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Assistive Technology in the English Language Classroom: Reality and Perspectives

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Abstract—**The Oman Vision 2040 Policy aims to create a system of high-quality education where human capabilities are empowered and where learners of a wide range of ability feel welcome and their learning is invigorated. However, research reveals that educators still need to improve their knowledge of how to access valuable insights into such education practice, and there are many ideas that need to be sharpened and elaborated in academic and public discussions. In the context of Oman's higher education, besides English language learning and communicative skills' enhancement, there is inclusive language education as one of strategic directions and priorities. Suggesting that foreign language acquisition understood as a complex cognitive and social process can be facilitated by assistive technology used for enhancing English language achievement of the learners who lack some of its essential aspects, this paper explores the reality of integrating assistive technology in the English language classroom that includes students with visual impairments. It also outlines future perspectives involving the authors' understanding of assistive technology as practice that has the capacity for increasing language learners' autonomy, participation, and, simultaneously, advancing their academic standing. The shared insights will provide language educators with ideas on how using assistive technology can enable more efficient language teaching and learning experiences of visually impaired students, empower them and, consequently, strengthen their academic success.**

Index Terms—**assistive technology, English language classroom, higher education, inclusive education, visually impaired students**

I. Introduction

One of the features of modern educational systems and governmental policies worldwide is a move towards inclusive education and creation of inclusive educational settings (Bellacicco & Farinella, 2018) which support a full involvement of students with different learning needs and abilities and adapt their structures, policies and practices in order to accommodate such needs (Hutchinson et al., 2002). In the Sultanate of Oman, inclusive education is among the national strategic directions and priorities in the areas of education, scientific research and national talents. These are developed for a purpose to achieve a high-quality educational system that empowers human capabilities (Ramzi, 2019). Further, in Oman, inclusive education practice, especially in the context of higher education, is and has always been in the national public discourse (Albright, 2018; Rezaeian & Bagheri, 2017), social and institutional initiatives. The Disabilities Unit Project at the College of Arts and Social Sciences of Sultan Qaboos University set up in cooperation with Oman LNG joint venture company is one of the examples. The project includes a laboratory of assistive technologies equipped with the latest computer equipment and systems such as the most recent electronic devices, Braille sensors that facilitate students' learning, access to knowledge resources and digital content of the courses without relying on others (Disabilities unit project launched at SQU, 2019). In compliance with the governmental policies and initiatives, the academic research has also extended its boundaries to focus on innovative teaching and learning practices for the inclusion of special needs' undergraduate English language learners (Al Ghafri, 2015; Al-Busaidi & Tuzlukova, 2018). Assistive technology is one of such practices, having the capacity for increasing students' autonomy, participation, and simultaneously advancing their academic standing (Bellacicco & Farinella, 2018). Assistive technology is also understood as "any item, piece of equipment, software program, or product system that is used to increase, maintain, or improve the functional capabilities of persons with disabilities" (What is assistive technology, n.d, n.p.). However, while the reported practices appear to be valuable for Oman's academic and educational community in general, there are still many ideas related to inclusive education and use of assistive technology that need to be further elaborated, and

"… yet there's still the challenge of how to access valuable insights into ways to assist teachers to learn, share and network …" (Hock, 2015, p.7). To illustrate, Chakraborty (2001) argues that "various socio-economic, cultural, contextual, medical, personal, and family-related factors determine the feasibility and outcomes of using assistive technologies" (p.1).

Also, foreign language acquisition is a complex cognitive and social process that requires attention, auditory, visual perception, decoding, memory, mechanical skills and effort (What is assistive technology, n.d.). Students who lack any of these aspects may face difficulties in meeting their aspirations and desires in language learning. The problem is of course intensified in contexts where there are insufficient opportunities for language support. The learning experience is also affected by the perceptions held by teachers and indeed by all those responsible for program development and delivery that are sometimes mistaken and stem from the lack of knowledge about the theory and practice of using processes and resources to enhance students' functional capacities (Al-Busaidi & Tuzlukova, 2018). This paper inquires the reality and perspectives of assistive technology's integration and its application to enhance learning in the inclusive English language classroom in the context of Sultan Qaboos University and its Centre for Preparatory Studies.

II. Brief Review of Literature

Research in the area of inclusive education indicates that pedagogical change needs to take place where technology is deemed as "as both a tool and a catalyst for change" (Wen et al., 2017, n.p.). Waddell (2015) argues that "students should embrace technology for them to benefit", and while emphasizing the central role of technology, encourages teachers to be "open to introducing technology into the classroom to improve and innovate their teaching practice" (n.p.). Rezaeian and Bagheri (2017) maintain that applying technology in the field of knowledge networks and education can promote a culture of inquiry, communication processes, and creative exploration. A study that explored English language educators' perceptions of practices for promoting the inclusion of visually impaired students in the Omani undergraduate context stresses the potential of technology and innovative ideas, and that they are essential areas which impact student teaching and learning (Al-Busaidi & Tuzlukova, 2018). Al-Busaidi and Tuzlukova (2018) report that higher education institutions in the Omani context, just like other higher education contexts, are equipped with technologies, professional practitioners and supportive environments; however, the context of the visually impaired teaching, learning and technology facilities still persist to be a challenge for these institutions. This challenge is attributed to the inadequate knowledge and expertise of practitioners regarding technologies and innovative ideas (Al-Busaidi & Tuzlukova, 2018), and lack of the targeted professional development that can bridge the gap created by teacher's limited knowledge and experience with innovation and technology that can enhance change and effectiveness in pedagogy and improve effectiveness in the teaching and learning of visually impaired students can indeed be of vital significance (Al-Busaidi & Tuzlukova, 2018). This resonates with the studies conducted on teacher professional development, a prominent concept that is widely understood as a process of enhancing teacher participation in the teaching practice for the purpose of expanding teachers' knowledge and beliefs in their work environments (Driel et al., 2001; Guskey, 2000). It also corroborates with research that illustrates student and teacher-perceived difficulties with integrating technology into education (Emam et al., 2017; Ertmer et al., 2012, Al-Ani et al., 2020). Furthermore, Sze (2004) argues that technological interventions are non-specific. They are scattered, vague and incomprehensive. Also, teachers' "comfort level of assistive technology in an inclusive classroom remains low" (p.1).

III. Study Methodology

This study was conducted with an aim to identify the impact of assistive technology on possible shifting practices and perspectives of English language teaching to being universally accessible, equally usable, more inclusive and tailored to student needs. It also aimed at examining teaching and inclusive education practices currently in place at Sultan Qaboos University' Centre for Preparatory Studies, which mission involves its commitment to developing students' knowledge, attitudes, language, technical and life skills necessary for them to enter, participate and thrive in their academic undergraduate programs (CPS mission, objectives and values, n.d.).

Semi-structured interviews were adopted by the research team as a tool that probes into the practices of teachers and lab technicians in order to gain 'insights into or understanding of opinions, attitudes, experiences, processes, behaviors, or predictions" (Rowley, 2012, p.261) related to the integration of assistive technology in inclusive higher education classroom setting. The interviews specifically explored how the participants perceived their experiences and practices related to the use of assistive technologies for the visually impaired students in the English language classroom/the lab as an integral part of classroom teaching just like any other teaching tools adopted in classroom. The interviewed participants were two decision makers at the Centre for Preparatory Studies, one special needs coordinator, two English language teachers who have had the experience of teaching students with visual impairments, and two lab technicians at the Centre for Preparatory Studies and the College of Arts and Social Sciences. Both technicians manage labs that concern special needs students including visually impaired students.

Through interviews, large qualitative data sets were obtained by the research team, and thematic analysis was identified as "an apt qualitative method" (Nowell et al., 2017) for providing detailed data account (Braun & Clarke, 2006). Moreover, qualitative research, as explained by Nowell et al. (2017), is "a valued paradigm of inquiry" (n.p.).

However, "the complexity that surrounds qualitative research requires rigorous and methodical methods to create useful results" (Nowell et al, 2017, n.p.), and one of such methods is thematic analysis which is used across a range of research questions and epistemologies.

The analysis involved data management, description, and searching for themes understood as abstract entities bringing meaning, capturing and unifying "the nature or basis of the experience into a meaningful whole" (DeSantis & Ugarriza, 2000, p. 362). Most of themes matched the interview questions and the researchers' interest in more detailed data analysis of the aspects of the reality of integrating assistive technology in the English language classroom that includes students with visual impairments.

IV. Study Findings

The identified themes connected substantial portions of the data and appeared to be significant concepts (DeSantis & Ugarriza, 2000) related to the study participants' perceptions and experiences of integrating assistive technology in English language teaching and learning of visually impaired students. The main themes derived from the thematic analysis of the interviewed participants' responses are four: technology, professional development, management, and teaching and learning.

Below is a detailed account of each theme.

A. Technology

Under the theme 'technology' come three subthemes, namely, role of technology, types of technology and limitations.

(a). Role of Technology

Assistive technology is important, and without technological devices and tools the process is going to be very challenging and almost impossible. Sze (2004) maintains that "assistive technology can play an important role in special education because many students with disabilities need special instructional treatment" (p.3). The participants in the study stated that without the use of technology, it is almost "impossible" to integrate visually impaired students into the classroom and help them to be successful. As emphasized by the study participants, providing these students with the right technology will lead to them being more independent and increase their functional ability. Concurrently, because of the use of assistive technology, teachers will have less burden in helping students to complete their tasks and assignments. Further, development in technology is another area that was brought up by the participants as they stated that it can significantly impact the "quality" and the "method" of learning for students with visual impairments. Providing suitable magnifiers, for instance, that are available for use at the Centre for Preparatory Studies of Sultan Qaboos University, helps low vision students "learn better and faster". Another effective way is converting the learning materials into audio format. This can make it "more accessible for blind students to interact with the materials" that their classmates use for the course. Besides, converting the graded readers used by the English language students of the foundation program courses to take quizzes on the M-reader.org site into audio materials can be very helpful for visually impaired students. They, for example, can listen to the reading and then do the activity or the quiz.

(b). Types of Technology

Visually impaired students who take courses offered by the Centre for Preparatory Studies and Sultan Qaboos University are provided with technology facilities according to their needs. To illustrate, the participants mentioned a number of technological devices used by this cohort of students. These devices are, for example, magnifiers, audio materials, screen readers and laptops with screen readers.

Low-vision students are also provided with enlarged hard copies of teaching materials and soft copies for teaching and learning purposes. Copies are in the PDF format, so they can enlarge them on a computer, mobile phone or digital magnifiers. Visually impaired students are also entitled for some exam accommodations as they receive extra time, and sometimes a scribe is provided during assessment sessions.

(c). Limitations in Technology

With the integration of technology there is the "fear of the unknown", as expressed by most of the participants. Some teachers resist being "assigned" students who have some kind of vision loss and related challenges. They believe, for example, that this experience can pose a situation that they are not familiar with due to their lack of experience teaching these students. Besides, as perceived and indicated by all the study participants, it can be "overwhelming for teachers" to teach special needs students if they have not gone through the experience or if they don't know anything about it.

There are also challenges that concern financial resources as buying expensive equipment requires big budgets. Braille, for instance, is insufficient, as all the participants stressed. Braille system does not support pictures, charts and tables. The teacher has to rely on descriptions, classmates' support or one-to-one support.

B. Professional Development

The data analysis also revealed issues that can be categorized under the umbrella of professional development. These issues are training on technology, familiarization sessions for teachers and technical staff pre-service training.

(a). Training on Technology

All the participants emphasized the significance of different forms of professional development. Such response corroborates with other studies in other educational contexts. To illustrate, according to a study by McGregor and Pachuski (1996), when asked to rate both the importance and availability of specific technology supports, teachers rated training most highly. Laarhoven et al. (2012) maintain that lack of expertise and adequate professional development programs are among the largest barriers in effective integration of assistive technology in teaching.

The participants in this study stated that with assistive technology comes training as teachers, and technical staff need to be "trained on the right technology". They also propose that fortunately this situation is "much better" than what it is used to be. It, however, can be made "better". Technical staff need training workshops to "qualify" them and "familiarize them with best practices to deal with the special needs". Besides, teachers need to be "acquainted with the use of devices". One of the participants narrated an anecdote indicating how lack of training could lead to dire consequences:

> *I did not know that these magnifiers can be used to take pictures and save them. So, during quizzes, I allowed a student to use magnifiers because she needed to enlarge the quiz. To my surprise, she was scanning the texts and taking pictures of the whole text. This obviously violates the security of the test. This is because I was ignorant. No one told me about this before: what this devise can do and cannot do.*

(b). Familiarization Sessions

Some of the interviewees indicated that if teachers have "familiarization sessions" where they are "familiarized with the kind of support or accommodations" that they can give to the visually impaired students to help them learn the materials, this at least gives the teachers some "relief" to the teacher. When one deals with the students with visual impairments, "especially for the first time", they may be "willing to help, but they do not know how". Familiarization sessions may help reduce this tension created by merely the teacher's lack of "awareness" can help the students who are partially or completely blind be integrated more effectively in the classroom environment. In addition, inviting speakers to "raise awareness" about the inclusion of this group of students and to allow teachers to "open up" about their "fears and concerns in a safe atmosphere" under the umbrella of professional development is another form of familiarization. Also, if different teachers who are involved in teaching visually impaired students "share their experiences with a wider interested community of teachers", teachers will learn to improve the "process of inclusive education of language learners".

Further, technical staff also need to be trained on the "best practices" because the technical staff are "a great support for the teacher and the student for the whole process" as they are a "key element of success". One cannot "just rely on the fact that they know how to do it". They are not normally provided with the training on "how things can be done".

(c). Pre-Service Training

As maintained by Laarhoven et al. (2012), increase of the assistive technology integration into teacher education programs worldwide has been recommended by many prominent researchers and practitioners in the field of assistive technology. However, two of the teacher participants argued that even though teachers normally "study psychology" and "how to deal with different students and individual differences" during their pre-service training, these programs do not include special needs education. There is a pre-service program on "preschool education at Sultan Qaboos University", but there is no "special education program". In a special education program, teachers can "learn" about "how to deal with students who have special needs in terms of psychology and how to help reach the same learning outcomes".

C. Management

Management in the area of integrating technology in the English language teaching context is a third theme that emerged out of the data analysis of the interviews. This theme can be classified into lengthy process, clarity of the process, gaps in the process, strategic planning, leadership, communication and physical environment.

(a). Lengthy Process

All of the teacher participants proposed that the process of integrating technology in class is "time consuming". To them, this process involves "preparing" and "writing" materials and making "accommodations" in terms of teaching and testing. This finding corroborates with the results of a study by Johnson et al. (2016) on adopting new educational technologies and the time-consuming nature of the process.

(b). Clarity of the Process

According to the three teachers, integrating technology is a "lengthy" process; it goes to the course teacher, to the course leader, to the assistive technology specialist and to the student. Besides, the "clarity of the process for all the parties involved" is "very important" because if the integration process is clear to the students, teachers, test writers, coordinators and technical staff, then one can assert that there is "a clear process". In this regard, one of the teachers argued when everyone is aware of the process,

> *They will accept it more. If they don't know it, if it is too mysterious for them, it will be very difficult for them to accept it.*

(c). Gaps in the Process

All of the teacher participants and one of the lab technicians thought that there were "gaps" in "the process". This is because, according to one of the teachers, teachers "find themselves assigned roles without any preparation". One teacher suggested that "shadowing" a faculty member with a significant role in inclusion is very important. Another argued further that

> *the understanding of this inclusion has to change into a more formal system run by a team of people. So, it is not just scattered roles here and there.*

A third teacher recommended that with the "establishment" of a committee for the special needs, including the students with visual impairments, it is "great", but there "still needs to be more formal". She proposed further,

> *teacher training needs to be a must. Technical staff training is a must. Shadowing people of a key role is a must. You need a system. So, if the person disappears, the system does not get affected.*

(d). Strategic Planning

All the participants proposed that there needs to be "more strategic planning" on preparing faculty members with "the educational qualification" or [attract]ing faculty members with the "right qualifications" and "experiences". The administration of the university and its Centre for Preparatory Studies "should start looking at" the next fifty years: "where we want to go and what point we want to reach".

As Sultan Qaboos University "admits more and more visually impaired students annually", all programs "have to have ready materials for this kind of students". One of the teachers problematized what is being done at the Centre for Preparatory Studies when visually impaired students get accepted at the University stating that,

> *the current practice is once one of these students joins the program, arrangements are made, and most of them depend on the individual teacher and course leaders. Such arrangements sometimes vary from one program to the other, and that affects the quality of learning experience the students get.*

Further, all of teachers and technicians stated that the issue of understaffed lab technicians as well as the understaffing of qualified members in the special needs Lab. Teachers and technicians all proposed that the institution needs to look into "employing additional people" or "assistive technology specialists" who can "provide" their "full attention" to the institution and the visually impaired students, especially as the number of such students increases every year

(e). Leadership

One of the teacher participants stressed the significance of "leadership qualities" in the process of managing "very smoothly" the integration of assistive technologies for the students with visual impairments in the English language classroom. She reflected on this matter saying:

> *I felt the difference with the establishment of the Special Needs Committee, with the person in charge with very good leadership qualities. The communication improved. The coordination improved. I think the whole process improved with a person who was able to coordinate it very well to facilitate the different commination between the different parties.*

With good "leadership" and "administrative" traits, this teacher contended further that when teachers and lab technicians work in harmony and "in a very smooth way", they will be no problems with "registration", "teacher allocation", "testing", "invigilation" or "materials".

(f). Communication

The three teachers proposed that having a "report" about each student's "experience, accommodations, assessments" which the student with any kind of vision loss has received at school would "help" his/her teachers" greatly. A teacher suggested that it is essential to have a "system tracing students' progress, challenges, needs, teachers' end of semester notes" once the student is accepted at Sultan Qaboos University where future teachers should be able to access this "record" when a student with visual impairments is enrolled in their courses. Another teacher contended that teachers need to be "trained" and made "aware of other institutions' successful experiences" in inclusion of such students. Also, according to this teacher, the administrative staff should always "keep up-to-date information" about "recent technology serving" visually impaired students and "effective methods" to suit their "needs".

Unfortunately, this is "currently missing" in the practice of the Centre for Preparatory Studies, one of the teachers argued. Very few tertiary education institutions in Oman admit visually impaired students with a "personal assistant" provided by his family, a teacher stated. This teacher's "knowledge" was "derived from" her "curiosity" and "effort to ask questions". That is why, the teacher added, a "dialogue on a higher level" needs to be created to facilitate communication and coordination between institutions, between students and teachers. Another teacher recommended that a "dialogue" between the Special Needs Committee, the teachers and students at Sultan Qaboos University should be created where teachers' "views on the challenges and achievements" are shared between the different stake holders.

While acknowledging "great efforts spent to support these students", a third teacher proposed that higher education institutions need to "listen" to the students with visual impairments to be able to "support them better".

(g). Physical Environment

One challenge that the student with visual impairments encounter at higher educational is the physical environment of the institutions. The three teachers expressed their perceptions about how this factor can impact the level and quality of inclusion of visually impaired students in mainstream classes. One of the teacher-participants stated that ten years ago, when then the "inclusion started", the physical environment was not "friendly enough" to "accommodate" the blind students and the students with low vision. Currently, another teacher proposed, the environment at higher education institutions needs to be "much easier to use and more accommodating".

D. Teaching and Learning

(a). Individual Differences of Visually Impaired Students

All teachers contended that visually impaired students differ in their language proficiency, reading Braille and attitudes. One of the teachers proposed that "each individual" student has "totally different needs" than the other student who has "the same disability", and therefore, each one "requires special attention and accommodations". Another participant stated that some "blind students" have the ability to "read Braille". According to this study participant, this is because they did their high school studies in Omar bin Al Khattab Institute. In this educational establishment, they were exposed to materials written in Braille. On the contrary, other visually impaired students graduated from regular government schools where they received no training on Braille. A third teacher also suggested that some students with visual impairments have positive attitudes to learning English, whereas others develop negative attitude to English leaning, and, therefore, approaching students with the same disability will differ due to these differences.

(b). Course Materials and Copyright

One of the lab technicians contended that "access" to course materials is "the most important" part in the process of integrating visually impaired students into mainstream English language classroom. He argued saying that if the "availability of the academic content" is not "well prepared for the student, learning will be "affected negatively". For this cohort of students, he continued, the materials should be prepared in Microsoft Word format. However, he noted that "due to copyright issues, the institution cannot obtain digital versions of the course textbooks and materials from publishers". In this regard, the lab technicians supervised a project, With My Hand I Read, the special needs lab in the College of Arts and Social Sciences. With the help of more than 400 university student volunteers, more than 25,000 pages of textbooks were retyped, formatted and made available for teaching and learning purposes.

(c). Availability of Laptops with Installed Screen Readers and Textbooks in Braille

According to all the participants, visually impaired students who join the university are provided with a laptop that has an installed screen reader that allows them to read electronic material. Students are provided with Braille devices too, a situation that requires the availability of all materials in an electronic format so that they would have equal access to the course content just like their peers. According to all the participants, most of the teaching materials are now available in electronic format. Many of the in-house and commercial textbooks have been scanned, proofread and made available into electronic format.

There have been "challenges"; however, and the "biggest" challenge is that "most" of the course textbooks are "commercial" books which, according to the two lab technicians, are particularly of a challenge and most likely "will continue" to be. This also applies to some in-house textbooks that are not available as digital copies; nevertheless, these are luckily "less of a challenge" because most of them are available in electronic format.

(d). Support

Students with visual impairments receive a wide range of support when they join the university. Through the Deanship of Student Affairs of Sultan Qaboos University, they are assigned student "mentors" who assist them outside the classroom. The mentor is usually "introduced" to the student's teachers in order to be sent important information about assignments, deadlines, practice tests, student's incidents of missing classes or exams. In addition to the administrative support they receive, some visually impaired students who cannot read Braille "depend heavily" on their mentors to "reinforce" what they have learnt in the class. These students are also provided with the course materials in PDF format and taught how to use the 'read' function to go through the materials. In spite of this, teachers believe that still there is a lack of information available to them about students' 'diagnostic profile' and/or prior experience at school. However, each visually impaired student is a unique case and, therefore, requires a different type of support in teaching and learning.

(e). Achievement

Despite all of the concerns and challenges, there have been noticeable teachers' shifts in understanding the university's initiatives focused on the needs of students with disabilities, as well as appreciating the services that are provided and individual efforts taken. According to study participants, for example, there are currently "more

cooperative" teaching staff, and some of them go "the extra mile" in making the atmosphere more inclusive for the visually impaired students.

V. Implications and Conclusions

Foreign language context is a cognitively and socially complex process that involves developing auditory, visual and mechanical skills. When students encounter difficulty with any of these skills, they face challenges learning the language. When there are obstacles in the process of creating supportive inclusive environments that attempt to provide learning and teaching opportunities that lessen the impact of students' disabilities, learning experience becomes a burden. Moreover, they more likely lead to the learning environments that are inefficient, discouraging for achieving maximum productivity and failing to make the best use of available resources and efforts. The quality of the learning and teaching experience of the visually impaired students is also influenced by how decision makers, teachers and technicians perceive the experience of inclusive pedagogy for the students with visual impairments. An essential part of the inclusive experience that is appropriate to students' needs, supportive, engaging and inviting is the integration of assistive technology. Using assistive technology enables more efficient language teaching and learning experiences of visually impaired students, empowers them and, consequently, enhances their academic success.

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