

**Augmented Reality Integration for Enhanced English
Vocabulary Acquisition among Elementary Students with
Special Educational Needs in an American Private School
in Dubai, United Arab Emirates: Perspectives of Special
Education and English Teachers on the Challenges and
Potential**

دمج تكنولوجيا الواقع المعزز لتعزيز اكتساب مفردات اللغة الإنجليزية بين طلاب
المرحلة الابتدائية من ذوي الإحتياجات التعليمية الخاصة في إحدى المدارس
الأمريكية الخاصة في إمارة دبي – الإمارات العربية المتحدة: التحديات و
الإمكانيات من وجهة نظر معلمي التربية الخاصة ومدرسي اللغة الإنجليزية

by
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Abstract

The current study explores the perspectives of special educational needs (SEN) teachers and English teachers regarding the effectiveness of utilizing augmented reality (AR) in enhancing vocabulary acquisition among elementary students with special educational needs in an American private school in Dubai. The researcher conducted semi-structured interviews with a purposeful sampling that included six English teachers, four special educational needs teachers, and six learning support assistants. As the study follows a qualitative approach, a detailed description of the participants' perspectives has been provided. The study has attempted to answer the following questions: 1) What are the perceptions of English teachers regarding the effectiveness of augmented reality in enhancing vocabulary acquisition for elementary students with special educational needs?, 2) How do Special Education teachers evaluate the suitability of augmented reality as a tool for supporting vocabulary application among students with diverse learning needs?, 3) What are the identified challenges, if any, in integrating augmented reality for vocabulary development among students with special educational needs, as perceived by both English and Special Education teachers?, and 4) What strategies and recommendations do teachers propose to optimize the use of augmented reality in catering to the individualized vocabulary learning requirements of students with special educational needs in an American private school in Dubai? The study found that integrating AR has shown effectiveness in the retention and application of newly acquired words among students with various special educational needs. Additionally, it has explored the main challenges along with recommendations to strengthen the effectiveness of using AR technology in special education.

Keywords: augmented reality, vocabulary acquisition, special educational needs

خلاصة

تستكشف الدراسة الحالية وجهات نظر معلمي الاحتياجات التعليمية الخاصة ومعلمي اللغة الإنجليزية حول فعالية استخدام تكنولوجيا الواقع المعزز في تعزيز اكتساب المفردات لدى طلاب المرحلة الابتدائية من ذوي الاحتياجات التعليمية الخاصة في إحدى المدارس الأمريكية الخاصة في دبي. أجرى الباحث مقابلات شبه منظمة مع عينة منتقاة شملت ستة مدرسين للغة الإنجليزية، وأربعة معلمين ذوي احتياجات تعليمية خاصة، وستة مساعدين لدعم التعلم. وبما أن الدراسة تتبع نهجاً نوعياً، فقد تم تقديم وصف مفصل لوجهات نظر المشاركين. حاولت الدراسة الإجابة على الأسئلة التالية: (1) ما هي تصورات معلمي اللغة الإنجليزية حول فعالية الواقع المعزز في تعزيز اكتساب المفردات لدى طلاب المرحلة الابتدائية من ذوي الاحتياجات التعليمية الخاصة؟ (2) كيف يقوم معلمو التربية الخاصة بتقييم مدى ملائمة الواقع المعزز كأداة لدعم اكتساب واستخدام مفردات اللغة الإنجليزية بين الطلاب من ذوي الاحتياجات التعليمية الخاصة؟ (3) ما هي التحديات التي تم تحديدها، إن وجدت، في دمج الواقع المعزز لتنمية المفردات بين الطلاب ذوي الاحتياجات التعليمية الخاصة كما يراها معلمو اللغة الإنجليزية والتربية الخاصة. (4) ما هي الاستراتيجيات والتوصيات التي يقترحها المعلمون لتحسين استخدام الواقع المعزز في تلبية متطلبات تعلم المفردات الفردية للطلاب من ذوي الاحتياجات التعليمية الخاصة في مدرسة أمريكية خاصة في دبي؟ وجدت الدراسة أن دمج الواقع المعزز أظهر فعاليته في تخزين الكلمات المكتسبة حديثاً وتطبيقها بين الطلاب من ذوي الاحتياجات التعليمية الخاصة المختلفة. بالإضافة إلى ذلك، توصلت الدراسة إلى تحديد بعض التحديات الرئيسية إلى جانب التوصيات المقترحة لتعزيز فعالية استخدام تكنولوجيا الواقع المعزز في التعليم الخاص.

الكلمات الرئيسية: تكنولوجيا الواقع المعزز، اكتساب مفردات اللغة الإنجليزية، الاحتياجات التعليمية الخاصة

Dedication

To my backbone, my father Jihad Alshatarat, my sweet mother, Sabah Alqennah, my beloved husband, Omar Dalbah, and my three little angels, Raseel, Abdulrahman, and Kady.

I extend my deep gratitude to my father and mother, who have always believed in me and motivated and encouraged me to keep exploring and expanding my knowledge. A big heartfelt thank you goes to my beloved husband, Omar Dalbah, for his understanding, endless support, and tolerance. Words can never be enough to express how grateful I am for you standing by my side every step of the way, never complaining or wavering, and playing the role of father and mother whenever I dedicated my time to my studies. I would like to extend my deepest love and gratitude to my kids, Raseel, Abdulrahman, and Kady, for the times I was engrossed in my studies; your patience, understanding, and the joy you bring into my life have been my motivation. I dedicate this dissertation to you, my dear children, as a testament to the importance of education and the love that fuels my pursuit of knowledge. Your mother loves you and hopes one day she will see her name written in the dedication of your dissertation.

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Chapter 1: Introduction

The introduction chapter of this dissertation is divided into the following six sections: The first section provides a brief overview of augmented reality. The next one states the problem statement of the study. The study's aims and objectives are stated in the third section. Then, the fourth chapter states the research questions that drive the investigation in the present study. The fifth part highlights the significance of and the rationale behind conducting the current research. Finally, the present thesis's chapters are outlined.

1.1 Overview of Augmented Reality

Technology utilized in the education sector, specifically in the special education sector, has gained importance in meeting the various learning requirements of students with special educational needs (SEN) and learning styles (Khanna & Bhola, 2023). In this regard, Karacan and Akoglu (2021) contemplated that augmented reality (AR) is an important technology that assists students with special educational needs to learn better, specifically when in the domain of developing their lexical reservoirs and acquiring new vocabulary. Moreover, the research conducted by Badilla-Quintana et al. (2020) stated that to meet the needs of students with a diversity of learning abilities, technology is an important part of the educational system. Papanastasiou et al. (2019) stated that adding virtual features to the real world with AR technology creates interactive and multisensory experiences that can enhance the learning experience for students with a range of special learning styles, needs, and abilities. Overall, it can be concluded that AR has been shown to help students with SEN become more interested, stay motivated, and better retrieve what they learn.

As per the study of Chen and Chan (2019), the usefulness of AR in helping students with special needs learn and acquire vocabulary in certain situations is still not fully

understood, even though it has many possible benefits. The research by Shaumiwaty et al. (2022) articulated that to make sure that all students, including those with special needs, can get a good education, it is crucial to understand the way teachers feel about using augmented reality (AR) to help elementary school students learn new vocabulary and use it in real life. It is important to focus on the exploration of using AR in the special education sector. According to the notion delivered by Abalkhail et al. (2020), understanding the perspective of stakeholders on utilizing the technology can provide useful information and suggestions that can be used to improve the outcomes of AR in education. Likewise, the primary purpose of this research is to explore and attain solid knowledge of educators' points of view on AR technology applications to enhance the learning experience of students with special educational needs to acquire and retrieve vocabulary.

1.2 Problem Statement

Augmented reality technology is revealed to be a revolutionary tool through which various sectors, including education, are taken to another level in the aspect of interactivity and collaboration. Nevertheless, the integration of this technology into areas of special context with diverse special educational needs may pose some challenges, such as the development of specific AR tools that are used in the educational aspects. In addition, some obstacles, such as insufficient training and the availability of resources, may impede educators from utilizing AR effectively in their instructional practices (Kassing & Jay, 2020). Although educators are aware of the potential of AR to enable students to learn better, they find themselves in many cases lacking both the required knowledge and support to be capable of using it effectively (Tzima et al., 2019). In inclusive classrooms, with students having different educational needs, the traditional way of teaching might not cater to those needs, especially in the case of

vocabulary development. The limitations of traditional practices emphasize the need for innovative approaches, like the application of AR technology, to improve learning quality for students with special educational needs. However, the implementation of AR in special education poses different challenges, such as the transformation of the technology in a way that caters to various individualized learning needs.

Apart from ensuring that AR material is linked to the learning plan of every student and that everyone with different abilities has access to it, there are some obstacles the teachers in inclusive classes have to overcome. This is compounded by the fact that AR technology can be considered costly for some educational systems, as Smogorzewska et al. (2019) noted. It becomes a barrier for many schools that would like to invest, despite the promising potential these tools bring. The concentration of research that has been done so far regarding the effectiveness of AR in teaching children with SEN shows effectiveness in improving engagement and interactions (Grindal et al., 2019). The feasibility has been demonstrated by a preliminary study; however, in-depth research is needed to determine the lasting impact and the most effective ways to apply AR in inclusive classes. Therefore, this study intends to contribute to the field of study by exploring special education and English teachers' perspectives on the effectiveness of AR applications for enhancing vocabulary acquisition for elementary students with special educational needs. It is an effort to identify the effectiveness, explore challenges, and emphasize the potential of AR in American curriculum-based private schools in Dubai.

1.3 Research Questions

This research study aims to investigate the perspectives of English and special education teachers on the effectiveness of integrating augmented reality as a tool for

improving vocabulary acquisition and application among elementary students with special educational needs in a private school in Dubai, United Arab Emirates (UAE).

The research attempts to answer the following questions:

1. What are the perceptions of English teachers regarding the effectiveness of augmented reality in enhancing vocabulary acquisition for elementary students with special educational needs?
2. How do special education teachers evaluate the suitability of augmented reality as a tool for supporting vocabulary acquisition and application among elementary students with diverse educational needs?
3. What are the identified challenges, if any, in integrating augmented reality for vocabulary development among students with special educational needs, as perceived by both English and special education teachers?
4. What strategies and recommendations do teachers propose to optimize the use of augmented reality in catering to the individualized vocabulary learning requirements of elementary students with special educational needs in an American private school in Dubai?

1.4 Rationale and Significance

The significance of this research stems from its holistic approach as one of the first studies to comprehensively examine interconnected educational fields: English as a second language, special education, and technology for elementary students in a private school in the UAE. This significance lies in the incorporation of cutting-edge technology, such as augmented reality, that integrates virtual reality into real-world objects and the effectiveness

of this integration in the scope of vocabulary acquisition for elementary students with diverse special educational needs.

The study examines the perspectives of English and special education teachers on the integration of AR during vocabulary lessons for students with special educational needs in an attempt to elicit useful information and suggestions that can be used to improve lesson planning, teacher training, and policymaking in inclusive schools (Bailey & Alexander, 2020). It was stated by Nilholm (2021) that students reflect higher attention and engagement when AR technology is utilized in the lessons. These exceptionally interactive technologies enable students to actively attain knowledge. The study findings are most likely to be beneficial as they cover multidisciplinary aspects. Ultimately, understanding the challenges and considering the recommendations may assist in the creation of focused instructional techniques and lead to improvements to the individuality aspects of the technology. In addition, this consideration of the study findings may enhance teacher training by giving them the information and skills they need to use augmented reality successfully in inclusive classrooms.

This study seeks to gather valuable insights into the feasibility, adaptability, and efficacy of AR in enhancing vocabulary acquisition for students with SEN in diverse classrooms. It focuses on the experiences and perspectives of English and special education teachers engaged in both standard and specialized instructional support. This asserts the importance of this research in the context of an American private school in Dubai, emphasizing its relevance not only to this particular institution but also to other schools with different curricula and in different Emirates. The varied demographic and diverse educator body in this school offers rich ground for exploring inclusive and innovative teaching approaches. This research aims to contribute significantly to the body of academic knowledge

regarding the application of AR in supporting students with SEN in learning vocabulary. It also aspires to provide practical recommendations and insights that will help in the development of curricula, teacher training, and educational policies in similar schools striving to create welcoming, technology-enhanced learning environments for all students.

1.5 Outline of Research's Chapters

The research chapters are outlined as follows: Chapter 1 provides a brief overview of augmented reality (AR). Additionally, it establishes the research context and study significance, and it outlines the aim and questions guiding this investigation. Chapter 2 discusses and reviews the literature review with a comprehensive analysis of existing literature on AR in special education. Moreover, it highlights underpinning theoretical frameworks and previous empirical findings relevant to vocabulary acquisition. Chapter 3 describes the research methodology, detailing the data collection and analysis procedures used to explore the perspectives of English and special education teachers on augmented reality in vocabulary learning. Findings and analysis of integrating AR into vocabulary acquisition in special education are presented in Chapter 4, followed by the discussion in Chapter 5. Finally, Chapter 6 includes the conclusion and recommendations.

Chapter 2: Literature Review

The literature review gives an insight into the critical concepts related to the application of augmented reality (AR) in special education and how it can be utilized in schools to enhance the lexical development experience of students with special educational needs (SEN). It critically reviews the previously conducted empirical research to identify the knowledge that will help understand how the AR-based vocabulary acquisition approach will impact elementary school students with special needs.

2.1 Theoretical Framework

As with special education, several theory models serve as fundamental and related to AR. Previous research suggests that these models play a role in helping educators understand how technology can be used to help students with special needs learn languages (Bell & Bell, 2020). In a constructivist sense, the use of AR is commensurate with these ideas that favor active comprehension and the construction of knowledge. The theoretical framework underpinning language acquisition through AR-enriched content hinges on the premise that individuals with special needs can enhance their oral proficiency by actively engaging with the material due to its interactive features.

2.1.1 Socio-Cultural Theory and Zone of Proximal Development (ZPD)

As proposed by Vygotsky in 1978 (socio-cultural theory), social context is integral to learning. In addition, Tzuriel et al. (2021) have considered the socio-cultural implications of technology-enriched educational environments in special education. The collaborative nature of technology promotes its incorporation into the learning process, working in compliance with the Vygotsky theory that shows that mutual experiences lead to language acquisition and, ultimately, brain development. The Zone of Proximal Development (ZPD) is a concept by

Vygotsky that is practical in two ways for the creation of an environment where closed-loop learning is designed for individuals. Furthermore, in line with a study by Nicholas et al. (2021), the AR assimilation of the learning material into students' ZPD enhances the assumption that the specific versions of some special AR applications, rather than typical AR programs for general learners, can help students with special educational needs learn words better within their ZPD.

2.1.2 Cognitive Load Theory and Multimodal Learning

It is crucial to take into account Sweller's (1988) Cognitive Load Theory while designing AR applications for special education. It was stated by Cheng et al. (2014) that AR affects brain load in a learning situation studied by Taiwanese researchers. It is now more transparent that properly implemented augmented reality applications can help decrease the unnecessary mental burden of language acquisition and make vocabulary learning tasks more efficient. In schools where students have special needs, the education provided with the help of AR uses several senses for more effective learning that takes place through multimodal learning. A study was conducted to observe the efficiency of implementing AR technology in teaching science and link AR's malleability to meet the visual preferences of the users, which might assist students with special educational needs to process new words effectively (Ginns & Leppink, 2019).

2.1.3 Universal Design for Learning (UDL)

The Universal Design for Learning (UDL) system helps develop and implement technology such as AR applications because it facilitates flexible learning environments. The study by Kennette and Wilson (2019) focused on linking UDL for learning principles with the use of technology in special education and emphasized that technology that recognizes the use

of UDL can incorporate modifications for students with special needs. For one to understand how elementary school students with special educational needs can use AR to enhance vocabulary learning, these academic models need to be taken into consideration based on relatability.

Special education teachers play a crucial role in determining whether augmented reality (AR) is effective and appropriate for students with diverse learning needs to acquire and use vocabulary effectively. As technology continues to advance, there is growing interest in incorporating augmented reality (AR) into special education, particularly for children with cognitive, auditory, or visual impairments. The effectiveness of AR in this context is assessed through various factors, encompassing both theoretical frameworks and practical considerations. In Pedagogical Considerations, teachers of students with special needs examine the practicality of AR by observing its suitability for different learning styles and individual lesson plan models by using the Likert scale. For visual, auditory, and kinesthetic learning styles, AR offers interactive tactile learning with all these sensory qualities. Implementing these needs among students with different learning needs can be satisfied more easily (Dewi & Dalimunthe, 2019). This way, AR ignites interest in students learning a language more than conventional approaches as it allows the user to employ words actively and personally.

2.2 Empirical Literature

Examination of how some technological applications, such as augmented reality, may be used to assist students with special educational needs to learn more effectively. Therefore, many studies were conducted, and the research delivered good outcomes, for instance, children being more engaged and having higher word recall rates (Roski et al., 2021).

Research also indicates the importance of AR apps in teaching students lexicon and connects the use of technology for improving learning with maintaining students' interest. Nave's (2021) research conducted a study that attempted to determine how AR contributes to brain load and the improvement of the learning environment. The study's results suggest the possibility of getting lower brain load through the use of AR apps, probably because a sufficiently acceptable technology could reduce unnecessary information during learning and make this process more effective and faster.

Law and Heintz (2021) discovered how educators view AR. Although the study does not directly link the applications to special education, the responses by educators demonstrate how general teachers view the feasibility and effectiveness of AR technology. AR is a part of the world we live in; it may have already been introduced to our classrooms or will very soon invade them. For this reason, understanding teachers' feelings towards AR might help reveal possible issues and greatly facilitate its use in classroom settings.

Although there have been numerous studies of AR application in learning, there is a noticeable dearth of studies that focus solely on utilizing AR to assist students with special educational needs to learn, acquire, and apply words. Moreover, there is a scarcity of studies attempting to uncover the lasting outcomes and sustainability of AR approaches for enhancing linguistic achievement in special education. According to DesJardine and Durand (2020), many studies have looked into short-term and instant returns, but there is a lack of full understanding of the long-term impacts to be achieved and challenges toward long-term achievement.

In addition, more studies must be done in terms of understanding the impact of cultural and environmental elements on how effectively AR improves vocabulary-building capabilities

for children with disabilities (Ashraf et al., 2023). This becomes even more apparent when analyzing students not only in different but also in varied educational surroundings, such as the domain of this study having an American private school situated within Dubai. In order to be relevant and student-friendly, AR apps have to take into account cultural factors and language barriers to enhance the scope of service to cover different students with different levels of language proficiency and special needs. Finally, while empirical research is beneficial for understanding how AR could be applied to education in general, there is a vast gap to fill in the specific domain of vocabulary acquisition and language development using AR for students with special educational needs. In the future, research should focus on plugging this gap by analyzing what particularities, challenges, and cultural issues affect the utilization of AR technology in general and influencing individual language acquisition for students with special educational needs.

2.3 Augmented Reality

Augmented Reality (AR) has become a game changer, incorporating the virtual world into the real world with ease. In line with computer science, AR has witnessed profound progress that was prompted by academic inquiry, technological advances, and practical applications of technology across industries such as transportation. It shows how science, technology, and real-world use can work together in many different fields. As Safi and Chung (2023) stated, in the early 1990s, while Tom Caudell was in the position of a Boeing engineer, he coined the term “augmented reality” to mean the computerized screen method, which helped workers assemble fragments of aircraft. A completely different situation is demonstrated by AR which has its origins no later than Ivan Sutherland’s work in the 1960s, when he proposed head-mounted display screens. This was illustrated by “Sutherland’s Sword

of Damocles.” Despite its rudimentary capabilities compared to modern AR devices, this early model laid the groundwork for subsequent advancements in AR technology (Fanini et al., 2023). Throughout the latter half of the 20th century, attention shifted towards virtual reality, with a focus on computer-generated imagery, computer vision, and methods for physical input. However, Starner et al. (1997) development of portable computers capable of overlaying digital information onto the user’s view of the real world in the 1990s marked a significant milestone in the evolution of AR.

As technology continued to improve, AR applications expanded beyond theoretical frameworks and entered real-world contexts. Early examples included the use of AR for military training and flight warning displays. However, it was not until the 21st century, with the widespread adoption of smartphones, that AR gained significant traction among the general population. The release of augmented reality games like “Pokémon Go” in 2016 demonstrated the potential for AR to create engaging and immersive experiences for users, reaching a broader audience and sparking widespread interest and investment in AR technology. The scholarly writing on virtual and augmented reality has looked at its theoretical foundations, technical parts, and wide range of uses. According to Milgram et al. (1995) “Augmented Reality: A Class of Exhibitions on the Reality-Virtuality Continuum,” the Reality-Virtuality Continuum is a range of environments that are either completely real or completely virtual, with augmented reality (AR) being in the middle. There have been many studies on the effects of virtual reality on learning that take place in classroom settings.

The work of Dunleavy et al. (2009), in their article “Affordances and Constraints of Immersive Participatory Augmented Reality Modelling for Teaching and Learning,” discussed

the advantages and disadvantages of those AR simulations. Making students think about how these things might change was a way to get them excited and help them understand better.

Various studies in the medical services field have likewise taken an overview of how AR could change the results of treatment and how it very well may be utilized for preparing and focusing on patients. Additionally, Zhao and Zhu(2016) show various ways that expanded reality can be utilized in medication. For instance, it can accelerate and work on the exactness of medicines. It can likewise make clinical preparation more straightforward for understudies and make it simpler to find out how patients' cases are turning out in a virtual setting. It has made some amazing progress since its initial hypothesis models and tests. Currently, it is a muddled innovation utilized in numerous clinical settings. The available materials give a complete picture of long-term technological progress by combining theoretical frameworks with real-world studies to look at augmented reality's potential and setups. Augmented reality is still a field of unexplored potential that educators may find very interesting. In addition to changing how we see and talk to computers, it could also change how we experience or make the world.

2.4 Special Education

Special education is a specialized branch of education aimed at providing assistance and support to students who face challenges or have special educational needs. This field is quite dynamic, driven by a desire to ensure equity and inclusion for all individuals, irrespective of their conditions (Rumrill et al., 2020). This approach recognizes the unique needs of each learner and strives to address them effectively. Practices in special education have evolved, encompassing various aspects such as historical developments, legal frameworks, pedagogical methods, and contemporary issues (Li, 2023). Historically,

educational programs for individuals with diverse special needs were frequently segregated from mainstream schools, thus restricting their access to conventional educational opportunities. However, substantial change has been achieved, especially during the mid-twentieth century, in addressing the rights of individuals with special needs and disabilities. According to Shtayermman (2021), in the United States, legislative measures such as the Rehabilitation Act (RA) of 1973 and the Individuals with Disabilities Education Act (IDEA) have been instrumental in enhancing access to mainstream schools for children with educational needs. Different evaluative and recognition steps are essential aspects of special education procedures. An article by Alfonso et al. (2000) discussed in detail the difficulties as well as effective ways to detect students with learning difficulties and disabilities. It emphasized the role of comprehensive evaluation instruments and several people who should participate, for example, teachers, parents, specialists, etc. Special education programs frequently place a strong emphasis on cooperation since it fosters social skills, improves peer-to-peer learning, and gives students the chance to support one another's individual needs. According to Reindal (2021), students can gain valuable skills like empathy, communication, and problem-solving by working in groups, which also promotes a varied learning environment. Teachers strive to meet the needs of every child by building strong connections and using clear communication, with an emphasis on inclusivity.

Modular blended learning approaches integrate early intervention with special education services, which can address numerous challenges (Kumar et al., 2021). Teachers are urged to continuously improve their skills, as effective teaching is key to the success of such approaches. Nonetheless, issues of disproportionality remain, with some groups being overrepresented in special education. Thus, Sedrak et al. (2021) suggest reevaluating and

updating special education policies to eliminate biases and promote fairness. They argue for a more adaptable and responsive educational system to meet the evolving needs of students.

These systems have to be more flexible and responsive to student demand, which changes in various circumstances. Moreover, it is stated by Anderson (2022) that special education is an ever-evolving discipline that has the full support of society, as it promotes everyone to equitable learning opportunities.

2.5 Second Language Vocabulary Acquisition

Vocabulary acquisition is the process of saving and retrieving words and phrases of a certain language, including pronunciation, definition, and usage in diverse contexts (Schmitt & Schmitt, 2020). This brain and verbal growth are necessary for effective conversation, understanding, and doing well in social and educational contexts. Numerous research has been conducted on vocabulary acquisition in the fields of educational psychology, linguistics, and language acquisition research. As observed in psychological education, one significant aspect of improving language skills and school performance is learning words that a student has never used before. The facts indicate the importance of linguistic development at early stages in generalization to all reading and writing skills (Andringa & Godfroid, 2020). Studies in linguistics have examined the challenging dynamics of acquiring language, such as keeping in mind frequency and context. Paul Nation wrote a book called *Vocabulary*, which refers to the number of words that are used in other linguistic structures, their extent and magnitude (Gupta, 2023). He highlighted and showed that people should be happy when they encounter words many times, in different useful situations, so they can understand them well. Nation's work contributes to the understanding that accidental contact and purposeful acquisition of words might enable a learner to accumulate a necessary and diverse language.

Jeanne Sternlicht Chall's book, *Learning to Read: The Paper "The Great Debate Revisited"*, covers aspects of the case with context to learn vocabulary in detail. Context hints and a candidate approach to the surrounding text appear to be rather helpful for deciphering the semantic meaning of phrases while reading. It was stated by Mahon et al. (2001) that the individuality of second-language learners and how factors that depended on their traits, such as drive, ability, and attitude, affected their rate of learning new words. These differences are important when adapting lessons to accommodate every student, so teachers must understand how one's characteristics, such as gender and age, can influence their performance.

Native language is a social product and by being learned from our parents or any other close people, children can acquire their native language practically forgetting that it has some universal traits common to all languages. It is important to consider this social-cultural theory of Vygotsky, which also focuses on the fact that performance, or how we think or learn, depends on our cultural background, social relationships, and learning environments.

Vygotsky wrote in 1978 a book called *Mind in Society: The Emergence of Higher Psychological Processes* in which he argues that language and thoughts are intertwined, and as well as being limited to everyday social and cultural circumstances, new vocabulary words also function within this environment.

In conclusion, word acquisition is a complex process influenced by factors linked to cognitive, linguistic, environmental, and cultural variables.

Chapter 3: Methodology

This chapter of the current research describes the research methodology. It incorporates the research design, sampling selection, data collection, and data analysis.

3.1 Research Design

A research design is one of the most fundamental constituents of a research study, as it outlines the research objectives. This section covers the research design used in this study regarding the implementation of AR in vocabulary acquisition in special education contexts, as well as the inductive research strategy, the qualitative approach, and the rationale for the qualitative approach. First, the research strategy that the current study has adopted is an inductive research approach, which is the process of inferring general theories or conclusions out of observations, especially where the specific hypotheses are not well set to be tested at the initial stages of analysis (Haydam & Steenkamp, 2020). This qualitative research method depends on inductive research in data collection and also in inferring the patterns and themes that are observed. Systematically, the qualitative research approach is a great tool that enables exploring participants' insights and experiences in detail by using a set of research methods, such as in-depth interviews and content analysis (Moser & Korstjens, 2017). Therefore, the inductive research strategy has been applied to yield thorough insights from the observed patterns within inclusive educational settings regarding educators' views and attitudes towards the use of AR in enhancing vocabulary acquisition for students with special educational needs.

Qualitative research is well-suited for exploring complex phenomena and understanding the factors that may impact society (Stutterheim & Ratcliffe, 2021). This study aims to explore the impact of AR technology on enhancing vocabulary acquisition among students with special needs in a relatively small school environment. The use of qualitative

methods provides a chance to go into depth to understand the challenges students with special educational needs face while learning new vocabulary and how the integration of technology can lead to better outcomes.

The primary research method chosen for data collection is semi-structured interviews. Semi-structured interviews have a multipurpose data acquisition method, which enables multifaceted data collection from a small sample size. On the other hand, the lack of details regarding all the attributes of a particular phenomenon and the expense borne by the participant may make them the most appropriate tools to investigate the integration of digital technology in special education. It should be considered that other qualitative research methods, such as case studies and ethnography, were not included in this study due to their constraints. In case studies, detailed explanations of concepts are given that may have several limitations in terms of saying which causes and effects are related to each other or testing hypotheses if the phenomenon is too complex (Stutterheim & Ratcliffe, 2021). Thus, semi-structured interviews are the most efficient tool for finding out what the challenges and potential AR may have on enhancing the vocabulary learning experiences of students with special needs.

The primary means of collecting data was via conducting semi-structured interviews that aimed at collecting data using both deep and broad approaches, since in this case, it is concerned with exploring the perspectives of various stakeholders such as English teachers, special education teachers, and learning support assistants.

3.2 Research Paradigm

Durach et al. (2017) define a research paradigm as a set of common beliefs and agreements on how problems should be understood and addressed among scientists. As the

study aims to explore the perspectives of participants, a constructivist paradigm is used. This constructivist paradigm, which evolves on the concept of constructing cognition in the participants' minds, is beneficial when a researcher seeks to acquire in-depth and personal insights from selected participants. A constructivist paradigm implies that people's reflections on their personal experiences influence their concepts' understanding, knowledge attainment, and general perspective of the world around them (Andrews, 2012). In this qualitative research, the researcher establishes a welcoming environment and collaborates with the participants to draw on their experiences. The researcher attempts to elicit information by asking open-ended questions and elaborating on the questions to support participants' experiences. Likewise, as this paradigm proposes that there are multiple truths and realities to examine and reflect on, this would be more successfully achieved through qualitative methods.

3.3 Sampling

In qualitative research, the selection of the quantity of respondents and methods is crucial for improving the validity and utility of the study (Maxwell, 2021). For this study, the interviewed sample includes English teachers, special education teachers, and special education learning assistants who work firsthand with students with special educational needs. For this study, the sample size was set at 16 interviewees due to the relatively small size of the school where the research was conducted. The sample included six English teachers, six learning support assistants, and four special education teachers. Each group brings a different point of view to the learning process. As the study is concerned with exploring the effectiveness of using augmented reality in enhancing vocabulary acquisition for students with special needs, it adopted purposeful sampling. Purposeful sampling reflects the strong,

information-rich cases that provide in-depth knowledge rather than empirical generalizations (Patton, 2002).

The objective of the present research study is to delve into the perspectives of the selected sample. Thus, purposeful sample selection assures that the sample is chosen based on certain criteria relevant to the question that is being studied, hence able to produce valuable and rich data (Challob, 2021). The study is therefore focused on generating elaborate insights on the utilization of AR in education, enabled through the consideration of selected participants with given criteria by the sampling technique. While dealing with qualitative research, purposive sampling has many advantages since it has the potential to identify individuals who possess pertinent expertise as well as firsthand experience of AR technology, which indeed benefits the depth and relevance of the data collected. The participants ought to be selected based on the relevance of the question at hand and the probability of getting relevant information that is aimed at answering the research questions. The selection of the sample with direct experience teaching with technology guarantees the gathering of rich and useful data (Challob, 2021). Participant selection is based on how relevant they are to the study questions and how much information they can give. In situations where depth of understanding is more important than statistical representativeness, like when AR is used to teach words to students with special needs, this method is suitable for looking into in-depth and related aspects. In conclusion, the chosen sample size and purposive sampling technique align with the qualitative nature of the research, enabling in-depth exploration of diverse perspectives and experiences in the application of AR technology in educational settings. For the roles and experiences of the respondents, see Table 4.1.

Table 1*Roles and Experiences of Respondents*

	Role	Experience (Years)
RESPONDENT1	English Teacher	10
RESPONDENT2	English Teacher	8
RESPONDENT3	English Teacher	6
RESPONDENT4	English Teacher	7
RESPONDENT5	English Teacher	9
RESPONDENT6	English Teacher	8
RESPONDENT7	Learning Support Assistant	5
RESPONDENT8	Learning Support Assistant	7
RESPONDENT9	Learning Support Assistant	4
RESPONDENT10	Learning Support Assistant	3
RESPONDENT11	Learning Support Assistant	4
RESPONDENT12	Learning Support Assistant	5
RESPONDENT13	Special Needs (SEN) Teacher	4
RESPONDENT14	Special Needs (SEN) Teacher	7
RESPONDENT15	Special Needs (SEN) Teacher	10
RESPONDENT16	Special Needs (SEN) Teacher	3

3.4 Data Collection Method

There are various data collection methods commonly used in research, each with its own strengths and limitations. Some of the commonly used methods include surveys, questionnaires, interviews, observations, focus groups, and document analysis (Zachariah & Nonyelum, 2020). In the context of qualitative research, interviews are often considered a valuable data collection method, and semi-structured interviews in particular offer several advantages. The technique employed in data collection comprises semi-structured interviews with all participants.

The use of semi-structured interviews enables the adoption of both flexible and structured strategies for collecting qualitative data, which facilitates further investigation of participants' perceptions, experiences, and difficulties with the application of AR technology

in vocabulary instruction. This approach allows us to go deeper into finer nuances and personal views, thereby deepening the perception of varied AR utilization patterns and attitudes in schools. Furthermore, semi-structured interviews enable respondents to express their opinions, feelings, beliefs, and experiences related to the research problem. Thus, it is considered appropriate for gathering detailed information about people's perspectives, experiences, feelings, and attitudes on a certain topic (Barriball & While, 1994).

The researcher conducts a semi-structured interview with all the participants. The researcher's role is to facilitate the procedure by organizing the conversation and asking questions during the interviews to obtain informative responses. Compared to many other data collection methods, semi-structured interviews show effectiveness in establishing a rapport and creating a connection with interviewees to elicit information related to the case (Dearnley, 2005).

The researcher carried out interviews with all participating English teachers, special education teachers, and special learning assistants. Each interview lasted for approximately 20 minutes, and questions were constructed according to the research questions. The timing of the interviews varied according to the teacher's availability. All interviews took place on the school's premises upon prior permission and consent forms obtained from the school principal and participants.

Although there are various ways to carry out an interview, such as video calls, phone calls, or online interviews, face-to-face interviews are the most common and provide the best data quality due to their efficacy and feasibility (Hancock, 2001).

The research's validity and reliability were taken into account. The validity and reliability of any research are key indicators of any study's quality, as validity is a key

demonstrator of the trustworthiness of the researcher (Riege, 2003). On the other hand, reliability deals with the consistency of data collection that yields the same results each time the tool is utilized (Nassaji, 2015). Consequently, the current study considered its validity and reliability through various measures. First of all, the researcher developed a set of comprehensive questions. Additionally, the researcher conducted a short pilot study to determine the suitability, effectiveness, feasibility, and structure of the questions to facilitate the process of data collection from the respondents. Finally, the fact that the researcher is an English teacher who deals with students with various special educational needs furthers the validity and reliability of the research.

3.5 Data Analysis Technique

The study relies solely on a qualitative approach using semi-structured interviews. In semi-structured interviews, the questions are formed within a predefined topic context, which is typical of qualitative and exploratory studies (Ruslin et al., 2022). Consequently, the data analysis was a complex procedure of conducting the interviews, gathering the data, combining and categorizing the data, and ultimately creating different themes.

In this study, the qualitative data was identified using thematic analysis, which is among the best methods to identify and understand patterns in the data. Fossey et al. (2002) further indicate that thematic analysis is an in-depth analysis of data to identify the patterns of a qualitative study. Therefore, organizing the themes based on their frequencies will lead to clear results. Thematic analysis is aimed at identifying larger themes, which can help us answer the research questions better. This method takes into account not only people's own experiences and views but also bigger trends, the effects on policy, and the best ways to use virtual reality in the classroom. The organized method of finding and explaining repeating

patterns fits with the exploring and qualitative nature of the research. This gives a better understanding of the study's main aim and helps identify specific data and concepts that can be used to explain the meanings and assumptions of the data and content (Clarke & Braun, 2013).

3.6 Ethical Considerations

Ethical considerations should be approached with high priority when it comes to research projects, as there is always a possibility of infringing on human rights, apart from the preservation of privacy. According to Arifin (2018), ethical principles hold significant importance, as emphasized by ethical guidelines, which advocate for the protection of private data through appropriate ethical standards. Appropriate ethical principles should be incorporated into the research process, most importantly informed consent and, in some situations, threats of privacy and confidentiality (Facca et al., 2020). This directly points towards explicit informed consent provided for the research participants, who were aware of the nature of the investigation and the activities in which they were indulging for the sake of compliance with these standards.

The researcher followed specific ethical guidelines to make informed decisions about participating in the research. The researcher obtained a consent letter signed by all the participants. Moreover, the researcher provided the participants with sufficient information about the research, bearing in mind the ease of the format to appeal to all participants.

The confidentiality that was adhered to during this study, as well as respected issues of privacy, such as the names and identities of the participants, were kept anonymous. The participants were advised at the absolute starting point that their participation in this study was voluntary, and they reserved the right to back out of the research whenever they deemed they

needed to. Encoded reports of respondents' interviews were safeguarded on a personal laptop and stayed distant from outsiders while guaranteeing the privacy of the data. Ethical provisions are to enhance the general trustworthiness and uptake of the study, which elements allude to ensuring a responsible study.

Chapter 4: Data Analysis

This chapter provides data to address the current study on the challenges and potential of implementing augmented reality (AR) for enhancing vocabulary acquisition for students with special educational needs (SEN). Moreover, it summarizes the findings from the semi-structured interviews conducted with the 16 participants, including English teachers, special education teachers, and learning support assistants.

Research data analysis includes the systematic process of categorizing the collected data in a particular study to understand and identify reoccurring patterns (Alhojailan, 2012).

Qualitative data analysis was done through semi-structured interviews with 16 participants, including English teachers, special educational needs educators, and special learning assistants who all have relevant experience in the field. This method-oriented approach offers valuable information. The present research examines the influence of the use of AR on vocabulary acquisition among primary school learners with SEN at a private school in Dubai, UAE. Secondly, during data analysis, the researcher focused on identifying themes and patterns concerning the qualitative study (Ruslin et al., 2022).

4.1 Thematic Analysis

Thematic analysis is used as the major technique aiming at the scrutinization of qualitative data acquired in this study, which allows for the identification and analysis of repeatedly emergent patterns or themes in a structured manner. Winiarska (2017) claims that the method applies to most theories and research methods, hence making it versatile. This contributes to the validity and credibility of any findings.

4.2 Familiarization with Data

According to Dawadi et al. (2021), having a sound perspective of the data is important for researchers so that they can create a connection to the research study. After the interviews were recorded, transcriptions were completed. The results of each interview were analyzed by comparing the responses to the questions. During data analysis, important text and notes were underlined, categorized, and organized. The gathered data from each respondent was thoroughly analyzed by comparing it to other respondents to the same question. In the following step, the first lines of code and groups of codes were converted into themes.

4.3 Coding and Induction of Themes

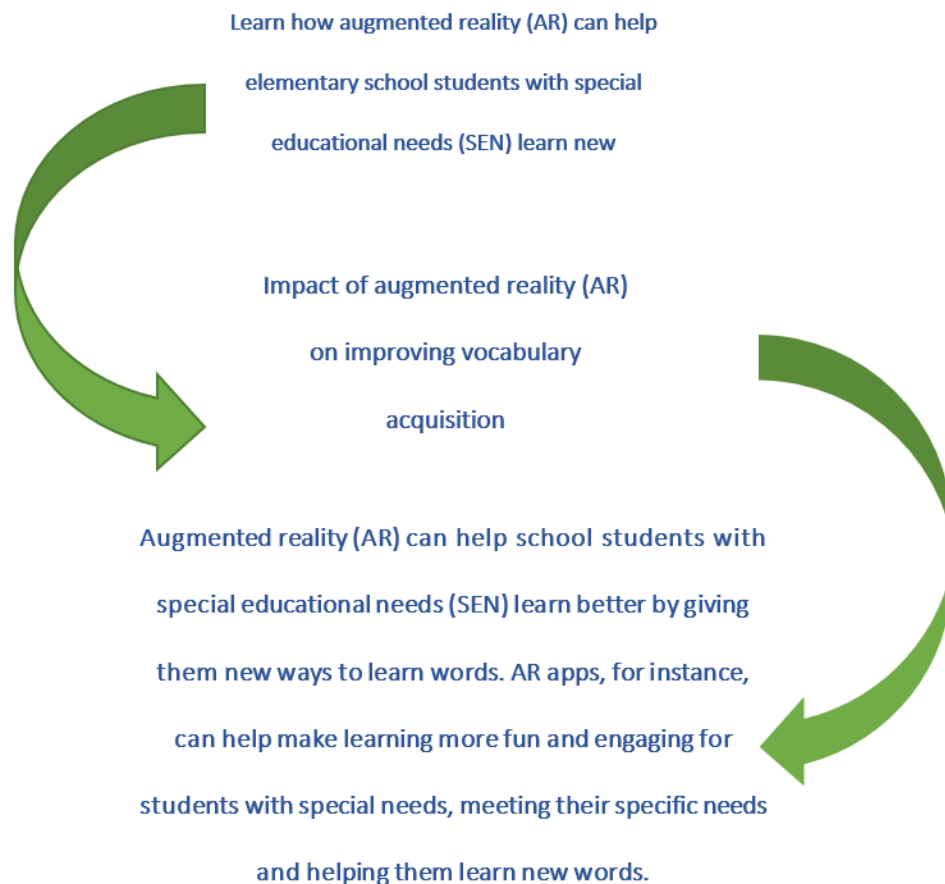
After examining the electronically collected and transcribed data, the researcher was able to identify some potentially salient data elements as the first step of the coding process (Byrne, 2022). An in-depth process of content review and labeling relevant data segments has developed codes that illuminate essential insights and associations, later to be further refined and categorized into potential themes. These themes then go through a critical assessment to determine their uniqueness and can be supported by comprehensive evidence, with the focus mostly on putting forward both the quantitative aspects, for instance, the frequency of codes, and their meaning in the context. In a coherent and integrated way that is based on the findings of fresh research, the researcher, combining supportive data, develops a rich and thick description that explains the impact of the augmented reality technology being utilized in special education to enhance vocabulary acquisition, hence raising confidence in the research outcomes and advancing knowledge in this field. As the study includes a relatively small number of participants, it was appropriate to gather the notes, remarks, and annotations on a spreadsheet to create initial codes.

4.3.1 Coding Process

The process of grouping and categorizing qualitative data to find themes and the connections between them is called coding (Bradley, Curry, & Devers, 2007). As a researcher, codes were taken, it looked for statements or words that stood out for key ideas in each answer. These tags could be words, sentences, or numbers. See Figure 4.1 for the initial framework and Source.

Figure 1

Initial Framework and Source



4.3.2 Themes Formulation

The first phase focused on assessing the codes concerning the study objectives and the lessons provided by the special education teachers. The expertise, viewpoints, and skills of these teachers were recorded to help the study define its scope (Lee et al., 2023). During the coding process, a template was structured, which helped in facilitating the analysis of data obtained from the beginning with the semi-structured conversation with the English teachers, learning support assistants, and special needs teachers. Once the themes were delineated, alignment was ensured between each theme and its corresponding codes and responses. Following a thorough review of the identified themes, the researcher assigned names to each theme identified in the study:

- Integration of Augmented Reality (AR) with Vocabulary Acquisition
- Enhancing Vocabulary Acquisition through Augmented Reality (AR) in Special Education
- Augmented Reality (AR) as a Tool for Achieving Learning Objectives in Special Education

These thematic names encapsulate the key findings and insights derived from the qualitative data collected through semi-structured interviews with English teachers, learning support assistants, and special needs (SEN) teachers.

Table 2*Collected Responses with Initial Themes*

	Keywords for the Naming of Initial Themes
<i>“I am somewhat familiar with augmented reality, but I haven’t had much exposure to using it in an educational setting. I’ve seen some demonstrations of AR applications, but I haven’t personally incorporated them into my teaching practice. I’m interested in learning more about how AR could be used to enhance vocabulary acquisition for students with special educational needs.”</i>	Familiarity with augmented reality Experience with augmented reality in education Perceived effectiveness of augmented reality for vocabulary acquisition Potential benefits of augmented reality for students with special educational needs Interest in incorporating augmented reality into teaching practice
<i>“Nevertheless, it creates an investment challenge in the implementation of augmented reality (AR) in the process of our teaching practice as educators in special education. Of course, this poses other challenges to integrating the availability of AR devices into classrooms and attending to the learning needs of different students. We feel, though, that this would, in principle, be</i>	Limited experience with augmented reality Belief in the potential of augmented reality for vocabulary learning Suitability of augmented reality for supporting vocabulary application Challenges in integrating augmented reality for vocabulary development

money well spent for enhancing the learning experience.”

Role of teachers in facilitating the
integration of augmented reality

“Augmented Reality creates an interactive and personalized learning experience, hence promoting higher engagement and learning of skills even under constraints. I have used a simple AR application to teach two students with autism some new vocabulary words related to a science lesson. They were engaged and started using words verbally.”

“I have used augmented reality in some of my previous lessons, but mainly to do some interactive activities. This was not limited to vocabulary learning, but, on the other hand, I believe this will serve well in this manner. For instance, AR apps are applications that have been utilized to simulate a virtual field trip, an activity that students relish and are at the same time educated about.”

“It is only a little experience that I have in the area of augmented reality, but it

would seem quite engaging for students with special educational needs. I have observed a demo lesson where the English teacher used AR with her students. In that sense, I will be interested in the possibilities. AR can create, indeed, a truly immersive learning environment, responsive to the many styles of learning and useful for vocabulary acquisition.”

“I haven't yet used augmented reality in my teaching practice, but I have been invited to a lesson where the SEN teacher used an AR application to help her students learn 3 new vocabulary words. It was such an enlightening experience about the possibilities this new technology holds. I guess the best part was the interactive AR experience that allow abstract concepts to be visualized and hence make word-to-meaning linkages.”

“Augmented reality is something I have done a bit with, just in the case of educational apps. It's not something I used

specifically for vocabulary development, but it may very well be quite a useful tool. For example, I have used augmented reality apps to teach geometry topics and my students with autism and dyslexia enjoyed the interactive nature of such assignments. I would want to deal with how augmented reality could be used in vocabulary learning.”

“Augmented reality offers potential support in vocabulary acquisition and application among students with diverse needs. It offers hands-on activities with interactive learning that satisfy many learning styles. For instance, AR can supply visual and auditory responses, thus reinforcing vocabulary and making the learning process more interactive and retentive.”

“Even though I have been introduced to AR recently, I can safely say that it could be quite helpful in enhancing vocabulary learning. Its interactive nature could help

engage students and help the latter understand vocabulary effectively. For instance, interactive augmented reality games or simulations may help get context for the vocabulary words, understand them, and remember their meaning.”

“Challenges of having the technology and resources in place at the time of need arise in using AR for vocabulary development. Issues also arise concerning the cost and availability of AR apps and software. It is difficult to have ready-made AR applications for vocabulary, which, in my opinion, is disappointing as I have witnessed huge improvement when my students with learning difficulties learn new vocabulary words using AR.”

“I believe that effective integration of AR into the vocabulary learning process relies largely on teachers. They can direct, support, and enable the use of AR technologies to construct meaningful learning experiences.”

Table 3*Coding and Reviewed Themes*

	Reviewed Themes
Augmented Reality's Impact on Vocabulary Learning	Relationship between augmented reality and vocabulary acquisition
Overcoming AR Integration Challenges for Special Needs Vocabulary Learning	Challenges in integrating augmented reality for vocabulary development among special needs students
AR's Effectiveness for Diverse Learners' Vocabulary Skills	Suitability of augmented reality for supporting vocabulary application among diverse learners
Enhancing AR for Personalized Vocabulary Education	Strategies for optimizing augmented reality in meeting individualized vocabulary learning needs

Table 4*Review and Final Themes*

	Final Themes
AR and Vocabulary Learning Interaction	Relationship between augmented reality and vocabulary acquisition
AR Integration Challenges for Special Needs Vocabulary Learning	Challenges faced in integrating augmented reality for vocabulary development among students with special educational needs
AR Effectiveness in Diverse Vocabulary Learning	Suitability of augmented reality as a tool for supporting vocabulary application among students with diverse learning needs
Enhancing AR for Tailored Vocabulary Learning Strategies	Strategies and recommendations for optimizing the use of augmented reality in catering to individualized vocabulary learning requirements

Chapter 5: Discussion

This chapter provides an in-depth presentation of the prominent findings that the researcher elicited by coding the gathered data categorizing it into key themes. It also provides an in-depth discussion of the key findings.

5.1 Findings

The findings address the core of the study on the challenges and potential of integrating AR technology to enhance vocabulary acquisition and application for students with special educational needs.

5.1.1 First Theme: Relationship Between Augmented Reality and Vocabulary Acquisition

It has been observed that AR has emerged as a significant tool in vocabulary acquisition, particularly for students with SEN who may find traditional learning methods challenging. Through AR, a dynamic, multisensory learning space that can improve engagement and interactivity, thus, favoring foreign vocabulary acquisition, is built. AR technology is a combination of what is real and virtual, so students can touch virtual objects and scenarios. AR is an important tool through which the comprehensive meaning of abstract concepts can be understood more easily, which is important in the process of acquiring and applying vocabulary in context.

Table 5*Participants' Examples*

	“The virtual museum allowed my students to interact with vocabulary in a way that felt real. They were more engaged, and the abstract words became concrete in their minds.”
RS13	“The visual and auditory elements of the AR tool really made a difference for my dyslexic students. It provided the support they needed to grasp and remember the vocabulary.”
RS14	“For the student with ADHD, the short, focused bursts in the AR app kept them engaged. It was tailored to their needs, and that made all the difference in vocabulary learning.”
RS7	“Some students prefer traditional methods, and for them, the transition to AR can be challenging. It’s important to consider individual preferences in implementing these tools.”
RS10	“The intricate features of the AR app distracted some students from the vocabulary itself. We need to strike a balance between visual appeal and user-friendly design.”

English teachers enthusiastically described a vocabulary lesson using an AR app where students explored a virtual museum. Each exhibit represented a word, and students had to find and interact with objects related to the vocabulary. They expressed how this immersive experience made abstract concepts more tangible, which consequently resulted in improved retention and better student engagement. To support this, RS5 shared a related experience

where using AR for vocabulary acquisition for her student with mild autism yielded effective results compared to the work of the same student before being introduced to AR. She said, *“I was amazed by the improvement in my student’s linguistic abilities after incorporating AR into vocabulary lessons. Before AR, my student’s use of nuanced language and vocabulary was limited, the expressions were weak, and even the interest was very low; however, I witnessed a remarkable expansion in the student’s lexicon after integrating augmented reality. AR applications enabled the student to save, retrieve, and apply the words fast and pretty well.”*

The teacher continued to highlight the specific linguistic examples that demonstrated the positive impact of AR on vocabulary acquisition.

Drawn from these participants’ data, the researcher found that in most cases, the relationship between integrating AR and enhancing vocabulary acquisition is mostly effective.

Furthermore, SEN teachers for students with dyslexia and Attention Deficit Hyperactivity Disorder (ADHD) stated that AR incorporated visual cues, interactive elements, and audio support to reinforce vocabulary. They noted a significant improvement in the students’ ability to retrieve and apply the words in context. Moreover, AR has successfully provided short, focused, and interactive content that catered to the students’ short attention spans. They also emphasized the effectiveness of multisensory approaches in supporting their students with their various special educational needs.

Despite the positive feedback on integrating AR into vocabulary lessons, some learning support assistants (LSAs) expressed some concerns regarding AR application. Their main concern boiled down to distractions and preferences. As elicited, the LSAs noted that their students with special needs became more attached to the application features rather than focusing on the target vocabulary. Additionally, one LSA stated that her student with a hearing

aid found it challenging to transition from paper-based and hands-on activities to digitally explained lessons. Therefore, her opinion suggests that the effectiveness of AR might depend on individual preferences and how students with special educational needs perceive the application.

The researcher found that most of the English teacher participants expressed their enthusiasm and satisfaction with using AR to enhance vocabulary acquisition and retention for their students with special educational needs. The participants said that this integration had a positive impact on their lessons due to its pacing, interactivity, and multisensory features. They collectively made their lesson lively, more engaging, and, consequently, more effective. Additionally, most SEN teachers agreed on how stimulating the lessons were when integrating AR, as many abstract concepts were made easier and more real-world related.

Respondent 13, a teacher of SEN, focused on innovating the methods of teaching to overcome the difficulties in the learning process. Learning became more stimulating and easier for students with special needs by connecting them with virtual content in a customized manner. As noted by RS13, *“The introduction of digital tools such as AR in education can speed up the learning process and can provide all students with equitable opportunities catered to the needs of the individuals.”* This was supported by RS8, who emphasized how revolutionary digital technology, such as AR, is impacting educational planning concerning its contribution to raising student participation and performance. AR technology is, therefore, the tool most suited for enhancing vocabulary acquisition and applications for students with special educational needs.

RS16, one of the participating SEN teachers, agreed that digital technology is essential for individualized interactions and understanding diverse aspects of student learning in a

blended environment. The role of data-informed decision-making and instructional design was emphasized as they strive to improve school planning processes continually. As shown by the information provided by RS16, AR-based technologies help schools to be more flexible and reactive to each child's individual learning needs. Augmented reality (AR) can help students with special educational needs (SEN), but it can be hard to make sure that all students can access it and that the material is geared towards different learning styles. Also, the fact that AR technology can cause visual overload and make students easily distracted can make it hard for this diverse group to learn effectively. These perspectives emphasize the importance of knowledge tools, which include AR, in dealing with educational problems and improving learning in the context of special education settings. According to RS5, augmented reality can effectively be implemented in education so that students with various special educational needs can learn vocabulary and deal with various learning issues and challenges. This will enable the improvement of education quality and motivate innovation in the field of special education.

5.1.2 Second Theme: Suitability of Augmented Reality as a Tool for Supporting Vocabulary Acquisition Among Students With Special Educational Needs

The study explored the effectiveness of AR as a tool for vocabulary acquisition and application among learners with special educational needs. Among the participants, the underlying principles were brought to the fore that can drive the use of AR in this field. First of all, RS1 claimed that AR offers a performing and palpable learning platform, which is especially useful for kids with special learning needs. AR allows learning to be a personalized and adaptive experience. Respondent 7 identified that AR gives students with special needs the room to have their learning styles, cognitive abilities, and sensory preferences met through

customized AR applications. This personalization makes the learning process more relevant to the students by letting them digest vocabulary in a way that is appropriate to them. Additionally, RS14 underscored the possible effects of AR on increasing engagement and motivation among students with special learning needs. AR experiences that provide users with an environment unbound by physical limitations can translate into an engaging learning process filled with motivation and curiosity about vocabulary. Engagement level is improved in this way, which, in turn, leads to better retention and application of vocabulary knowledge.

Similarly, the respondents pointed out the possibility of support and feedback in real-time being provided by AR as the students interact with vocabulary in the form of material. With the help of AR applications, students can be given scaffolding or visual support. This support can help students with special learning needs to accomplish the challenge of difficult vocabulary tasks in a better way, as it builds confidence in their language abilities. Generally, the participants in this study who use AR in their classroom or come to observe classes where AR is being utilized expressed a positive view regarding the appropriateness of AR as a resource to support vocabulary acquisition and applications for students with special learning needs. They emphasized that AR applications in vocabulary lessons offer hands-on, tailored, and engaging learning that is in line with the specific needs of these students, hence improving their language development and academic success.

As expressed by RS2, integrating AR technology in supporting vocabulary acquisition for students with dyslexia has proven efficacy as the technology provides a multisensory approach. For example, the visualization of phonetic aspects of vocabulary words helps students with dyslexia save, retrieve, and apply complex vocabulary through the reality-virtual features as per the participant's description. As a result, integrating real-world elements with

virtual aspects created an interactive nature and made it easier for students with dyslexia to use vocabulary in different contexts. Many learning support assistants highlighted that students with speech and language impairments benefit from integrating AR into their vocabulary lessons as it provides visual cues for vocabulary. Nevertheless, RS8 pinpointed the fact that she did not observe the tangible effectiveness of AR with her students, especially when expressive language challenges hinder the ability to be fully engaged with AR interactive aspects and features.

On the other hand, RS13, a special education teacher, shares her concern regarding the alignment of AR content with the individualized education plan (IEP) for students with special educational needs, and more specifically, students with specific learning disabilities (SLD):

“Despite how great and engaging AR technology can be, it can be frustrating for students with SLD, provided that a detailed alignment and customization is created to meet the linguistic learning objectives in the students’ IEPs, and merely arbitrary.”

RS15, another SEN teacher, expressed her reluctance to use AR with students with ADHD. She explained, *“Some fast and dynamic features of augmented reality may have the opposite effect and lead to distraction instead of engagement.”* Thus, attention span and fast dynamics may affect the suitability of AR for enhancing students with ADHD’s ability to acquire and apply vocabulary effectively.

In conclusion, the majority of the participants expressed their enthusiasm regarding the integration of AR technology to enhance students’ vocabulary acquisition and application and how it is suitable for students with some special educational needs, such as autism and dyslexia, due to its interactive and multisensory features. It is evident from the responses that AR technology and linguistic needs, such as developing vocabulary, are connected. For

example, AR can prove effectiveness by tailoring content to meet lexical needs, sensory sensitivities, and expressive language difficulties. However, some concerns arose regarding distraction and attention span limitations, where modifications seem necessary to effectively use AR for vocabulary acquisition.

5.1.3 Third Theme: Challenges of Integrating Augmented Reality

After analyzing the participants' responses, the researcher found that participants with different backgrounds posed some challenges associated with integrating AR in educational settings. The sixteen educators who participated in the study had varied opinions, points of view, and attitudes toward the effectiveness of AR, with the majority noting its potential to be very effective in enhancing engagement, vocabulary retention and application, and learning outcomes. Integration of augmented reality to help students with special educational needs develop their vocabulary for education was clearly articulated by RS9, who comprehends the multifaceted aspects of the impediments encountered. Therefore, the first elicited challenge is to guarantee equal access to AR technology, especially for students who have different levels of access and technological familiarization. This implies prioritizing resource allocation and infrastructural project implementation so that all students can enjoy AR-based learning. Additionally, RS9 brings up the important task of adapting AR content for the different kinds of learning requirements of students with special needs. The AR applications must be designed with this in mind by respecting the different learning styles, cognitive abilities, and sensory preferences of the students to efficiently interact with them in the course of vocabulary acquisition. This involves partnerships among educators, developers, and SEN experts to create AR experiences that are inclusive and, most importantly, accessible.

Moreover, RS13 explained the technical complications that make the perfect design of AR into the existing educational frameworks difficult. This includes broken connections between devices and platforms, and issues with network infrastructure and bandwidth. Getting over these technical obstacles necessitates both proper investment in technology infrastructure and continuous technical support to ensure the success of AR projects. While acknowledging AR's potential to be very effective in catering to diverse learning needs, many participants raised concerns about individualization and accessibility. Respondent 11 noted, *"Although students with sensory issues can benefit from integrating AR into their vocabulary lesson and become more physically and mentally engaged, it becomes frustrating when students with special educational needs face technical glitches or when accessibility issues arise, resulting in an unwanted hindrance that may affect the AR experience."* Respondents 3 and 12 further added that in many cases where AR is well-implemented, it's very effective, especially for tailoring content to individual needs; however, it becomes less effective when there are limitations in accessing the necessary devices or software.

Respondent 4 indicated that such an effective technology that engages and enhances students with special educational needs experiences during their vocabulary lessons comes with the burden of dedicating time and effort to tailoring AR applications to cater to different vocabulary lessons. On the same point, RS6 emphasized, *"AR is very effective when teachers receive adequate training. Nevertheless, such integration can become less effective when there's a lack of professional development for users."* This was a key point when teachers explained the challenges that they may face while integrating AR into their vocabulary lessons. Moreover, resource constraints emerged as a common challenge while analyzing the data. This challenge resonated with both English teachers and SEN teachers.

Many respondents shared insights on challenges related to vocabulary content relevance and curriculum alignment. Respondents 5, 6, and 9 explicitly stated that there is a huge challenge in finding or creating content that aligns seamlessly with their current curriculum. Respondent 8 further added, *“Sometimes, it becomes financially overwhelming to create content that aligns with our learning objectives.”* Consequently, it is challenging to justify the use of AR in their vocabulary lesson. Other respondents highlighted several concerns regarding the adaptability of integrating AR in enhancing students’ vocabulary acquisition, especially when these students share certain special educational needs, as sometimes this technology may face limitations regarding the availability of customizable features to cater to and address the requirements of students with special educational needs.

Respondent 8 discussed moral issues connected with information security, openness, and computerized reasonableness to ensure that AR innovation is utilized safely and genuinely in schools. The points of these arrangements are to make and uphold decisions that safeguard students’ security, ensure that all students have similar opportunities to get AR innovation, and empower activities that do not make training gaps greater. Considering the stand of the last respondent, the obstacles can be overcome by working together, financing infrastructure, providing ongoing professional training, and adhering to the code of ethics. In this way, educators will be on the spot to make effective use of the opportunities that augmented reality provides to enhance the vocabulary of the students.

In conclusion, as per the data analysis of the respondents, the challenges that English and special education teachers face while integrating AR to enhance students with special educational needs vocabulary acquisition are curriculum alignment, connection safeguarding, content suitability, feature adaptability, and professional training.

5.1.4 Fourth Theme: Strategies and Recommendations for Optimizing the Use of Augmented Reality in Catering to Individualized Vocabulary Learning Requirements

As the research explored the challenges of integrating AR, a recurring theme emerged concerning strategies and recommendations for optimizing AR's use in catering to individualized vocabulary learning requirements. All participant English teachers, special education teachers, and learning support assistants shared some common valuable recommendations to overcome the challenges that come with utilizing AR technology in vocabulary lessons to make the experience relatable and effective.

Respondent 14, a special education teacher, emphasized that AR works well for meeting the learning styles of all students, whether they learn best through visuals, auditory, sensory, or kinesthetic. AR's ability to adapt education to different learning styles is shown through the visual cues that the applications provide, the multisensory features of integrating elements of the real world into virtual aspects, and the movements of students around the classroom to meet kinesthetic learners' needs. Thus, specific measurements must be met to optimize the experience of using AR for enhancing vocabulary acquisition for students with special educational needs.

Respondent 13 emphasizes the need for ongoing professional development and training for teachers to make sure that AR is successfully used in educational methods. AR-enhanced collaborative learning spaces can make learning more personalized and interesting, so this training should focus on those. However, data must be carefully understood so that it can help every student when it is used to make decisions about how to teach and for personalized language learning through AR.

Respondents 2, 3, 9, 13, 14, and 15 suggested creating a standardized pre-assessment for each student with special educational needs to provide them with suitable customization while integrating AR. As stated by RS9, pre-assessing the student's linguistic needs is crucial in the process of utilizing augmented reality, as it enables customizing AR content based on the student's specific learning needs. *“Tailoring vocabulary exercises within AR apps based on the linguistic profiles outlined in students' Individualized Education Plan (IEP) has shown promising outcomes.”*

Ben Aissa (2020) emphasized the need for ongoing professional development. *“To optimize AR's effectiveness, continuous professional development is essential for educators. Staying updated on new AR applications and instructional strategies ensures that teachers can confidently navigate potential challenges.”*

For the best results with using AR to build vocabulary, ongoing professional development is needed, as stated by RS1. Such professional development is essential for English and special education teachers to update instructional strategies while incorporating AR as well as be able to address challenges if there are any. Respondents 7 and 11 emphasized the importance of collaboration and the inclusion of the ICT department in training to fix technical problems, give teachers specialized training on how to use AR effectively, and hold workshops for special education teachers to improve how they teach vocabulary. To help teachers get the most out of AR, these smart suggestions are meant to improve the vocabulary learning process for students with special educational needs.

Furthermore, one of the participants emphasized continuous testing and evaluation of AR-based educational tools as an important aspect. This guarantees a constant upgrade of teaching and learning resources for enhanced performance by students. In general, the

respondents stressed the value of personalized learning, teamwork, career development, and data-driven decision-making in the organization of the most appropriate learning environment for language learners with specific needs (Jafari & Ahmadi Safa, 2023). The use of AR technology can create very interactive and learner-centered environments that would enable students with special educational needs to overcome any obstacles where they could learn a second language and how to improve their outcome skills.

5.2 Discussion

This section provides a discussion of key findings to answer the research question: What are the challenges and potentials of integrating augmented reality to enhance vocabulary acquisition among elementary students with special educational needs in a private school in Dubai, UAE?

In this study, semi-structured interviews were conducted to collect data from a diverse group of participants, including English teachers, learning support assistants, and SEN teachers. These groups were the main objective of this study: to explore AR as a tool to enable the acquisition of vocabulary among students with SEN. Semi-structured interviewing offered the flexibility of questioning and ensured the inclusion of the main issues related to AR and vocabulary acquisition. The participants were selected according to their roles in the education sector to get perspectives that were as diversified as possible. Questions were designed to obtain participants' feelings and opinions on AR and its ability to enhance the acquisition of vocabulary, as well as their perspectives on the challenges, and recommendations on the possibilities of adaptations to optimize the learning experience for students with special educational needs. The key findings were then categorized into separate themes based on their reoccurrences among the collected data.

Analyzing the different positions of English teachers, learning support assistants, and SEN teachers shows some unique characteristics. While English teachers mainly give the argument for AR's functional benefits, they point to its immersive and interactive aspects in improving vocabulary. On the other hand, special education teachers and learning support assistants provide a great variety of opinions on the application of AR in the special education field concerning special educational needs and learning disabilities. English teachers, who experienced AR with their SEN students and used it daily, mentioned the immediate usefulness of AR and noted its interactivity and immersion, along with its effect on the improvement of vocabulary in both the acquisition phase and applications. However, LSAs and SEN teachers, through their experiences of teaching English classes, have been suggesting ways of covering logistical aspects of AR integration, such as professional development and overcoming technical barriers, and they have also pointed out the implications of AR for personalized learning (Alalwan et al., 2020).

The teachers' insights help to expatiate the role of AR in the process of vocabulary acquisition, with the aspects of its immersion and interactivity being of particular importance. Learning support assistants disclose the complications of implementing AR in an educational context under the assumptions of resource constraints and technical issues (Michel-Villarreal et al., 2023). SEN teachers' views make the use of AR in vocabulary application with students who have special learning needs a feasible alternative due to the appraisal it receives as a personalized learning tool that is suitable for individuals. Furthermore, both the models and the techniques discussed by all participants help to develop an AR application specifically for vocabulary learning.

The analysis and patterns found in the research can both confirm and disprove the existing theories. As Kamal et al. (2020) state, the “Technology Acceptance Model” (TAM) is a conceptual theory proposed in the field of educational technology. According to this theory, the perceived usefulness of technology and the level of ease of use of technology influence people’s attitudes toward the adoption and usage of technology. This theory corresponds to the philosophy of English language teachers, who point out the wonders of immersive and interactive solutions implemented by AR in the enrichment of vocabulary. In addition, the advocates of the Universal Design for Learning (UDL) theory suggest that to accommodate a range of learners, multiple means of representation, engagement, and expression should be provided. This is in line with the goals of SEN teachers, who focus on providing personalized learning experiences (Cumming & Rose, 2022). Nevertheless, the challenges that were identified by the participants, for example, resource constraints and technical barriers, may affect the application of these theories, as they highlight the challenges and difficulties of technological integration into education.

As can be noticed from the perspectives of English teachers, the application of augmented reality holds great potential and stands as a cutting-edge tool for enhancing vocabulary acquisition for students with special educational needs, as well as increasing students’ engagement and autonomy. This technological tool can enhance students’ outcomes and improve their learning experience. The interviewees’ perspectives were clear: such a technology when applied correctly and aligned to the student’s IEP will yield better vocabulary acquisition and application. Moreover, special educators’ insights were valuable in understanding to what extent augmented reality applications would be suitable to cater to the various needs and learning styles of students with special educational needs. They provided

clear evidence that AR technology can help students with dyslexia learn in more interactive ways. Nevertheless, a well-planned alignment must be created to ensure the student's IEP reflects the significance of a personalized approach while utilizing augmented reality for vocabulary acquisition.

Despite the promising future of augmented reality and its role in enhancing vocabulary acquisition for students with special educational needs, various challenges must be overcome to establish a strong and smooth application. As noted by the participants' perspective, some challenges are the limitation on the range of customization in the application, the constant need for professional development training to stay updated and enlightened to face technical challenges, and the resource constraints that may impede equitable access to technology by students with special educational needs. Overcoming these challenges will create a vast opportunity to optimize AR in vocabulary lessons comprehensively and effectively. The participants identified some strategies and suggested recommendations to optimize the use of AR, including establishing a clear pre-assess and customization of use, providing continuous professional development, and initiating collaboration among different departments to ensure a holistic approach toward effective integration of AR in English classes targeting students with special educational needs. These suggestions create a roadmap for educators and developers to come together with ideas on how to effectively create AR features that suit students with special educational needs.

5.3 Conclusion

This research underpins the investigation into the applicability of Augmented Reality (AR) technology for special education, primarily in the scope of supporting students with diverse special learning needs in acquiring vocabulary. The technology is most promising

when integrated into special educational settings, particularly in the teaching of vocabulary acquisition to children across various learning needs (Zuo et al., 2022). It brings out the relationship between AR and special education, with a focus on finding how AR can help attain vocabulary and show the importance of digital technology in schools. Scavarelli et al., (2021) conducted one of the most elaborate studies to shed light on the potential evolution of AR and challenges during the implementation of AR within special education settings. The study also provides useful hints and ways for better use of AR in the direction of meeting the specific needs of every willing individual to acquire vocabulary. Augmented Reality (AR) is a relatively new idea of technology that holds promising effects in special education (Perifanou et al., 2022). As per the study of Supli and Yan (2024), it opens up a world of options for helping students with a wide range of learning needs learn new words. Briefly, the major focus of this study is on the role of AR in the enhancement of language development.

The literature review defines AR in the context of its theoretical underpinnings, how AR transforms and diversifies its possible uses and the challenges that may come with the integration of AR into educational settings (Khan et al., 2023). Overlapping the digital content in the real world makes an AR learning setting interesting and interactive, connecting abstract ideas to real-world understanding. AR engages the students on a deeper level using live visualizations and multimedia experiences that help the students remember words in a certain language (AlGerafi et al., 2023). This exciting way would not only grasp the attention of students but would also cater to so many different styles of learning, making educational practices more open and inclusive. Despite the potential of AR technology, the study also identifies several issues that may pose challenges to using it effectively in special education settings. According to the study of Tariq (2024), the use of AR-based solutions effectively is

hard due to limited resources, difficulties in reachability and access, and the different needs of students. However, despite all these difficulties, the teacher should try and give learning opportunities enhanced through AR to all students while considering the individual needs of students with special educational needs. Additionally, concerns about the utility of AR for teachers and the holistic plans that must be made to deal with the concerns help make the inclusion of such plans worth their while.

One of the main points of this study is that AR technology can change the way that special education is conducted. As per the study of Murphy et al. (2022), AR allows one to learn through means that are interesting, dynamic, multidimensional, and linking abstract ideas to the understanding of reality. AR creates active learning settings when digital material is placed atop the real world. Interaction with virtual objects and scenes will help the student understand and remember better what he or she is learning. This dynamic approach not only grabs the interest of the students but also goes well with their varied learning styles, thus making the classroom a better and more interesting place for everyone. The study conducted by Sereno et al. (2020) shows that AR has the potential to be helpful, but it has its limitations when applied in special education settings. Its implementation is difficult because there are not enough tools, it is hard for some students to get to, and each student has different learning needs. Teachers have to take the initiative to address such issues so that all students enjoy AR learning across the board, with or without special needs. Teachers will be able to use AR to generate a friendly learning environment in which all students with special educational needs will find comfort. This will be achieved by conceiving new ideas, and then working collectively on them.

This study further offers interesting insights on how to best maximize AR in helping each student with SEN learn new words. This would mean that personalizing learning, relationships between teachers and tech experts, continuous professional development, and data decisions are some of the highly essential means to get the most out of AR technology (Tariq, 2024). It strongly highlights that schools, through a learner-centered approach, would enable each student with varied learning needs to perform in inclusive schools and maximize their full potential. The study also emphasized the relevance of digital technology as a wider feature in schools. Digital technologies, including AR, can transform the way we teach and learn. They give teachers new tools to improve their student results. Teachers will be able to take on AR technology according to the varied needs of all their students in an active and open classroom. This will have implications for increasing student involvement, understanding, and recall. Furthermore, this research indicates how AR technology has brought a complete transformation to special education, especially in the scope of learning new words. AR brings creativity, participation, and innovation to schools through the intensification of learning and its appeal (Jafari & Ahmadi Safa, 2023). In conclusion, with a few issues, AR can allow teachers to create lively, welcoming classrooms that meet the needs of all of their students with special educational needs.

5.4 Recommendations

There are many recommendations for taking up new research to investigate the effectiveness of applying augmented reality (AR) in the field of special education in the future. First of all, the number and background of participants need to be broadened. As per the small size of the school where the study took place, only 16 participants were interviewed. A larger and more diverse set of people from a range of educational settings working with

children with special educational and learning needs would help us learn more about how AR could be applied comprehensively and effectively in special education, and more specifically, investigate the long-term effect of AR on acquiring vocabulary and using it in different contexts. This would further enhance the findings of the study. Through this, researchers can be able to integrate the quantitative information obtained from polls or received through observational studies together with semi-structured interviews for a deeper insight into how AR affects special education. As further proposed by Chung et al. (2020), the correctness and reliability of the results are guaranteed through the use of the methods of correlation and member checking by the researchers. As long as researchers verify that the findings are consistent with what participants have said, triangulation can be defined as using many data sources or methods. Moreover, in general terms, AR technologies need to be studied, not just in relation to learning vocabulary, to understand the alternative usages and benefits of special education. In this context, further insight into the effectiveness of AR in aiding students in experiences in the learning process or the development of social skills could provide useful information regarding the overall effect AR has in inclusive schools for students with special educational needs.

Moreover, the study increases the immense knowledge base in the field of the use of AR in special education. The findings of this research suggest many important points for researchers to explore, as well as shed light on the potential benefits and drawbacks of applying AR to different learning cases. This truly improves the learning tools and the support services that we use to assist children with various learning styles by finding out how AR techniques are used in special education. It will be very useful for us to know about AR in special needs education and how it will affect the way we teach and learn. Besides, this study

has some limitations that should be considered. Firstly, the presented sample of 16 individuals can be a big problem in extrapolating the findings to a much larger population in the special education area. The study, however, was relatively broad as it included people coming from various backgrounds, but the importance of a larger sample size was still not looked at deeper. Also, the study uses semi-structured interviews, and the responses elicited could be skewed since participants tend to answer questions based on their own experiences or points of view. Moreover, as per Tsai (2020), an AR study that looked at how this technology can help students memorize new words, it does not need to overview other areas of improvement using AR in the area of special education.

The next step is to try to solve a different problem by using a larger and more varied group of research methods, as well as to consider more uses of AR, specifically in special education. One of the study designs that follows students' growth over long periods of their lives would give us a lot of information about how AR applications affect students' long-term language learning and general learning results. Moreover, the way for fair access to this new digital tool in special education among students should be explored by paying attention to how cost-effective and accessible AR applications are in education. In this way, the costs and benefits of using AR in schools will help teachers, principals, and decision-makers make decisions that will play an essential role in the special education of the next generation. In addition, the perspective of students who have other learning needs should be given more weight in educational research. This will assist in ensuring that AR applications are truly inclusive and address the needs of every learner. Students can collaborate as co-researchers to involve themselves in the design and testing of AR-based learning activities, thus giving them the power to shape their learning paths. Apart from that, we should also focus on the moral

problems and privacy problems that can arise when AR technology is used in schools. Such problems as the protection of data, informed consent, and digital equality should be tackled to make sure that AR solutions are fair and cover all students (Gallego Arrufat et al., 2024). However, future research will be able to illuminate the case of the ethical and responsible application of augmented reality in special education by addressing the student's needs first and thinking about the social implications as well.

In conclusion, this dissertation contributes to the evolving discourse on the integration of AR in education by providing a comprehensive analysis of its impact on vocabulary acquisition, especially for students with diverse learning needs. The diverse perspectives from educators and support staff offer a holistic view, recognizing both the potential benefits and inherent challenges associated with AR. By understanding these complexities and leveraging effective strategies, educators can navigate the terrain of AR integration, creating engaging and personalized learning experiences that cater to the diverse linguistic needs of students. The ongoing exploration of AR in education remains a dynamic field, holding promise for transformative learning experiences and enhanced educational outcomes.

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Appendices

Appendix A

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Letter of Consent

Dear Participants,

I am a postgraduate student undertaking an MEd in SIE at The British University in Dubai, and I am conducting research for my Master of Education in Special and Inclusive Education Dissertation. Here is a brief introduction to my study:

This research aims to explore English and Special Education Teachers' perspectives on integrating augmented reality for enhanced vocabulary acquisition among elementary students with special educational needs in an American Private School in Dubai.

Research Questions:

1. What are the perceptions of English teachers regarding the effectiveness of augmented reality in enhancing vocabulary acquisition for elementary students with special educational needs?
2. How do Special Education teachers evaluate the suitability of augmented reality as a tool for supporting vocabulary application among students with diverse learning needs?
3. What are the identified challenges, if any, in integrating augmented reality for vocabulary development among students with special educational needs, as perceived by both English and Special Education teachers?
4. What strategies and recommendations do teachers propose to optimize the use of augmented reality in catering to the individualized vocabulary learning requirements of students with special educational needs in an American private school in Dubai?

Your involvement is completely voluntary, and all answers are confidential and anonymous. You are free to withdraw from the study at any time, even if you have already started.

Your Participation in the study will be considered as a confirmation of your willingness to participate in this study. Please complete the form at the bottom of this letter and return it to the researcher. If you would like to receive more information about the study, please contact me at 22000891@student.buid.ac.ae

Thank you,

Samah Alshatarat

MEd Student - 22000891@student.buid.ac.ae

The British University in Dubai.

Appendix B



Third-Party Consent Form

Dear School Principal,

I would like to get your permission to conduct my research study in your respected school.

By signing this consent form, I understand that Mrs. Samah Alshatarat is a candidate for a postgraduate degree at The British University in Dubai (BUiD). I understand that the researcher is conducting a study titled “**Augmented Reality Integration for Enhanced English Vocabulary Acquisition among Elementary Students with Special Educational Needs in an American Private School in Dubai, United Arab Emirates: Perspectives of Special Educational and English Teachers on the Challenges and Potential**”.

This study aims to explore teachers' perspectives on integrating augmented reality for vocabulary acquisition among students with special needs. In addition, it aims to understand the challenges faced in teaching vocabulary to this specific demographic, the potential advantages AR might offer in addressing these challenges, and the practical considerations, including barriers and support needed for successful implementation. The research seeks to provide insights into the feasibility and efficacy of incorporating AR technology into the educational framework for enhancing vocabulary learning among elementary students with special educational needs in the context of an American Private School in Dubai.

The research has four main questions:

1. What are the perceptions of English teachers regarding the effectiveness of augmented reality in enhancing vocabulary acquisition for elementary students with special educational needs?
2. How do Special Education teachers evaluate the suitability of augmented reality as a tool for supporting vocabulary application among students with diverse learning needs?
3. What are the identified challenges, if any, in integrating augmented reality for vocabulary development among students with special educational needs, as perceived by both English and Special Education teachers?
4. What strategies and recommendations do teachers propose to optimize the use of augmented reality in catering to the individualized vocabulary learning requirements of students with special educational needs in an American private school in Dubai?

I understand the findings of this research study are solely the responsibility of the researcher. It is understood that any information/data the researcher collects from contacts within and/or about our organization outside the research protocol will not be part of the research findings. I understand the researcher may publish findings following the completion of this study. Any information published will be limited to the findings of the research. No research participants will participate in this study without the knowledge and approval of this organization and **BUiD's** Research Ethics Committee.

- o I grant the researcher permission to contact members of the organization to request their participation in the study as required by the research proposal.
- o I grant the researcher permission to use organizational premises as necessary to conduct the research.
- o I grant the researcher permission to collect, use, and store organizational documentation related to the project.
- o I understand that in granting permission to access organizational documentation, the researcher will store copies outside of the organization in a secure manner as approved by **BUiD's** Research Ethics Committee.
- o The researcher will maintain all documentation and findings regarding this in confidence and confine its use to this research study.

Your assistance in facilitating the progression of my study is highly appreciated.

Thank you.

Samah Alshatarat

2200891@student.buid.ac.ae

Appendix C

Interview Guide

“Augmented Reality Integration for Enhanced English Vocabulary Acquisition among Elementary Students with Special Educational Needs in an American Private School in Dubai, United Arab Emirates: Perspectives of Special Educational and English Teachers on the Challenges and Potential”

Aim: This research study aims to investigate the perspectives of English and Special Education teachers on the effectiveness of integrating augmented reality as a tool for improving vocabulary acquisition and application among elementary students with special educational needs.

Interview Questions

1. How familiar are you with the concept of augmented reality, and have you had any prior experience or exposure to using augmented reality in an educational setting?
2. What are your initial thoughts or perceptions regarding the potential effectiveness of using augmented reality (AR) as a tool to enhance vocabulary acquisition among elementary students with special educational needs?
3. Have you had any prior experience or exposure to utilizing AR technology in your teaching practice? If so, describe how you have used it and any observed outcomes.
4. In your opinion, how suitable do you believe AR is as a tool for supporting vocabulary application among students with diverse learning needs?
5. From your perspective, what do you perceive as the main challenges or barriers in integrating AR technology for vocabulary development among students with special educational needs?
6. Can you provide specific examples or instances where you believe AR could be particularly beneficial for enhancing vocabulary learning among students with special educational needs?
7. What strategies or approaches do you think would be effective in optimizing the use of AR for meeting the individualized vocabulary learning requirements of students with special educational needs?
8. Are there any concerns or reservations you have regarding the implementation of AR technology for vocabulary acquisition among students with special educational needs?
9. How do you envision the role of teachers in facilitating the effective integration of AR into the vocabulary learning process for students with special educational needs?
10. Based on your experiences and expertise, what recommendations would you offer for educators and schools looking to incorporate AR technology into their teaching practices for students with special educational needs?