The observed outcome can be attributed to administrative factors concerning the endorsement and support from administrators. These factors can be linked to the availability of adequate funding for university schools to arrange forums, facilitate student trips to Arab or foreign nations, and facilitate exchange visits.

The study employed an independent sample t-test to examine the significant variations in the potential utilization of virtual reality technology depending on characteristics such as educational qualification and years of experience, specifically addressing the second research question.

Table 4. Independent samples *T*-test.

Variables	*N*	Mean	St. dev	df	*t*	Sig
Less than 5 years	84	4.15	0.39	238	1.120	0.076
More than 5 years	156	4.20	0.35			
Undergraduate degree	171	4.17	0.36	238	1.135	0.075
Postgraduate degree	69	4.21	0.35			

According to the data presented in **Table 4**, it is evident that teachers with less than 5 years of experience had a mean answer of 4.15 for the possible use of virtual reality technology, while teachers with more than 5 years of experience had a mean reaction of 4.20. In addition, the chart indicates that teachers with undergraduate degrees had a mean response of 4.17 for the potential usage of virtual reality technology, whereas those with postgraduate degrees had a mean score of 4.21. There was no statistically significant difference (Sig) seen between the two groups of teachers, categorized based on their experience (0.076) or level of qualification (0.075).

Both experience and level of qualification had a minimal impact on the possible application of virtual reality technologies.

7. Conclusion

The main objective of this study initiative was to assess the feasibility of employing virtual reality technology for educating individuals with learning difficulties. The study's findings suggest that virtual reality technology has the potential to be used for educating individuals with learning disabilities in the Asir region on topics such as infrastructure, human resources, administrative legislation, and students. The results indicate that virtual reality technology can effectively educate those with learning disabilities, leading to improved instructional capabilities for those identified with learning challenges. The researcher posits that the observed outcome is rational and may be ascribed to the coronavirus pandemic. Likely, the current utilization of e-learning and its modern technologies in schools is exerting an influence on the estimates of the individuals in the sample. Furthermore, their academic background in remote instruction and the efforts of schools to upgrade their digital learning platform, as outlined in the Ministry of Education's present initiative, could also influence their assessments. Blended education entails the incorporation of remote learning into the conventional educational framework, especially in times of crisis. It entails utilizing contemporary technology to enhance the educational experience, specifically for students at educational institutions. The report attributes the schools' current efforts to use e-learning as an educational approach to the latest technical breakthroughs and their integration into programs, notably in response to the breakout of the Corona pandemic.

Conflict of interest: The author declares no conflict of interest.

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