| **RESEARCH ARTICLE**

Assessing Teachers' Technological Pedagogical Knowledge and Early Childhood Development of Learners with Special Educational Needs

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| **ABSTRACT**

This research assessed the technological pedagogical knowledge and early childhood development of LSENs among SPED teachers at the identified SPED centers in Cebu City and Talisay City Division for the school year 2022-2023 as the basis for pedagogical skills enhancement plans. It aims to establish a foundation for enhancing pedagogical capabilities. Employing quantitative techniques, this study analyzed the responses of 106 respondents, which include teachers and parents, using the frequency, weighted mean, chi-square, and t-test for the statistical analysis. Findings revealed that parent-respondent profiles showed that most respondents were female, 35-44 years old, high school graduates, had 1-2 and 3-4 children, and had a combined family monthly income of 10,000 and below. Results found that each parent and teacher respondent perceived LSENs' mastery level in early childhood improvement as Near Mastery and instructors' technological pedagogical information became classified as Knowledgeable. Notably, there is no significant difference between the parents' and teachers' perceptions of LSENs' mastery. This observation points to the need for teachers to strengthen their technological and teaching skills to support young children's unique needs better. It emphasizes how important it is to provide SPED teachers with opportunities to enhance their ICT skills to help children with special educational needs (LSENs) learn and grow more effectively.

| **KEYWORD**

Special Education, Early Childhood Development and Technological, Pedagogical Knowledge, Descriptive Quantitative Research, Cebu City

1. Introduction

The Department of Education (DepEd) has been forced to innovate to guarantee uninterrupted learning due to the COVID-19 outbreak's significant effects on the education sector (Ajani, 2019). DepEd has acknowledged digital literacy as a fundamental need, stressing how important it is for teachers to succeed in this changing educational environment (Wei, 2023). ICT has become an essential level of education, including special education, during the pandemic (Sharma, 2021). This educational approach change has significantly impacted students with special educational needs (LSENs) and their parents.

According to Paul (2023), the abrupt shift to digital learning has confused LSENs and disturbed their usual learning habits. Parents have struggled to adapt their daily routines to this new setup, and the sudden shift has posed significant challenges for teachers. Some of the issues and concerns that they faced include unreliable internet connection and varying comfort levels with modern technology.

In this connection, utilizing technology can help LSENs succeed academically. Computer technology applications have increased test scores of learners with learning disability in reading.   Writing, arithmetic, spelling, reading comprehension, organization, and social skills are some of the few skills that can be improved using technology (Batanero et al., 2019). Computer technology can be utilized to assist learners in a variety of ways, such as writing software, arithmetic skill enhancement software,

reading software, e-books, text-to-speech, grammar and spelling checkers, writing tools, and many more (Akpan & Itighise, 2019; Viner et al., 2020)Computers can aid learners with special needs, specifically learners with learning disabilities, in writing by assisting their motor movements and checking spelling. They allow them to edit, alter, and produce a tidy and legible document, which makes it possible to use them to give LSENs an advantage.

Notably, teachers are primarily responsible for providing instruction. As a result, teachers are expected to stay current on innovations, developments, and information. Without a doubt, the digital era has dramatically benefited education in general by making information more accessible to access, use, and share (Haleem et al., 2022; Kalolo, 2019). Mishandling information, on the other hand, could have disastrous consequences. Teachers must be digitally literate to assist students in becoming responsible digital citizens. Educators must adapt quickly to this rapid change. Teachers must know the whats and hows of these technologies to utilize their benefits fully and effectively. Undoubtedly, some teachers are still under-exposed to technology's practical uses. And it is critical to reach out to and support these teachers so they can provide excellent education to their students. Technology may have proven to be effective in classroom instruction use, but teachers play a crucial role in integrating technology into daily instruction, for they are the main users of this technology (Suárez-Rodríguez et al., 2018).

In the study by Briones (2018), utilization of ICT by teachers demands careful preparation and the use of teachers' pedagogical competence in the classroom. Technological pedagogical knowledge is the relationship between different technological tools and different ways to use them. (Santos & Castro, 2021).

This research emphasizes the importance of assessing teachers' skills and understanding of early childhood development, especially when working with special needs students. By doing so, educators can be better equipped to offer the support and guidance these students need to succeed academically, socially, and emotionally.

2. Purpose of the Study

This research assessed the SPED teachers' technological pedagogical knowledge and early childhood development of LSENs at the identified SPED centers in Cebu City and Talisay City Division for the school year 2022-2023 as the basis for Pedagogical Skills Enhancement Plans. Specifically, it sought answers about the profile of the teachers and parents, the perceived level of technological pedagogical knowledge for LSENs of the teacher respondents, the perceived level of mastery of the LSENs in early childhood development of the teachers and parents, and the test of the significance of the difference between the parents and teachers' perception on the mastery of the LSENs in the areas of early childhood development.

3. Research Methodology

3.1 Research Design. This study used a quantitative research approach to explore how teachers teaching special educational needs students were trained in technology and contributed to their early childhood development. First, a plan was developed to answer research questions, followed by a survey. This survey helped gather information about the early development of LSENs and the technology skills of their teachers. This research relied on quantitative methods involving using numbers to understand things. Online questionnaires and surveys are used to gather this data, using patterns to make sense of it (Pyrczak & Oh, 2018).

1.2. Respondents
In this study, the chosen respondents were Special Education teachers and parents of Bulacao Community School Special Education Center, Pardo Elementary School Special Education Center, and Tabunoc Central School Special Education Center, which comprised 12 teachers and 25 parents for a total of 37 respondents. The researchers used universal sampling as their sampling technique. Universal sampling can help achieve optimum complexity for any signal class (Avron et al., 2019).

3.3 Instrument
The instrument was adapted from a study conducted by Aditya et al. (2022), which will allow researchers to investigate how the digital disruption of early childhood education affects students with special needs. It is divided into three sections: the first discusses the demographic characteristics of the respondents, the second focuses on their views on using digital technology in the classroom, and the third and final section discusses the challenges of utilizing digital technology.

3.4 Statistical Treatment of Data
Gathered data were treated using frequency, percentage, weighted mean, and t-test for independent samples.

4. Results and Discussion

This section presents the results of the parents' and teachers' demographic profiles in the three identified public schools of Cebu City. In addition, the succeeding tables showed the results of the parents' and teachers' perceptions of their technological pedagogical knowledge of ECD. Lastly, a comparative analysis of the perceptions of the respondent groups regarding the mastery of the LSENs in early childhood development was also presented.

4.1 Demographic Profile of the Parent Respondents. This part discusses the profile of the parent respondents in terms of age and gender, highest educational attainment, number of children, and combined family income of the three identified schools.

Table 1. Age and Gender of the Parent-Respondents

Age (in years)	Female		Male		Total	
	f	%	f	%	f	%
55 and above	11	11.46	1	1.04	12	12.50
45-54	18	18.75	7	7.29	25	26.04
35-44	29	30.21	8	8.33	37	38.54
25-34	21	21.88	1	1.04	22	22.92
Total	**79**	**82.29**	**17**	**17.71**	**96**	**100.00**

As presented in Table 1, there were a total of 96 parents who responded to the survey; 79 (82.29 %) of them were women, and 17 (17.71%) were men. The age group of 35–44 showed the highest percentage of female respondents, with 29 (30.21%), followed by 45–54 with 18 (18.75 %), 25–34 with 21 (21.88 %), and 55 and older with 11 (11.46 %). Male participants were most prevalent in the 35–44 age group (8.33%), followed by 45–54 or 7 (7.29%), 55 and older or 1 (1.04%), and 25–34 or 1 (1.04%).

The data suggest that female respondents dominated over male respondents. It can also be noted that the age bracket of 35-44 showed similar numbers for both female and male respondents. It further suggests that mothers may be more actively engaged or available to participate in surveys about their child's education and development. This could also reflect traditional gender roles where mothers often take on primary caregiving responsibilities and are more involved in their children's schooling (Oranga et al., 2022).

Table 2. Highest Educational Attainment of the Parent-Respondents

Educational Attainment	f	%
Master's Graduate	1	1.04
Master's Level	2	2.08
College Graduate	22	22.92
College Level	20	20.83
High School Graduate	27	28.13
High School Level	12	12.50
Elementary Graduate	5	5.21
Elementary Level	6	6.25
No Formal Schooling	1	1.04
Total	**96**	**100.00**

As presented in Table 2, the data revealed that most of the parent respondents were High School graduates, 27 (28.13%), followed by college graduates, 22 (22.92%), College level 20 (20.83%), High School level 12 (12.50%), Elementary level 6 (6.25%), Elementary graduate 5 (5.21%), Master's level 2 (2.08%), and Master's Graduate and no formal schooling of 1 (1.04%).

The data indicate that high school graduates' parents offer a unique perspective on education, reflecting their own experiences and challenges in completing secondary education. High School graduate parents may bring varying levels of awareness regarding educational resources and support services available to their children, influencing their engagement with schools and educators (Posey-Maddox & Haley-Lock, 2020).

Table 3. Number of Children of the Parent-Respondents

Number of Children	f	%
7-8	1	1.04
5-6	17	17.71
3-4	39	40.63
1-2	39	40.63
Total	**96**	**100.00**

As presented in Table 3, the data showed that parents with 1-2 children and 3-4 children (39, 40.63%) dominated the distribution. This is followed by 5-6 children (17, 17.71%) and 7-8 children (1, 1.04%).

The data may suggest that the parent respondents were particular in the importance of having a good number of children in the family. The result further indicates that having less than four children in a family can bring various implications across different aspects of life (Chambers & Gracia, 2021). The economy usually means that each child has access to more financial resources (Brannen & Wilson, 2023), which could result in a higher standard of living and more chances for personal growth (Spinelli et al., 2021). With fewer kids to look after, parents can give more individualized care, which promotes emotional health and better bonds.

Furthermore, families may be able to influence social dynamics within the family, contribute to environmental sustainability with a more negligible ecological impact, and invest more in educational possibilities if they have fewer children (Wang & Feng, 2021). It might, however, also lead to adult children taking on more caregiving duties for elderly parents, which would strain their time and finances.

Table 4. Combined Family Monthly Income of the Parent-Respondents

Monthly Income (in pesos)	f	%
Above 30,000	6	6.25
25,001-30,000	5	5.21
20,001-25,000	9	9.38
15,001-20,000	1	1.04
10,001-15,000	18	18.75
10,000 and below	57	59.38
Total	**96**	**100.00**

As presented in Table 4, data showed that most parents, about 59.38 percent, earn 10,000 pesos and below each month, which means they might be having a hard time with money. Some parents, about 18.75 percent, earn between 10,001 and 15,000 pesos each month. A smaller group, about 9.38 percent, earns between 15,001 and 20,000 pesos. A few parents, around 5.21 percent, earn between 25,001 and 30,000 pesos, and 6.25 percent earn more than 30,000 pesos each month.

The data provided a comprehensive picture of the financial situation of the 96 parent respondents by showing the various combined monthly incomes of those respondents. A sizable portion of the sample, comprising 59.38 percent of households, report having a monthly income of 10,000 pesos or less, indicating they are struggling financially.

According to Reich et al. (2020), financial constraints often translate into limited access to educational resources and opportunities for enrichment, hindering learners' ability to engage fully in their learning. Moreover, disparities in the quality of schooling may exist, with students from low-income households attending underfunded schools with fewer resources and less qualified teachers. Economic hardship can also impact learner's health and well-being (Hamilton & Gross, 2021), leading to increased absenteeism and health issues that impede their academic performance.

4.2 Demographic Profile of the Teacher Respondents. This part discusses the teacher respondents' profiles in terms of age and gender, highest educational attainment, and length of service.

Table 5. Age and Gender of the Teacher-Respondents

Age (in years)	Female		Male		Total	
	f	percent	f	percent	f	percent
56	2	20.00	0	0.00	2	20.00
48	2	20.00	0	0.00	2	20.00
45	2	20.00	0	0.00	2	20.00
44	1	10.00	0	0.00	1	10.00
41	1	10.00	0	0.00	1	10.00
39	0	0.00	1	10.00	1	10.00
28	1	10.00	0	0.00	1	10.00
Total	**9**	**90.00**	**1**	**10.00**	**10**	**100.00**

As presented in Table 5, the data showed that most, or 90 percent, of the teacher respondents were female. Twenty percent of the female respondents were 45, 48, and 56, respectively. Moreover, 10 percent of the female respondents were 41 and 44, and another 10 percent were 28. On the other hand, only one male respondent, age 39, comprised 10 percent.

The data suggest that female teacher respondents dominated the survey. This further implies that female teachers are more represented than male teachers within the study sample. This could be due to various factors, such as gender distribution within the teaching profession in the specific context of the research, cultural norms or biases that influence career choices, or even specific recruitment strategies used.

Gender-related experiences and points of view may influence the research findings (Wharton-Smith et al., 2019), and the disparity in male and female participants raises concerns regarding gender inequalities in the educational context being studied. Additionally, the age distribution of teachers provides context for any potential disparities in teaching ability, viewpoints, and methods.

Table 6. Highest Educational Attainment of the Teacher-Respondents

Educational Attainment	f	percent
With Doctorate Units	1	10.00
Master's Graduate	1	10.00
With Master's Units	7	70.00
Bachelor's Degree	1	10.00
Total	**10**	**100.00**

As presented in Table 6, the data revealed that the majority (7,70%) of the respondents had the highest educational attainment With Master's units, followed by Doctorate units, Master's graduate, and Bachelor's degrees (1,10), respectively.

The data indicate that the teaching workforce has invested in furthering their education and professional development beyond the undergraduate level. This could mean a commitment to continuous learning and improvement in teaching practices. Also, teachers with masteral units may possess advanced knowledge and skills in their subject area or specialization, which can enhance the quality of instruction and academic support provided to students. Lastly, the prevalence of teachers with masteral units points the importance of continuing professional development and the need for education institutions to support teachers' lifelong learning initiatives (Al-Shammakhi, 2020).

Table 7. Length of Service of Teacher-Respondents

4.3 **Level** of

Length of Service (in years)	f	Percentage
16 and above	6	60.00
11-15	3	30.00
10 and below	1	10.00
Total	**10**	**100.00**

Teachers' Technological Pedagogical Knowledge for LSENs. Table 7 presents the level of teachers' technological pedagogical knowledge for learners with special educational needs based on 25 indicators.

Table 8. Level of Teachers' Technological Pedagogical Knowledge for LSENs

S/N	Indicators	WM	Verbal Description
1	I know how to solve my own technical problem	3.10	Knowledgeable
2	I can learn technology easily	2.90	Knowledgeable
3	I keep up with important new technology	3.10	Knowledgeable
4	I frequently play around the technology	2.80	Knowledgeable
5	I know about a lot of different technology	2.70	Knowledgeable
6	I possess the necessary technical skills to effectively use technology.	2.90	Knowledgeable
7	I have had sufficient opportunities to work with different technology.	3.00	Knowledgeable
8	I am capable of utilizing technology tools to analyze data and present findings.	2.90	Knowledgeable
9	I am able to utilize technology to create strategies for addressing real-world problems.	2.80	Knowledgeable
10	I have ability to design webpages and to use authoring software	2.10	Less Knowledgeable
11	I understand the legal, ethical, cultural, and societal issues related to technology.	2.90	Knowledgeable
12	I know about technology that I can use for teaching instruction	3.10	Knowledgeable
13	I know how to use of specific software and websites for teaching instruction and communication	2.80	Knowledgeable
14	I can find and evaluate resources that I need for preparing and making my lessons	3.20	Knowledgeable
15	I can use technology for presenting my lesson	3.10	Knowledgeable
16	I can select technologies that improve the teaching methods for a lesson.	3.20	Knowledgeable
17	I can choose technologies that enhance learners' learning for a lesson	3.10	Knowledgeable
18	I am thinking critically about how to use technology in my classroom	3.00	Knowledgeable
19	I can adapt the use of the technologies that I am learning about to different teaching activities	3.00	Knowledgeable
20	I can utilize technological tools to promote higher-order thinking skills, such as problem-solving, critical thinking, decision-making, knowledge acquisition, and creativity.	2.90	Knowledgeable
21	I can use technology tools and information resources to increase productivity	3.10	Knowledgeable
22	I can infuse technology to strategies of teaching	3.10	Knowledgeable
23	I can use technology for more collaboration and communication among learners and with teachers too.	3.10	Knowledgeable
24	I know how to use technology to facilitate academic learning	3.10	Knowledgeable
25	I can use different platforms (e.g., software, simulation, environmental probes, graphing calculators, exploratory environments, Web tools) to support learning and research	2.60	Knowledgeable
Aggregate Weighted Mean		**2.94**	**Knowledgeable**

Legend: 3.25-4.00-Very Knowledgeable; 2.50– 3.24-Knowledgeable ;1.75 – 2.49-Less Knowledgeable ;
1.00 – 1.74–Not Knowledgeable

Table 8 shows that the teachers' pedagogical knowledge level for LSENs is **Knowledgeable**, with an aggregate weighted mean of 2.94. Of the 25 indicators surveyed, only indicator 10, "I have the ability to design webpages and to use authoring software," is Less Knowledgeable, with a mean of 2.10.

The data imply that most teachers demonstrate a solid understanding and proficiency in integrating technology into their pedagogical practices for LSENs. This suggests that educators are equipped with the necessary skills and knowledge to leverage technology effectively to support the diverse learning needs of LSENs(Kilag et al., 2023; Winter et al., 2021).

4.4 **Level of Mastery of the LSENS in the Areas of ECD as Perceived by Parents.** Table 9 presents the level of mastery of the LSENs in the areas of ECD as perceived by the parents. This includes 18 indicators: socio-emotional development, behavioral development, physical health, well-being, self-help, motor development, sensory development, perceptual development, cognitive mathematics, physical environment, natural environment, listening, viewing, speaking, reading, writing, aesthetic development, and creative development.

Table 9. Level of Mastery of the LSENs in the Areas of Early Childhood Development as Perceived by Parents

S/N	Indicators	WM	Verbal Description
1	Socio-emotional development	2.93	Near Mastery
2	Behavioral development	2.93	Near Mastery
3	Physical Health	3.57	Attained Mastery
4	Well-being	2.99	Near Mastery
5	Self-help	3.36	Attained Mastery
6	Motor development	3.52	Attained Mastery
7	Sensory development	2.58	Near Mastery
8	Perceptual development	2.78	Near Mastery
9	Cognitive Mathematics	2.52	Near Mastery
10	Physical environment	2.90	Near Mastery
11	Natural environment	2.27	Lack Mastery
12	Listening	3.10	Near Mastery
13	Viewing	2.81	Near Mastery
14	Speaking	2.42	Lack Mastery
15	Reading	2.05	Lack Mastery
16	Writing	2.69	Near Mastery
17	Aesthetic development	2.43	Lack Mastery
18	Creative development	2.24	Lack Mastery
	Aggregate Weighted Mean	**2.78**	**Near Mastery**

Legend: 3.25-4.00-Attained Mastery; 2.50– 3.24-Near Mastery;1.75 – 2.49-Lack Mastery; 1.00 – 1.74–No Mastery

As presented in Table 9, the data showed that the LSENs' level of mastery in the areas of ECD is Near Mastery, with an **aggregate weighted mean of 2.78**.

The data indicate that of the 18 indicators surveyed, five of which were perceived by the parents to Lack Mastery, only three indicators attained mastery, and the remaining indicators were Near Mastery. The five indicators perceived as a lack of mastery were natural environment, speaking, reading, writing, aesthetic development, and creative development.

Parents think their learners have grown a lot in many ways. This could mean they have gotten stronger, have more freedom to do things, or are healthier. These improvements show that parents trust their learners to learn much in these areas. Even though parents see some problems, these insights show how important it is to focus on helping learners in these specific areas.

Mondi et al. (2021) emphasized that while many young learners exhibit foundational skills in areas like communication and socio-emotional development, challenges remain in more advanced skills such as reading, writing, and creative expression.

4.5. Level of Mastery of the LSENs in the Areas of ECD as Perceived by Teachers. Table 10 presents the level of mastery of the LSENs in the areas of ECD as perceived by the teachers.

Table 10. Level of Mastery of the LSENs in the Areas of Early Childhood Development as Perceived by Teachers

S/N	Indicators	WM	Verbal Description
1	Socio-emotional development	2.85	Near Mastery
2	Behavioral development	2.80	Near Mastery
3	Physical Health	3.30	Attained Mastery
4	Well-being	2.93	Near Mastery
5	Self-help	3.03	Near Mastery
6	Motor development	3.14	Near Mastery
7	Sensory development	2.55	Near Mastery
8	Perceptual development	2.58	Near Mastery
9	Cognitive Mathematics	2.34	Lack Mastery
10	Physical environment	2.80	Near Mastery
11	Natural environment	2.40	Lack Mastery
12	Listening	2.79	Near Mastery

13	Viewing	2.69	Near Mastery
14	Speaking	2.49	Lack Mastery
15	Reading	2.23	Lack Mastery
16	Writing	2.46	Lack Mastery
17	Aesthetic development	2.34	Lack Mastery
18	Creative development	2.35	Lack Mastery
	Aggregate Weighted Mean	**2.67**	**Near Mastery**

As presented in Table 10, the data revealed that the level of LSENs in ECD as perceived by the teachers is **Near Mastery** with the **aggregate weighted mean of 2.67**. The teacher respondents of the 18 indicators surveyed perceived indicator No. 3 as the sole indicator to have Attained Mastery. Moreover, seven (7) indicators are perceived to have Lack of Mastery, namely cognitive mathematics, perceptual development, speaking, reading, writing, aesthetic development, and cognitive development.

The teachers' perceptions highlight the noteworthy progress of LSENs across various developmental areas, acknowledging their achievements in self-help skills, social-emotional maturity, and physical health. Although some cognitive and communication abilities exhibit areas for improvement, the overall analysis suggests that LSENs in early childhood foundation are nearing a mastery stage. This recognition is a valuable foundation for tailored interventions and approaches to promote holistic growth and address specific developmental domains among students with special needs.

Park (2019) found that teachers frequently report speaking, reading, and writing as areas where LSENs struggle, reflecting a need for more specialized interventions and resources to address these deficits effectively.

4.6. Test of Significance of the Difference. Table 11 tests the difference between the parents' and teachers' perceptions of the mastery LSENs in ECD.

As presented in Table 11, the computed p-value of 0.172, greater than 0.05 significance level, suggests that the null hypothesis is not rejected. Hence, there is no significant difference between the parents' and teachers' perceptions of the mastery of LSENs in the areas of ECD.

Table 11. Test of Difference between the Parents and Teachers' Perception of the Mastery of LSENs in the Areas of Early Childhood Development

Source of Difference	Mean	Standard Deviation	Mean Difference	Computed t- value	p-value	Decision	Result
Parents	50.09	10.96	2.01	1.370	0.172	Do not reject Ho	Not Significant
Teachers	48.08	9.31					

*significant at p<0.05

The decision judgment "Do not reject Ho" suggests that the null hypothesis is not disregarded and that discrepancies between parents' and teachers' views are likely attributable to random variability rather than a significant and statistically significant contrast. The outcome thus indicates that the observed difference in LSEN mastery levels between parents and teachers is not statistically significant. In other words, any differences observed in their ascertainments can be attributable to natural divergence and are not a sign of a significant difference in viewpoints.

This outcome emphasizes the crucial role of parents and teachers in working together and communicating openly to ensure a thorough understanding of LSENs' growth. Additionally, it demonstrates that parents and teachers generally share opinions of LSENs' expertise in early childhood development, providing important insight for educational planning and assistance.

Additionally, teachers and parents work together to support students' academic progress (Ramanlingam & Maniam, 2020). Mutual respect, regular communication, and common growth objectives for the student are the cornerstones of this collaboration. At home, parents offer fundamental support by fostering virtues like self-control, curiosity, and a love of learning. They ensure that their children have the necessary resources, a conducive environment for study, and encouragement to engage with their schoolwork. Conversely, teachers bring their professional expertise to guide, instruct, and inspire students within the classroom. They identify individual student needs, tailor their teaching strategies, and provide feedback that helps learners grow.

According to Twum-Antwi et al., (2020), when parents and teachers work together, they create a supportive and cohesive network around the student, ensuring that educational efforts are reinforced at home and school. This collaboration leads to a more holistic approach to education, addressing academic challenges promptly and effectively, thereby significantly enhancing the learner's academic achievement and overall well-being.

5. Findings

Based on the gathered data, the following are the study findings.

The parent-respondents' profile shows that most respondents are female, 35-44 years old, high school graduates, have 1-2 and 3-4 children, and have a combined family monthly income of 10,000 and below. Additionally, their perception of the level of mastery of LSENs in early childhood development is Near Mastery. On the other hand, the teacher-respondents' profile reveals that most of the respondents were females. In terms of age, they belonged to the 45-56 age bracket. Most are pursuing their master's degrees and have taught for over 16 years. Results showed they are Knowledgeable regarding their mastery of technological pedagogical knowledge for LSENs. Furthermore, their perception of the level of mastery of LSENs in early childhood development is Near Mastery. Finally, the test of hypothesis showed no significant difference between the parents' and teachers' perceptions of LSENs' mastery level in early childhood development.

6. Conclusion and Recommendation

Based on the findings and after a careful analysis and interpretation of the study, it is evident that there is a crucial need to enhance teachers' technological pedagogical knowledge of learners with special needs. Based on the study's results, teachers and parents perceived the reading skills as the least mastered among the 25 indicators assessed. This finding emphasizes the importance of prioritizing interventions and professional development opportunities to improve teachers' instructional strategies and support for LSENs in reading. Additionally, the results show no significant difference between the perception of teachers and parents regarding the mastery level of LESENs in early childhood development. This alignment highlights the potential for collaborative efforts between educators and parents in addressing the developmental needs of LSENs, fostering a holistic and inclusive approach to education. Moving forward, these research insights can catalyze targeted interventions and collaborative initiatives to enhance pedagogical practices and foster optimal learning outcomes for LSENs in their learning childhood years.

7. Study Limitation and Future Research

This study was confined to SPED teachers and parents from selected centers in Cebu City and Talisay City Division, which may limit the generalizability of the findings to other regions or educational contexts. Variability in access to technology and resources across schools might have influenced perceptions of technological knowledge. Future research could expand to other regions or provinces for comparative analysis and include longitudinal studies to track trends.

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