


# Integration of assistive technology in teaching learners with special educational needs and disabilities in the Philippines

Rolyn Joy Campado<sup>1</sup> , Cathy Mae Dabi Toquero<sup>1\*</sup> , Diane Mae Ulanday<sup>1</sup> 

<sup>1</sup>College of Education, Mindanao State University, General Santos City, PHILIPPINES

\*Corresponding Author: [cathymaetoquero@gmail.com](mailto:cathymaetoquero@gmail.com)

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## ABSTRACT

This study examined the integration of assistive technology (AT) in teaching learners with special educational needs (LSEs) in selected schools in the Philippines. This aimed to determine the assistive technologies utilized in teaching the special education (SPED) learners. The research also examined the perceptions, challenges, and support mechanism in the integration of technology among SPED teachers. Key informant interviews or in-depth interviews were conducted amid the COVID-19 pandemic to 12 SPED teachers handling learners with special needs. The findings of the study revealed that the available assistive technologies are interactive multimedia and conventional technology. Educational apps and high-tech tools are also used but of limited number. As SPED teachers who are teaching LSEs use AT, they find it useful as a reinforcement to learning, provides satisfaction in teaching, and brings motivational impact to learners. However, this somehow leads to fixation of learners to technology. Inadequacy of resources, learners' misbehavior during instruction, technological problems and poor mastery of skills are the identified challenges of SPED teachers. Financial, emotional, administrative, instructional and moral support are needed as a support mechanism. The study recommends for SPED schools to provide relevant trainings to SPED teachers on how to deal with the difficulties to meet the special needs of the learners.

**Keywords:** COVID-19, assistive technology, children with disabilities, special needs, SPED teachers, special educational needs

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## INTRODUCTION

Technology plays a great role in this growing society and the ever-changing world. The advances that it brings to the lives of people are inevitable. The emergence of numerous innovations is influenced by the existence of technology. In a generation full of demands, it paves the way for the accomplishment of different endeavors. The advent of technology has brought several changes, even in the field of education. The educational system in the Philippines has embraced the significance of technology in the teaching-learning process. In line with the goals of teaching 21<sup>st</sup> century skills and becoming globally competitive, technology is integrated as a helpful tool in achieving such objectives. Its presence in a classroom with learners who have special needs is highly needed to make learning easier for them.

Nowadays, problems with the integration of technology into the delivery of instruction inside the classroom still exist, despite the positive effects mentioned above and the observance of necessary precautions among teachers. Evidence suggests that over 90% of people who would benefit from assistive technology (AT) do not have access to them, indicating that there is a huge unmet need for such devices. A global survey conducted by UNICEF indicated that only 5-15% of

children with disabilities have met their needs through the use of AT (Rohwerder, 2018).

Children who are enrolled in the special education (SPED) classes and those who are part of mainstream education may have different types of impairments. Their conditions vary depending on what categories they belong. Their specific needs must be addressed particularly for those who are enrolled in regular classrooms to avoid being left behind. An average adult with disabilities in learning has less education, low success in employment and high levels of emotion and interpersonal adversities (Koo, 2013). For example, students with attention deficit hyperactivity disorder (ADHD) have difficulties paying attention, engaging in excessive activity, or controlling improper behavior. This is something that can happen to children, making them jittery, unable to concentrate, restless, and easily distracted (Sundus, 2018). Also, specialized hearing technologies may decrease the effect of barriers that deaf/hard of hearing (DHH) students experience in schools, such as classroom noise, rapid rate of discussion, rapid change of topics, and large numbers of people included in conversation, all of which can prevent DHH students from partaking in teacher-student and student-student communication (Rekkedal, 2012). Likewise, braille and embossed print need touch to produce information for those with visual impairment (VI) (Senjam, 2019). Ineffective readers,

according to Andresen (2007), acquire more intrinsic drive and self-esteem for schooling than pupils who do not utilize AT.

It is crucial to learn more about their needs in order to provide them with the high-quality education they deserve. There are 13 various types of disabilities in SPED, Cicek (2011) cited:

1. Learning disability
2. Deficiency of speech
3. Autistic spectrum disorder
4. Disruption of emotions
5. Orthopedic problems
6. Hearing impairment (HI)
7. Impaired vision
8. Deaf-blindness
9. Mental illness
10. Delay in development
11. Traumatic brain injury
12. Non-categorical early childhood
13. Other health problems.

Learners with special needs have distinct traits that distinguish them from other pupils. Thus, proper assessment is necessary in order to know their educational needs. Ebol (2000) noted some strategies for SPED learners such as strengthening/updating of training/refresher program for educators and other school workers to enhance their abilities for increasing the full potential of learners with disabilities; distribution of materials for learners with special learning needs; and utilization of technology and organizations of services (Toquero, 2021) to enhance access to textbooks and reference materials in correct formats.

Teachers' main challenge in SPED classrooms is pushing their students to behave in socially acceptable ways (Timor, 2011). Teachers lacked adequate knowledge and abilities in the use of AT (Alkahtani, 2013). On the other hand, indiscipline has a wide range of causes, just like the persons involved. The child's environment, as well as social, economic, psychological, and peer pressure issues, may all play a role (Simuforosa, 2014).

Teachers' attitudes and views, according to Johnson et al. (2016), are critical elements in influencing the use and efficacy of technology in classrooms. Teachers believe that introducing technology into the classroom improves educational outcomes and promotes job satisfaction, according to the study of Cagiltay et al. (2019). The use of AT has been demonstrated to improve dyscalculia students' desire and drive to solve mathematical problems (basic addition and subtraction) Amiripour et al. (2011) as cited by Felicia et al. (2014).

Current educational techniques emphasize the importance of using technology into SPED classrooms to improve achievement and promote learning (Baglama et al., 2017). Ahmed (2018) noted that there is a strong correlation between what people believe and what they do when it comes to AT.

Moreover, the image of classroom environments in third world countries like the Philippines is a mix of faded black and white with a livelier sense of hope from teachers that, through their efforts, colorful lives among the learners will stand out in the crowded pigments of the future (Dotong et al., 2016). In most SPED school settings, low-tech

devices are used that include non-electronic things such as pencil grips or paper communication boards, middle-tech devices include battery-operated devices such as calculators or hand-held spellcheckers, and a few high-tech devices that include objects that are electronic or mechanical in nature, such as computers with assistive software (Coleman, 2011). Thus, there is an existing technology gap in the Philippines.

The existing challenges that teachers encounter in the integration of technology may include shortages in supply of devices needed, lack of knowledge or proper training for teachers, as well as problems in the behavior of the learners despite the integration of technology. It was significant to conduct this study to address the present problems in technology integration by planning of action to come up with an effective solution.

### **Aims of the Study**

This study aimed to determine the integration of technology in teaching learners with special learning needs in the selected SPED schools in Mindanao, Philippines. It aimed to determine the answers to the following questions:

1. What are the available assistive technologies that teachers utilize in teaching learners with special needs?
2. What are the perceptions of SPED teachers in the utilization of AT?
3. What are the challenges encountered by teachers and the support mechanism they needed in integrating technology to LSENs?

## **METHODS**

SPED classes integrate technologies to keep abreast of the emergence of the devices that are helpful to make learning easier and meaningful. It is a common conception that learners with special needs struggle in different ways. Therefore, the delivery of instruction needs to be upgraded with the help of technologies. The assistive technologies pave way to make the teaching-learning process more engaging especially to learners with special needs who mostly experience difficulty in sustaining attention. Assistive technologies are applicable not just in SPED schools but even in other settings.

### **Research Design**

This study utilized the descriptive-qualitative method of research. The researchers used an interview guide. Various literature and studies were reviewed and considered before the formulation of the interview guide. The researchers primarily made a draft of the interview guide. The developed interview guide was reviewed and validated by three master teachers from the Division of Sarangani who were not involved in the actual study. The participants of the study included the teachers handling learners with special needs. There were three teachers in Creative Achiever Special Education Academy (CASEA), three teachers in Socksargen Center for Adaptive Intervention (SCAI), three teachers in General Santos City SPED Integrated School and three teachers in Romana Acharon Central Elementary School, for a total of twelve teachers. They were chosen using a purposive sampling procedure.

### **Instrument**

This study utilized interview guide questions in gathering data. The questions dealt on the available assistive technologies, perceptions of

**Table 1.** Types of assistive technologies integrated in teaching learners with special educational needs

Category	Assistive technology	
Interactive multimedia	Cellphone	
	Television	
	Laptop	
	Tablet	
	iPad	
	Computer	
	Radio	
	Speaker	
	Recorder	
	Lapel	
	Flash drive	
	Printer	
	Conventional technology	Picture dictionary
		Graphic organizer
Reading tracker		
Manipulative toy		
Peg board		
Bead/s		
Puzzle		
Straw		
Gripping device		
Big book		
Tripod pencil grip		

SPED teachers, challenges encountered and support mechanism for the development of intervention program needed in the integration in the selected SPED schools in General Santos City. The interview involved open-ended questions to give the participants freedom to provide responses they were comfortable with.

### Data Gathering Procedure

Learners, especially those who are enrolled in a specialized education school, should have access to good facilities that will motivate them to learn. Thus, this study that revolved around SPED that should be given importance to strengthen the integration of technology in the delivery of instruction to learners with special needs. The interviews were conducted during the advent of the pandemic in 2020. However, the study was delimited to the educational experiences and classroom challenges of the teachers prior to the pandemic.

Before the needed data for this study was gathered, the researchers wrote a formal letter to the directresses of the two private schools and the principals of the two public schools, requesting permission to conduct this study. Upon approval, one of the researchers met the directress and the principals, presented the letter, and explained the objectives of the study. The data was taken from the participants through a key informant interview. The researchers ensured that any private information would be kept confidential. Interviews were conducted with teachers who were handling SPED classes to gather significant data necessary for the study. The interview guide questions contained open-ended questions. The three participants from one private school were interviewed personally. The audio recording was conducted using a cellphone by following safety protocols, and the remaining eight participants were interviewed online via Google Meet, a virtual platform. A link was sent to each participant according to his/her availability. To guarantee that the data collected would be rich in the content required, follow-up questions were given. The data and information gathered during the interview were all documented.

### Data Analysis

An interview was conducted with the teachers who were handling SPED classes to gather significant data needed for the study. They were asked to describe the available assistive technologies, the perceptions of SPED teachers, challenges encountered, support mechanisms, and the intervention program to be developed for the integration of AT in selected private and public SPED schools in General Santos City. Thematic analysis was used to analyze the data, which included the following steps: familiarization, coding, generating themes, reviewing themes, defining/naming themes, and writing up. Quirkos software was the qualitative data analysis tool that was utilized in this study. Creating a project, importing text data, describing data properties, creating and grouping themes, coding text, exploring data, and exporting coded data were the sequential steps followed in this software.

## RESULTS

### Technologies Integrated in Teaching Learners With Special Educational Needs

The assistive technologies that usually existed in their schools, both in private and public, were the ones commonly used for instruction (Table 1). The narrative of the teachers enumerated the interactive and conventional technologies that they have integrated into the classroom. Based on the statements of the participants, there are assistive technologies best suited to the disabilities of learners with special educational needs (LSENs) in their schools.

#### Interactive multimedia

Cellphone, laptop, tablet, iPad, computer, radio, speaker, recorder, lapel, and printer are the electronic devices present in the private and public schools as mentioned by the participants. The findings are supported by the following statements of participant 1 and participant 8 from the private and public schools.

“... more on TV, laptops, cellphones, we download the applications or softwares” (participant 1).

“The electronic devices, manipulative toys and the multimedia are the things that I am using” (participant 8).

The learners were motivated since the teachers let them watch educational video clips and engaging them in dancing to the beat of the music. Assessing the students was made possible by a recorder, and written assessment material was also produced through a laptop and printer. There were only a few who had lapels. Most of them answered that lapels were not needed because their classes were self-contained. During the motivation process, most of the participants answered that they were using multimedia such as TV, laptops, and flash drives. They found them effective. The recounts of one SPED teacher from a private school and one from a public school demonstrate this.

“Okay ma’am, so far laptop was the only available technology that I had that time. So, I used it and what I did was I used to play videos through YouTube since there were many learning videos in YouTube, so I used to play them all” (participant 3).

“A downloaded unfreezing activity that I save in a flash drive to be inserted on the TV” (participant 6).

**Table 2.** ATs that SPED teachers utilize for instruction

Subcategory	Assistive technology
High-tech devices	Braille
	Hearing aid
	Laminating machine
	Video tape
	Talking calculator
	Talking computer
Educational apps/application softwares	AAC
	Kahoot!
	Reading guide app

Based on the recounts of SPED teachers, high tech tools are indeed helpful in the process of learning especially to the learners with visual and HI (Table 2). However, some of them mentioned existing assistive technologies like braille, hearing aid, video tape, and laminating machine are damaged and limited in number. Talking calculator and talking computer are available in one public school only as proven by one of the participants. Based on the narrative of the interview, augmentative and alternative communication (AAC) device or the application software installed to the assistive technologies served as a tool for alternative communication for learners with speech difficulties. Kahoot! application was also mentioned as useful for assessment, but others struggled to access it especially those who had hard time in reading and writing. However, there are also other high tech tools revealed by the teachers that are used for specific conditions particularly the hearing aid, braille, video tapes for social skills, laminating machines, talking calculator, talking computer but then most of them are limited in number (Table 3).

“Then we also have video tape for social skills because there are children that have autism. There is someone who is not capable even to move he will just stare the whole day, their specific needs” (participant 5).

One SPED teacher from the public school mentioned that braille was present in their school. However, it was damaged already.

“But before in VI they really had braille, but I was not able to reach that time it was there because it was damaged as well” (participant 9).

Teachers also use SPED software that they download to their devices, specifically for learners with autism like AAC. Social stories from videotape, cellphones, or computers are also utilized to educate learners with autism about reality and help them improve social skills. In addition to hearing aids, Braille is used for learners with VI and TV is used for learners with HI. The lapel is used in a transition class with

older and bigger students, but it is inapplicable to learners with autism because the sounds created by it may distract them.

In line with this, two SPED teachers (public and private) similarly stated that videos with social stories from videotape, cellphone, or computer are used to enlighten learners with autism about reality and develop skills in socialization. As a matter of fact, Alzyoudi et al. (2015) indicated that children with autism frequently have a lack of interactive social skills that would allow them to successfully engage with others. As a result, they frequently require training to assist them in effective social engagement. Video modeling is a frequently used instructional tool that has been demonstrated to be successful in teaching children with developmental impairments such as autism.

“Video tapes intended for social skills” (participant 5).

“So in autism, we are more on computer, cellphone like watching video. Most of the time, we show them videos about social stories with music from the speaker, that’s all so far” (participant 12).

### Conventional technology

The teachers who were included in the interview mentioned picture dictionary, graphic organizer, reading tracker, manipulative toys, peg board, beads, puzzle, straw, gripping device, big books, and tripod pencil grip and other alternative tools. The following are their statements:

“We have manipulatives” (participant 1).

“We also incorporate real objects” (participant 9).

The relevance of using pictures inside SPED classroom is emphasized by one SPED teacher from a public school. The picture exchange communication system will be able to start a conversation by passing out picture cards that are linked to what the child is thinking about. Manipulative plays provide learners with chances to explore things. They will learn how to push, pull, press, twist, and turn. According to the two SPED teachers from the public schools, manipulative toys were also introduced to children with special needs. Educational toys are one of the tools that can be used to stimulate the development of children with intellectual disabilities. These are specifically designed to stimulate learners’ developmental aspects, such as psychomotor (body muscles, body parts, and fingers), communication, interpersonal relationships, self-help, and intelligence (Sumijati & Untari, 2015).

In addition, tools pave the way to enhancing concentration, eye-hand coordination skills, and fine motor skills by letting learners grasp things using their own hands. One SPED teacher from the private

**Table 3.** Available assistive technologies for the types of learning conditions

Learning condition	Appropriate assistive technology	Target skill based on IEP
Autism	Television	Daily living skill
	AAC app	Communication skill
	Video tape	Social skill
Visual impairment	Braille	Literacy skill
Hearing impairment	Television with videos	Personal skill
	Hearing aid	Listening skill
Transition class (mixed composition of VI, HI, & difficulty in remembering)	Lapel	Attention skill
Apraxia of speech	iPad with AAC app	Speech skill

**Table 4.** Available conventional technologies for the types of learning conditions

Learning condition	Appropriate conventional technology	Target skill based on IEP
Autism	Picture exchange communication system	Communication skill
	AAC app	Communication skill
	Video tape	Social skill
Intellectual disability	Manipulative toy	Developmental skill
Dysgraphia	Tripod pencil grip	Motor skill

**Table 5.** Perceptions of SPED teachers about the integration of assistive technology

Perception	Description
Reinforcement to learning	Strengthens learning
	Identifies and concretizes learning experiences
	Allows learners to communicate themselves
	Enables learners to understand the topics clearly
	Meets the goals in the IEP
	Lessens teachers' work
Satisfaction to teaching	Catches learners' attention
	Teaching and learning targets are met
	Pupils learn and goals are achieved
	Teachers feel grateful and happy
Motivational impact	Teachers feel satisfied with the positive impact
	Motivates learning to complete tasks based on IEP
	Boosts interest

school and one from the public school mentioned the following tools: tripod pencil grips, peg boards, and beads.

In fact, another teacher from the public school noted that AT would be better if it were accompanied by conventional technology (Table 4). Akselrud (2004) believed that children who had trouble writing would have a difficult time in school. After practicing the Pencil Grip, children with learning disabilities will see an improvement in their tripod grasp strength. Crouch and Jakubecy (2007) added that people with dysgraphia have trouble seeing letters because the letter that is requested in the brain is often not the letter that is displayed. Repetitive practice, in conjunction with proper instruction, was found to be effective. This might be helped by correct posture and pencil grip.

#### SPED Teachers' Perceptions About the Integration of Assistive Technology

Regular learners have the tendency to get fascinated with technology, but learners with special needs are likely to get more fixated on it. One of the characteristics of learners with special needs is that they get obsessed with a certain thing, especially if it has caught their attention. This study accounts for the perceptions of SPED teachers on the utilization of AT. The narrative expresses their perspectives on learning reinforcement, teaching satisfaction, and motivational impact on learners. The various perceptions of teachers pertaining to technology integration in a SPED classroom are elaborated upon. The significance of having a positive outlook in the utilization process is given emphasis. The narrative enumerated the positive influence and impact of incorporating technology into the teaching-learning process, particularly for learners with special needs (Table 5).

##### Reinforcement to learning

Handling LSENs is challenging but Ahmed (2018) said that one of the most important roles of teachers is to create experiences for all students regardless of their disability and AT can help achieve this aim by providing pupils a bright future. Thus, AT serves a tool that can strengthen learning. It is important for SPED teachers to use AT in the delivery of the lessons in the field of teaching in order to help learners

with special needs identify and concretize an abstract experience. At the same time, it is needed in order for them to be understood and to communicate themselves to learn better by being able to clearly understand the topics/ skills despite existing hindrances. Reinforcement is needed to meet the goals or objectives in the individualized educational plan (IEP). One SPED teacher from the public school proved that it is far different from traditional teaching using chalk and eraser without the presence of any AT.

"Our routinary work once there is AT will be easier so it is easier compared to teaching without technology where you will be spending time thinking a lot while if you use technology if you will click it once, twice, everything is there, you already have a sample so even you as a teacher can also learn. Then, it is easier for you if you will prepare your lesson, of course everything is provided even the ideas, so all you have to do is to prepare other activities what you will do is to choose then you add, if you add or even if you wo not it's okay but it's important that you will use" (participant 4).

##### Satisfaction in teaching

A sense of fulfillment is felt by the teachers when they use AT in teaching and the learning targets are met. They feel satisfied when they are able to witness their pupils learn and the goals at the end of the lessons are achieved. The learning targets and goals are stipulated in an educational plan exclusive for SPED or also known as IEP. In fact, one SPED teacher from the public school elaborated how the targets in inculcating several behavioral changes to the learners are hit. It is important to note that behavioral modification is one of the particular targets of SPED.

"I was happy because my burden was eased in handling them for the moment I used technologies in school for example radio, TV, their attention got caught and they got relaxed. Once they got relaxed you could control them. How you control them ...

**Table 6.** Challenges encountered by SPED teachers

Problem	Description
Inadequacy of assistive technology	Insufficient number of assistive technology
	Lack of new and modern devices
	Expensive assistive technology
	Outdated existing devices
	Inadequate fund
Learners' misbehavior during instruction	Utilization of personal gadgets
	Distraction caused by technology
	Too much exposure to technology
	Too high volume of the gadget
Technological problems	Manipulation of technology
	Power interruption
	Failure of electrical service
	Updating of laptops
	Corruption of files
Poor mastery of skills	Slow connectivity
	Low assessment results

their approach ... 'okay your dancing time ends, okay everybody sit down'. If you would not let them dance they would be very hyper then they would feel tired so 'everybody sit down' since you're tired already 'okay inhale'" (participant 7).

#### *Motivational impact to learners*

LSEs have the tendency to get easily bored, lose interest and focus on learning. It is necessary to boost their interest and motivate them to listen to complete their tasks. Motivating them to complete their tasks is one of the targets of SPED as included in IEP. Moreover, internal interferences such as learning disabilities including ADHD and the student's understanding of the importance of the subject matter, in addition to contextual factors, prohibit pupils from focusing on the classroom (Stasch, 2014).

"Uhm in teaching children with special needs because they are usually visual learners so in using assistive technologies there will be an increase in interest and motivation of learners" (participant 2).

"They get addicted towards using cellphone. Sometimes I download (educational videos) to their phones so even at home they do not follow commands anymore" (participant 6).

The narrative reveals how AT captivate the attention of learners to be fully engaged in tasks with a goal of finishing them by being intrinsically motivated. One SPED teacher from the private school stated how assistive technologies increased the level of motivation and interest of the learners. Most of the learners are visual learners with much appreciation to the things that they see that is why they are more focused when AT is incorporated.

#### **Challenges of SPED Teachers During the Integration of Assistive Technology**

Learners with special needs often have difficulty demonstrating mastery of learning as measured during their assessment, despite the integration of AT during the delivery of the topic or skill to enhance learning. Therefore, teachers play a great role in enhancing the performance of the learners by thinking of possible ways towards improvement.

Insufficient number of assistive technologies is a common issue in the integration of AT (Table 6). The equipment needed in SPED are naturally expensive, so availability problem emerges. In fact, the common assistive technologies in third world countries are obsolete and limited. The two SPED teachers in private schools mentioned the same problem about the limited number of assistive technologies in their schools because the devices for SPED are costly. The findings are supported by the statements of the participant 1 and participant 12.

"Actually, it's lacking in a sense that there are not much assistive technologies yet in CASEA hmmm the assistive technologies in SPED are expensive" (participant 1).

"That's what we do because the gadget in our school is not enough" (participant 12).

The learners with special needs misbehave in a SPED classroom because they get distracted with the use of AT. There is something wrong with the AT that is why they do not behave well. Another one is it is not any more appropriate and they are not interested already because of too much exposure to the technology, or it is used in a longer span of time. There are also other factors why AT makes it a challenge for them to misbehave just like if the video is repeatedly played, the volume is high so the sound is way too loud and the teacher is not able to handle the misbehavior. Thus, learners with special needs have the tendency to show their behavioral issues because of the things around that may trigger them. Manipulation of technology, power interruption, failure of electrical service, updating of laptops, corruption of files, slow internet connectivity and the like are the technical issues that SPED teachers encounter upon integration of AT in a SPED classroom. The issues in technicality are common even in regular and SPED classes.

#### **Support Mechanisms Needed by SPED Teachers for Integrating Assistive Technology**

SPED teachers mentioned of support mechanisms that they need to counter the challenges that they experience in dealing with the instructional needs of LSEs. They seek for financial, emotional, administrative, instructional, and moral support (Table 7).

**Table 7.** Different forms and sources of support

Form of support	Source of support
Financial support	Stakeholder
	Local government units
	Private sector
Administrative support	Principal
	Administrator
Instructional support	SPED teacher
	Parent
	Principal
	SPED coordinator
Moral support	Doctor
	Psychiatrist
	Counselor
	Therapist
	Community

The teachers stated that they needed to have an ample amount of fund for the acquisition of new and suitable AT that can aid the learning of the learners with special needs and meet their needs. The procurement amount of money and source of funds are adjusted in accordance with the emergence of new and updated AT. As a result, financial assistance is needed in order to ensure a sufficient supply of technologies for learners with special needs. The need for financial support is emphasized by one participant below.

“Yes maam, for me since I experienced it, budget and of course support from different services and also from the government since it’s private of course you cannot be catered by the government so for me it’s budget the other forms of support will follow” (participant 3).

The integration of AT would not be possible without the assistance to the learners and teachers, especially in terms of the emotional aspect. Struggles in the classroom may come in several forms. As a result, they need a lot of emotional support. One participant from the public school shared the need of the children to receive support especially from their parents/guardians.

“I always told them that I had no problem with that. Even if I had to cater them all, as long as the support that I asked from you particularly attending if we have activity in school. If you will not be happy but as long as your child is happy it will be okay for me. If we have a meeting, even if you will not look directly to my face I have no problem with that as long as you’re there for the child” (participant 6).

Moreover, school principals and other administrative officers play a great role towards the improvement of the integration of AT in SPED curriculum. All forms of support coming from the management of the private and public schools would mean a lot particularly in finding stakeholders to donate for the betterment of the implementation. In fact, one SPED teacher from the private school highlighted the importance of asking help from the administrators especially when it comes to supplying their needs.

“... the admin knew already what was lacking but it could not be addressed directly because of financial concerns” (participant 12).

Teachers also need various classroom management strategies to solve the problems they encounter especially in dealing with misbehavior of the learners. Different techniques in teaching are suggested and applied by teachers such as setting ground rules and making adjustments based on the level/need of the learner. In the previous discussion, conditioning the minds of the learners before the lesson proper, using timer for discipline and time-management, and giving time to play were also the mentioned strategies of SPED teachers. In addition, one participant from the private school mentioned that rules should be set inside SPED classroom.

“I set some rules to clear things up” (participant 2).

They also pointed out the moral support for LSENs towards building a conducive environment while learning with AT. To improve the integration of AT in SPED schools, many people are needed. They have a variety of responsibilities. Individuals identified by SPED teachers are parents, principals, coordinators, counselors, and therapists and the community as a whole. One SPED teacher from the private school mentioned the same people who could make a big contribution towards the success of technology integration.

“Uhm of course the teachers, psychologist, therapist, and especially the parents are also needed. The parents really because children only spend a couple of hours at school so the time that they spend at home is longer and of course these teachers, psychologists, doctors, therapists, parents they work hand in hand to address the problems or to teach the child with special needs” (participant 2).

Based on the statements of SPED teachers, the people who can extend moral/psychological support are the stakeholders, therapists, doctors, psychiatrist and the people in the community as a whole. These people according to them could address the needs of the learners and make integration of AT successful. One of the participants even emphasized that anyone who interacts with the child can be one of the sources of encouragement to make learning possible and for them to behave well in school.

## DISCUSSION

Assistive technologies are designed to help LSENs develop significant skills and to unleash their full potential. It was revealed that the available assistive technologies that are commonly utilized in the private and public SPED schools fall in the categories of interactive multimedia and conventional technology. The digital computer-based systems embedded in mobile devices are referred to as interactive multimedia. Such as cellphones, laptops, tablets, iPad, computers, radios, speakers, recorders, lapels, and printers are the available assistive technologies. Hearing aids, braille, video tapes for social skills, laminating machines, talking computers, talking calculators are also available but limited in number.

AAC, Kahoot!, and reading guide apps are the educational applications/software that they utilize. Whereas the low-tech tools or non-electronic materials that can be used to improve teaching and learning are under conventional technology. The alternative tools they use include picture dictionary, graphic organizer, reading tracker,

manipulative toys, peg board, beads, puzzle, straw, gripping device, big books, and tripod pencil grip.

Qahmash (2018) stated that under the intertwined and overlapping umbrellas of assistive technologies and SPED, mobile technology finds a promising, new place on the surface of growing assistive technologies in the field of SPED. On the other hand, manipulatives have been suggested as an evidence-based strategy for pupils identified with a learning disability, and they are usually considered an efficient technique when employed within the concrete–representational–abstract teaching paradigm Peltier et al. (2020). Anandha et al. (2021) discovered that children with special needs were particularly enthusiastic about using Kahoot, and that it might aid them in improving their English vocabulary. Moreover, according to the findings of Walters (2018), the use of AAC in conjunction with traditional speech therapy can aid with communication interactions and language learning. Skogly Kversøy et al. (2020) stated that some people with intellectual disabilities will be able to incorporate touchscreen technology into their regular communication systems. Software for touchscreen devices that has been specifically designed for AAC devices makes it easier for people with disabilities to communicate. Since computers improve teaching concepts and skills and increase the permanence and generalization of learnt concepts and skills, they are increasingly used as useful technological tools in SPED (Baglama et al., 2018). According to Fekih (2018), using computers effectively in the classroom can significantly benefit students with special needs, such as the ones with dyslexia. Due to their difficulties processing information, students with special needs require different information inputs (visual and verbal) through more stimuli. It is stressed for this reason that offering students structured and enriched learning environments (like videos, 3D images, and animations) makes it easier for them to process relevant information instantly, boosts their motivation to learn, helps them understand tasks better, and allows them to develop higher level academic skills (Ozkubat et al., 2022). In addition, in the study of Almumen and Almuhabeb (2020) results showed that after reading the social story supplied via iPads, individuals improved their ability to communicate gratitude. It was determined in the study of Karakus and Varalan (2021) that the students' skills had improved in using interactive map applications on mobile devices, computers, and smart boards. Direction-finding and map reading skills among students with mild intellectual disabilities were developed in social studies sessions through the use of interactive maps. A variety of technologies have been used in the intervention process to help people with autism spectrum disorder (ASD) enhance their skills, including video modeling, computer-based intervention, mobile technology, virtual reality, and augmented reality (Hasan & Nene, 2022). In our society, the use of mobile devices is expanding quickly, and it has significant advantages for supporting deaf students' independent and group learning. One of the main advantages of using AT is that it enables educational opportunities for people who have difficulty learning through traditional methods, particularly for those who have HIs (Parvez et al., 2019).

The perceptions of SPED teachers or their beliefs, insights, and views in the utilization of AT have bearing to their performance in the integration of AT. As SPED teachers teaching LSENs using AT, they find it useful and beneficial as it serves as reinforcement to learning, provides satisfaction in teaching and brings motivational impact to learners. However, this somehow leads to fixation of learners to technology. Incorporating technology into the curriculum is

increasingly important for effective teaching in the educational system (Mokmin & Rassy, 2022). As cited in the study of Arpacik et al. (2018), numerous studies have shown that the usage assistive technologies enhances learning activities of people with intellectual disabilities. The study of Ndlovu (2021) revealed that AT and devices significantly improve the general performance of students with disabilities in higher education and give them the opportunity to do things they otherwise might not have been able to. Therefore, it would seem that devices and auxiliary aids could be effective in facilitating students with disabilities' access to learning in higher education. Dias and Victor (2017) revealed that the use of technologies benefits teachers. Mobile devices have been shown to foster independent learning by allowing teachers to identify unique student needs and exchange resources with students and among themselves. Baglama et al. (2022) revealed that the use of technological structures in schools effectively foster the independence of students with special needs. It is similar to the idea of de Freitas et al. (2022) that AT emphasizes fostering people with disabilities' independence, quality of life, and social inclusion. Uluyol and Aslan (2022) added that teachers have one of the most significant roles in the successful integration of AT into classes or classroom settings. For their students with special needs to use AT effectively at school and in daily life, teachers must adopt AT, have good attitudes toward AT, and successfully integrate AT into their teaching. In the study of Malz (2020), all of the teachers were in favor of incorporating mobile tablets and believed they were utilizing them successfully. On the other hand, Shin et al. (2016) stated that students who are differently abled may find difficulty in understanding concepts. They can be engaged actively through virtual manipulatives (i.e., interactive visual models). The advantages of using technology in SPED include making the curriculum easier to access, encouraging autonomous academic activity, allowing students to learn at their own pace, and boosting their motivation and interest in learning (Ari & Baser, 2022). Sani-Bozkurt et al. (2017) stated that people with ASD are likely to show more interest because of the novelty impact brought on by the use of recent technological tools.

Downey (2016) emphasized that obsessions in children with autism can develop from these recurrent actions, leading to a strong interest in things, numbers, and symbols. As a matter of fact, technology addiction, which has expanded around the globe and is continually growing, is having a significant social, physical, and mental impact on humans, particularly the youngest generation (Bicen & Arnavut, 2017).

The challenges encountered by the teachers in the integration of AT are the difficulties they meet along the way. Teachers handling LSENs encounter circumstances, which appear in different forms and are inevitable. The problems are insufficiency of resources to the extent that SPED teachers somehow use their personal gadgets, unavailability of new, modern, responsive and appropriate assistive technologies, learners' misbehavior during instruction, technological problems and poor mastery skills were the mentioned challenges of SPED teachers. Teachers suggested support mechanism or various sorts of assistance in order to enhance the integration of AT. Financial, emotional, administrative, instructional and moral support are all included in the list. The challenges and solutions in integrating technologies in the classroom were elaborated in the study of Johnson et al. (2016).

The findings showed that due to a lack of infrastructure and suitable materials, teachers' use of technology for instructional purposes was relatively limited. Problems surrounding insufficient equipment or connectivity, named the access constraint are addressed. If the school



does not have sufficient computers and fast internet connection, the implementation of educational technology is not feasible. The challenge of inadequate training connected to technology is presented. If teachers are not given effective professional development on new technologies, they will not be capable of utilizing it to its full potential. It is elaborated in the study of Keshav et al. (2018) that teachers face two different types of obstacles that prevent them from integrating technology into their lessons: those that are “internal” to them and those that are “external.” External barriers include problems with the availability of technology, issues with support and training services, and financial barriers. Internal barriers include the teacher’s confidence, beliefs, and perception of the value of the technology.

Factors linked to the support constraint are also discussed. Support barriers to technology integration consist inadequate technical support and administrative/peer support. The following solutions are hereby recommended:

- (1) attain funds for resources via non-traditional sources like crowdfunding, and grants,
- (2) seek guidance from the ISTE to determine efficient professional development programs,
- (3) make use of the expertise of master teachers in professional learning communities,
- (4) request training on newly implemented educational software directly from software companies, and
- (5) guarantee that adequate technical, administrative, and peer support are accessible to teachers during the integration.

According to Nikolopoulou (2021), main perceived hurdles include a lack of (or insufficient) resources/equipment, restricted teacher training chances, and a lack of money. In line with this, Alharbi (2016) suggested that technical support is another important resource that is underutilized as an AT. It was suggested, in the study of Chukwuemeka and Samaila (2020) that among other things, given the dynamic nature of SPED technology, both the government and other stakeholders should regularly organize workshop, seminars, and other capacity building training for teachers as a means of updating their knowledge and skills in the use of assistive devices. However, Jones et al. (2018) stated that in order for AT to be used properly and effectively, teachers must be trained in its use; research has shown that teachers’ familiarity with the technology plays a significant role in students’ success using it. According to Grout (2017), it is important to take careful into account when choosing and deploying AT for an individual to ensure that the appropriate technology is chosen, that the chosen AT is provided with training, and that support is available after the technology has been deployed.

Teachers, in general, cannot be expected to solve technology-related issues without proper technical help. Computer breakdowns, internet connections, poor internet connections, and teachers working with students are all examples of technical challenges. As a matter of fact, as stated in the study of Koch (2017), new teachers are not demonstrating proficiency in AT for their students with SPED needs in their classrooms, despite growing up with it and using it frequently in their personal lives. On the other hand, Habulezi et al. (2017) argued that multiple factors influence the poor performance of learners with vision impairment. Tanase (2021) stated that teachers continue to cope with challenging conduct, and as a result, many instructors leave the field soon after they begin. To respond appropriately to such issues,

teachers must first understand the psychology behind children’s misbehavior.

Despite the fact that children with emotional or behavioral disorders have historically had lower academic performance than children with and without disabilities. Indeed, the learning environment is in tune with the needs of the students where they can feel comfortable and protected (Malbogot, 2017). Furthermore, the school and administrative authorities should address their professional development needs and work to overcome the barriers to incorporating AT into the learning process. It might be helpful for instructors if the school administration ensures that there is someone in their area or at each school who is technically knowledgeable in assistive technologies and will be available on time (Tony, 2019). A personalized education plan ensures that instruction and curriculum fit the requirements of students with special needs, as well as ensuring appropriate practices and a supportive educational environment are given (Manalaysay, 2021).

## CONCLUSION

SPED teachers mentioned numerous available interactive and conventional AT in their narratives. There are assistive technologies that are most adapted considering the disabilities of the students that require special educational assistance. The perspectives of SPED teachers in the use of AT are linked to their performance in the integration of AT. The find AT as useful and beneficial as it reinforces instruction, offers satisfaction in teaching, and has an impact on learners’ motivation. Moreover, the teachers elaborated the challenges they encounter in the integration of AT for learners with special needs, which include inadequacy of AT, learners’ misbehavior during instruction, barriers in technicality and poor mastery of skills. Teachers stressed the importance of applying effective strategies in teaching and handling learners’ behavior. As support mechanisms, they seek for financial, emotional, administrative, instructional, and moral support.

Practical implications include for SPED schools to acquire new and modern AT when sufficient fund is available. SPED schools should upskill teachers’ knowledge and upgrade the existing assistive technologies. It is recommended to establish strong links with the stakeholders like non-government agencies and local government units and other private sectors that can extend financial support to supply the needs in the integration of AT. With regards to the learners’ misbehavior during instruction, it is recommended that parental involvement must be encouraged for parents to offer further assistance and guidance to learners as discipline always starts at home. Moreover, relatives, psychologist, therapist, doctors, and the members of the community must extend emotional support to learners for them to feel motivated and to behave well in school. Teachers must be equipped with effective behavioral management strategies. Poor mastery of skills of learners should be addressed by making creative curriculum using AT with the parents’ help. Moreover, technological problems must be addressed by strengthening administrative support through providing trainings and workshops to teachers on how to deal with such difficulties. Orientation about new features of AT must also be included for SPED teachers to have enough learning in case new technology will be integrated. SPED schools in General Santos City should implement the flexible professional development continuum program for private and public SPED teachers handling learners with special needs.

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