

## Everyone's Channel: Investigating the Potentials and Need for Modified Mathematics Video for Learners with Special Needs

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**Abstract.** The study investigated the potentials and needs for modified Mathematics video for learners with special needs at Big Steps Center for Special Education and Child Development Inc. Using purposive sampling, the study involved 20 respondents comprising both teachers and parents of learners with special needs. Data were collected through a researcher-developed questionnaire, supported by intensive research and brainstorming, and analyzed using frequency, percentage, weighted mean, and Spearman's rho correlation coefficient. Additionally, qualitative interviews with parents and teachers were conducted to gain deeper insights into their perspectives. The findings revealed that most teachers were young females in the early stages of their careers, while most parents were middle-aged females with a relatively high household income. Teachers and parents strongly agreed on the presence of cognitive, communication, sensory and emotional support in mathematics instruction, though gaps were noted in the use of assistive devices and specialized software. Instructional videos were found to be only slightly engaging, and their overall quality was rated poorly, highlighting the need for improvements in visual clarity, audio quality, content organization, and length. Notably, there was no significant relationship between the features of instructional videos and the positive opportunities perceived for learners with special needs. These findings suggest a need for a more effective framework for designing and utilizing instructional videos tailored to this learner population.

**Keywords:** Assistive Technology; Instructional Videos; Mathematics Instruction; Mixed-Methods Research; Special Needs Education

### 1 Introduction

All human beings are born equal and possess equal rights, including the right to education (Eskelson, 2019). Equality in education emphasizes that every individual, regardless of gender, physical abilities, health conditions, or other distinguishing factors, deserves dignity and access to quality learning opportunities (Contreras et al., 2020). Within this context, learning disabilities (LD) are recognized as a significant barrier to educational equity. These disabilities include dyslexia, dysgraphia, and other specific learning difficulties (LDA, 2021; Garnett, 2021). A learning disability is a lifelong challenge rather than a condition that can be cured (Bicer, 2021).

Children with learning disabilities often struggle with mathematics, a difficulty commonly referred to as mathematical learning disability (MLD). Despite the prevalence of MLD, educational interventions are often centered on reading difficulties, leaving mathematical challenges insufficiently addressed (LDA, 2021; Kemp, Aubrey, & Vidakovic,

2021). Research indicates that only a few children diagnosed with LD receive comprehensive evaluations and interventions for Mathematics (Garnett, 2021; Skoumios & Skoumpourdi, 2021; Susanto, Hobri, & Nugrahaningsih, 2021). Studies using methods such as latent class growth analysis and computer-based diagnostic tools highlight that MLD affects approximately 6–10% of children, with deficits often linked to challenges in connecting symbolic and non-symbolic number representations (Cai et al., 2013; Bartelet et al., 2014).

Several factors further influence students' mathematical achievement. While gender differences are not significant predictors, socioeconomic status, prior educational background, and reading comprehension skills strongly affect learning outcomes (Salihu et al., 2018; Skoumios & Skoumpourdi, 2021; Lee & Lee, 2020). Cognitive memory impairments are also reported to hinder 5–8% of learners from fully grasping mathematical concepts (Geary, 2020).

To address these challenges, video modeling and video-based instruction have emerged as promising approaches. According to Bandura's social cognitive theory (1986, 1997), observational learning is more effective when learners watch others perform tasks through video, as this enhances self-efficacy and skill acquisition. Empirical evidence supports this: for instance, Yakubova et al. (2022) demonstrate that video-based mathematics instruction significantly improves the skills of children with autism, with positive effects on addition, subtraction, and number comparison.

Despite these advances, gaps remain in the development and use of instructional mathematics videos for learners with special needs. Existing videos are often rated poorly in terms of visual clarity, audio quality, content organization, and engagement. Furthermore, assistive technologies and specialized software are underutilized in supporting learners with disabilities, limiting opportunities for inclusive education.

Given these gaps, this study investigates the potential and need for modified mathematics videos tailored for learners with special needs at Big Steps Center for Special Education and Child Development Inc. Specifically, it aims to:

1. Examine teachers' and parents' perspectives on the features and limitations of current mathematics instructional videos.
2. Identify the specific needs and opportunities for enhancing video-based instruction for learners with special needs.
3. Develop a framework for designing accessible, engaging, and effective mathematics video lessons that align with the principles of Universal Design for Learning.

Through this study, the researchers seek to provide practical strategies and evidence-based guidelines to support educators, content creators, and schools in delivering more inclusive mathematics education.

## 2 Methodology

## ***2.1 Research Design***

This study employed a mixed-methods approach using an explanatory sequential design. According to Creswell and Plano Clark (2018), mixed-methods research combines quantitative and qualitative approaches within a single study to provide a more comprehensive understanding of a research problem. In this study, the researchers first administered a quantitative survey to special education teachers and parents of learners with special needs. The survey gathered data on demographic profiles, positive opportunities, support systems, and features of instructional videos. These findings were then followed by qualitative interviews with a purposive subsample of teachers and parents to explore in greater depth the challenges and perspectives related to mathematics instructional videos for learners with special needs.

## ***2.2 Research Locale***

The study was conducted at **Big Steps Center for Special Education and Child Development Inc.**, located at Kapitán Pepe Subdivision, Cabanatuan City. This institution provided an appropriate setting for the study because it is dedicated to the education and development of learners with special needs. The school's specialized programs and resources supported an in-depth exploration of the cognitive, communication, and sensory requirements of this learner population.

## ***2.3 Participants and Sampling Technique***

The participants consisted of special education teachers and parents of children with special needs. For the quantitative phase, 10 special education teachers and 10 parents were purposively selected. For the qualitative phase, 5 teachers and 5 parents were drawn from the same group to participate in interviews. Purposive sampling was employed to ensure that participants possessed specific characteristics, such as teaching mathematics to learners with special needs (for teachers) or raising a child with special needs (for parents).

## ***2.4 Research Instruments***

Two instruments were used in this study: a researcher-developed survey questionnaire and a semi-structured interview guide.

The survey questionnaire was designed to address the following specific objectives (SOPs):

1. To determine the demographic profile of parents and teachers.
2. To assess positive opportunities and support systems available to learners with special needs in understanding mathematics, including cognitive, communication, sensory, emotional, and psychological supports, availability of tailored resources, and connections to real-world applications.
3. To evaluate the features of instructional videos used by teachers in terms of engagement and quality.

The questionnaire employed a four-point modified Likert scale ranging from 1 (Strongly Disagree) to 4 (Strongly Agree). To ensure validity, the instrument was reviewed by experts in special education and instructional design. Revisions were made based on their recommendations to improve clarity and alignment with the research objectives.

For the qualitative phase, a semi-structured interview guide was developed to elicit participants' perspectives on the effectiveness and potential improvements of mathematics instructional videos for learners with special needs.

### ***Research Procedures***

The research process followed six phases:

1. **Preparation:** The researchers sought approval to conduct the study and obtained informed consent from all participants.
2. **Instrument Validation:** The survey and interview guide were reviewed and revised by experts.
3. **Quantitative Data Collection:** The survey was administered to 10 teachers and 10 parents of learners with special needs.
4. **Quantitative Data Analysis:** Descriptive and inferential statistics were applied to the survey data.
5. **Qualitative Data Collection:** A purposive subsample of 5 teachers and 5 parents participated in interviews to elaborate on the quantitative results.
6. **Integration:** Findings from both phases were triangulated to develop conclusions and recommendations.

### ***Statistical Analysis of Data***

The following statistical tools were used to analyze the data:

1. **Frequency and percentage** were computed to describe the demographic characteristics of participants.
2. **Weighted mean** was calculated to determine teachers' and parents' ratings of opportunities, support systems, and video features. Interpretation was based on the following scale: 4.21–5.00 = Strongly Agree, 3.41–4.20 = Agree, 2.61–3.40 = Slightly Agree, 1.81–2.60 = Disagree, 1.00–1.80 = Strongly Disagree
3. **Spearman's rho correlation coefficient** ( $\rho$ ) was used to examine the relationship between opportunities for learners and the features of instructional videos. This nonparametric test measured the strength and direction of associations between the two variables.
4. **Thematic analysis** was conducted for the qualitative data. Interview transcripts were coded, and recurring themes were identified to capture participants' perspectives on the effectiveness and potential improvement of instructional videos.

### ***Ethical Considerations***

The study adhered to the ethical principles of respect for persons, beneficence, non-maleficence, and justice. Prior to data collection, informed consent was obtained from all participants, who were fully briefed on the purpose, procedures, potential risks, and benefits of the study. Participants were assured of their right to withdraw at any time without penalty.

Confidentiality was strictly maintained by removing personal identifiers and coding responses. Data were securely stored and accessible only to the researchers. The study complied with the **Data Privacy Act of 2012 (Republic Act No. 10173)** of the Philippines. Fair treatment of participants was ensured regardless of background, and diverse perspectives from both teachers and parents were represented. The researchers upheld transparency, accountability, and integrity by ensuring that findings were reported honestly and without manipulation.

### 3 Results

#### 3.1 Profile of the Teachers and Parents

Based on the results of the study, the frequency of the respondents' age from 20 to 29 years old is 5 or 50%, while the frequency of the respondents' age from 30 to 39 years old is 5 or 50%. The remaining age from 40-24 years old, 50-59 years old and 60 years and above had a is 0 or 0%. This indicates that most of the respondents' age is from 20 to 29 and 30-39 years old.

Based on data from the National Center for Education Statistics (2017), the largest percentage of special education teachers in public schools (56.0%) were in the 30-49 years old age category. While a significant portion (15.2%) were younger than 30, this data indicates that over half of special education teachers fall within the 30-49 age range.

Based on results, it suggests that the respondents in this study are mostly early to mid-career professionals highlighting a youthful special education workforce in the chosen setting.

The frequency of the parents of students with special need's age from 18 to 25 years old is 1 or 10% while the frequency of the respondents' age from 26 to 35 years old is 0 or 0%. In addition, the frequency of the respondents' age from 36 to 45 years old is 5 or 50% and the frequency of the respondents' age from 46 to 55 years old is 1 or 10%. Lastly, the frequency of the respondents' age from 56 years old and above is 3 or 30%. Therefore, it shows that most of the respondents' age is from 36-45 years old.

Research by Abdullah et al. (2020) family support and its relation to the personal hygiene of children with special needs, noting that most parent respondents were between 35-55 years old, suggesting a common age range for parents of these children. Therefore, the sample aligns with existing research indicating that parents of children with special needs often fall within the mid-to-older adult age range.

The findings suggest that parents of children with special needs are often in the mid-to-older adult age range, which may be indicative of the age at which individuals typically start or expand their families, particularly when raising children with specific learning requirements.

Furthermore, all of the teacher respondents are female, representing 100% of the total sample. There were no male respondents, indicating a complete absence of male representation. This result suggests that the teaching workforce for learners with special needs in the selected setting is entirely composed of female educators.

According to Domenico and López (2022), the lack of male teachers in special education is not only due to societal expectations but also stems from professional stereotypes that label caregiving roles as more appropriate for women. This results in a persistent gender divide within the educational workforce, particularly in roles that involve high emotional labor.

The findings suggest that the insights and perspectives gathered in this study are shaped entirely by female respondents, which may be indicative of the broader gender dynamics present in the context of special education service provision.

Also, all respondents identified as female, accounting for 100% of the sample while no male respondents were recorded. This indicates that the participants in this study are exclusively female, highlighting a lack of male representation among parents of learners with special needs in the selected context.

According to Daniel and Wang (2023) gender differences in special educational needs identification while focused on the students, implicitly acknowledges the significant role of parents in the process, often led by mothers. Therefore, the finding of an all-female respondent group aligns with the noted tendency for mothers.

The findings underscore the tendency for mothers to take a leading role in addressing the special education needs of their children.

Also, the frequency of respondents' highest educational attainment from bachelor's degree is 9 or 90%, while the frequency of respondents' highest educational attainment from master's degree is 1 or 10% and there is no respondent from doctorate degree. Therefore, it shows that most of the respondents' highest educational attainment is from bachelor's degree.

According to the National Center for Education Statistics (NCES) data from 2020-2021, a significant majority, approximately 93.6% of special education teachers in public schools hold a bachelor's degree as their highest educational attainment.

This suggests that a bachelor's degree is the predominant educational requirement for special education teachers, which may impact both the types of training they receive and the methods they employ in teaching students with special needs.

Lastly, half of the respondents (50%) have 1 to 5 years of teaching experience, while 40% have less than 1 year of experience. Only 10% have 6 to 10 years of experience, and none have been teaching for more than 10 years. This indicates that the majority of respondents are relatively new to the teaching profession, with most having 5 years or less of experience working with learners with special needs.

Research by Alliance for Education (2004) that 50% leave the field within their first five years. This suggests that a large percentage of special education professionals are likely within the 1-5 year range of teaching experience. Therefore, the sample appears to be heavily composed of teachers in the initial phases of their careers.

This finding aligns with the current data, which suggests that a significant portion of the special education teachers in the sample are relatively new to the profession. The predominance of respondents in the early stages of their careers may indicate that the

insights gathered are reflective of newer educators who may be navigating the challenges and opportunities specific to the initial phases of teaching students with special needs.

### 3.2 Teachers and Parents' Responses on positive opportunities and support systems available to learners with special needs in understanding mathematics

**Table 1.** Cognitive Support given by the Teachers

Cognitive Support Statement	Mean	Verbal Description
1. The learners are given lessons that match their thinking and learning needs.	4.70	Strongly Agree
2. The learners understanding are checked regularly to adjust teaching strategy.	4.80	Strongly Agree
3. Math lessons use fun and interactive activities to boost learning.	4.80	Strongly Agree
4. The learners are supported with step by step guidance.	5.00	Strongly Agree
5. Extra mathematics exercises/ activities are given to help the learners improve his/her mathematics skills.	4.70	Strongly Agree
<b>Overall Mean</b>	<b>4.80</b>	<b>Strongly Agree</b>

As shown in the Table 1, positive opportunities and support systems available to learners with special needs in understanding mathematics when it comes to Cognitive Support, the Overall Mean is 4.80 with a verbal interpretation as "Strongly Agree". Therefore, the respondents are Strongly Agree when it come the cognitive support as the positive opportunities for the learners with special needs. Item 4 got the highest mean of 5.00 with verbal interpretation of "Strongly Agree" this implies that the respondent learners are supported with step by step guidance. Items 1 and 5 received the lowest, though still high, mean of 4.70. These scores suggest that lessons are appropriately tailored to match students' thinking and learning needs and that extra mathematics exercises or activities are provided to further improve their skills.

Research by Swanson et al. (2016) that effectiveness of strategies that provide explicit and systematic instruction, breaking down complex problems into smaller, manageable steps aligning with the "step-by-step guidance". Similarly, research by Fuchs et al. (2018) emphasized the importance of adapting instruction to match students' individual cognitive profiles and learning needs, directly supporting the finding that learners benefit from lessons tailored to their thinking styles.

This high level of agreement across all items emphasizes the strong cognitive support structure in place. In particular, at BIS Steps School, teachers are known to be hands-on and deeply involved in each learner's progress. Their proactive and supportive teaching methods help ensure that students not only learn effectively but also enjoy their mathematics classes. The use of fun, interactive activities and the consistent adjustment of teaching strategies based on student understanding foster a positive and engaging learning environment where students are both motivated and supported.

**Table 2.** Cognitive Support given by the Parents/Guardian

Statements	Mean	Verbal Description	
1. My child is given lessons that match their thinking and learning needs.	4.70	Strongly	Agree
2. My child understanding is checked regularly to adjust teaching strategy.	4.60	Strongly	Agree
3. Math lessons use fun and interactive activities to boost learning.	4.60	Strongly	Agree
4. My child is supported with step by step guidance.	4.80	Strongly	Agree
5. Extra mathematics exercises/ activities are given to help my children improve his/her mathematics skills.	4.00	Agree	
<b>Overall Mean</b>	<b>4.54</b>	<b>Strongly</b>	<b>Agree</b>

As shown in Table 12, parents' perspectives on the cognitive support provided to their children in learning mathematics. The overall mean rating is 4.54, interpreted as "Strongly Agree" indicating that parents perceive a high level of cognitive support being given to learners with special needs. This suggests that the cognitive strategies applied in the classroom are effectively reaching and benefiting the students, as observed and affirmed by their parents. Item 4 received the highest mean of 4.80, reflecting strong parental recognition of the structured and scaffolded instruction that learners receive. This mirrors the teaching approach at BIS Steps School, where educators are notably hands-on and consistently guide learners through lessons in a clear sequential manner. Items 2 and 3 each with a mean of 4.60 also reinforce the effectiveness of the teaching strategies. Parents agree that their children's understanding is regularly monitored and that adjustments are made to teaching strategies when needed. This responsive and flexible teaching approach aligns with cognitive support principles that advocate for adaptive instruction based on learner progress and needs. Moreover, parents noted the use of fun and interactive math activities which supports the idea that the learning environment is not only instructional but also engaging making it easier for learners to absorb and retain mathematical concepts. Item 1 also received a high rating of 4.70 confirming that lessons are well-matched to the individual thinking and learning styles of the students.

This shows that differentiated instruction is in place, allowing learners with different cognitive profiles to access the curriculum meaningfully. While all statements received positive responses, Item 5 received the lowest rating of 4.00 interpreted as "Agree". Although this still reflects a generally positive view, it suggests that parents see room for improvement in the provision of supplementary activities. This highlights the need to reinforce practice opportunities beyond the main lessons.

As supported by Kauffman and Badar (2016), consistent and targeted practice plays a vital role in building and reinforcing mathematical skills, especially for students with learning challenges.

**Table 3.** Communication Support given by the Teachers

Statements	Mean	Verbal Description	
1. The teacher explains Mathematics in simple and easy to understand the language.	5.00	Strongly	Agree
2. The teacher uses pictures or diagrams to help the learner understand.	4.90	Strongly	Agree
3. The learners can use other ways to communicate if needed.	4.80	Strongly	Agree
4. The learners can ask questions and clear up confusion regularly.	4.70	Strongly	Agree
5. The teacher keeps in touch with me to discuss the learning needs.	4.80	Strongly	Agree
<b>Overall Mean</b>	<b>4.84</b>	<b>Strongly</b>	<b>Agree</b>

As shown in the Table 3, presents the communication support provided by teachers to learners with special needs in mathematics, the Overall Mean is 4.84 with a verbal interpretation of “Strongly Agree” indicating that respondents highly acknowledge the presence of effective communication strategies between teachers, learners, and parents. Item 1 got the highest mean of 5.00 with a verbal interpretation of “Strongly Agree” suggesting that teachers consistently explain mathematics in simple and easy-to-understand language. This reflects the teachers’ ability to simplify complex concepts to better suit the learners’ comprehension levels and Item 2 obtained a mean of 4.90, also interpreted as “Strongly Agree”, reflecting the effective use of visual aids to support learners’ understanding of abstract concepts. Item 3 had a mean of 4.80, with a verbal interpretation of “Strongly Agree”, suggesting that students are provided with flexible communication methods tailored to their individual needs. Item 5 likewise received a mean of 4.80, interpreted as “Strongly Agree”, emphasizing the teachers’ initiative to maintain regular communication with parents to update them on their child’s academic status and specific learning needs. Item 4 had the lowest mean of 4.70, though still interpreted as “Strongly Agree” indicating that students are generally given the opportunity to clarify doubts and engage in two way communication during lessons.

According to Jimenez et al. (2017), the use of simplified language and clear explanations is vital in improving comprehension for learners with special needs, aligning with the highest-rated item in the table. Additionally, Browder et al. (2019) emphasized the importance of creating an environment where students feel safe to ask questions and express confusion, supporting the findings related to learner-teacher interaction and inquiry.

This data affirms that at Big Steps School, teachers go beyond classroom instruction. They are hands on not only in teaching but also in building strong relationships with both learners and their families. Teachers regularly speak with parents after class to discuss progress, challenges, and how support can be reinforced at home ensuring that communication remains active, consistent, and student- centered.

**Table 4.** Communication Support given by the Parents/Guardian

Statements	Mean	Verbal Description
1. The teacher explains Mathematics in simple and easy to understand the language.	4.80	Strongly Agree
2. The teacher uses pictures or diagrams to help my child understand.	4.80	Strongly Agree
3. My child can use other ways to communicate if needed.	4.50	Strongly Agree
4. My child can ask questions and clear up confusion regularly.	3.70	Agree
5. The teacher keeps in touch with me to discuss my child learning needs.	4.60	Strongly Agree
<b>Overall Mean</b>	<b>4.48</b>	<b>Strongly Agree</b>

As shown in Table 4, reflects the parents' perception of the communication support provided by teachers to learners with special needs in mathematics. The overall mean score is 4.48 interpreted as "Strongly Agree", suggesting that parents perceive communication practices between teachers and students to be generally effective and supportive. The highest-rated items are Item 1 and Item 2, both with a mean score of 4.80 and a verbal interpretation of "Strongly Agree" indicates that parents observe teachers making strong efforts to simplify mathematical instruction and reinforce it through visual representations strategies essential for supporting the diverse learning needs of students with disabilities. Item 5 with a mean of 4.60 and a verbal interpretation of "Strongly Agree" shows that teachers are maintaining regular communication with parents to discuss their child's learning progress. This reflects the ongoing collaborative relationship between home and school especially evident at Big Steps School, where teachers are known to be hands-on and consistently update parents after class, ensuring a unified approach to student development. Item 3, which received a mean of 4.50 and a verbal interpretation of "Strongly Agree", suggests that learners are encouraged to use alternative modes of communication when needed—an inclusive practice that allows students with varying communication abilities to participate meaningfully in class. In contrast, Item 4 received the lowest score of 3.70, verbally interpreted as "Agree". While this still reflects a positive perception, it also highlights a potential area for improvement. It may imply that students are not always fully confident or given enough opportunities to seek clarification suggesting the need to further foster a classroom environment where open questioning is consistently encouraged.

These findings are supported by Carnine et al. (2016), who emphasized the effectiveness of using clear, simplified language and visual aids to support mathematical learning for students with disabilities. Additionally, Browder et al. (2019) stressed the importance of promoting an environment in which learners feel safe and supported in asking questions—an essential aspect of communication support that aligns with the lowest-rated item in the table.

**Table 5.** Sensory Support given by the Teachers

Statements	Mean	Verbal Description
1. The classroom helps the learners stay focused with fewer distractions.	5.00	Strongly Agree
2. Hands-on available materials are for learners to use.	4.80	Strongly Agree
3. The teacher adjusts lights or noise to make my child more comfortable.	4.40	Strongly Agree
4. The learners can use assistive devices (e.g., noise-cancelling headphones) as needed.	4.00	Agree
5. There is a quiet space available to help the learners relax and focus.	4.60	Strongly Agree
<b>Overall Mean</b>	<b>4.56</b>	<b>Strongly Agree</b>

As shown in the Table 5, the positive opportunities and support systems available to learners with special needs in understanding mathematics when it comes to Sensory Support, the Overall Mean is 4.56 with a verbal interpretation of “Strongly Agree” indicates parents perceive the classroom setting and sensory strategies used by the teachers to be supportive and appropriate for their children’s needs. Item 1 received the highest mean of 5.00 with a verbal interpretation of “Strongly Agree” highlighting that the classroom is effective in minimizing distractions helping learners stay focused. This reflects the structured yet flexible physical environment of Big Steps School which is designed to promote attention and calmness through its face-to-face setup. The school does not rely on devices like earphones or high-tech sensory tools; rather, it fosters a welcoming and sensory-considerate environment through natural classroom adjustments and a focus on interpersonal connection. Item 2 with a mean of 4.80 00 with a verbal interpretation of “Strongly Agree” indicates that hands-on materials are readily available aligning with Big Steps School’s practical and engaging approach where learners are given tactile experiences to reinforce understanding. Item 5 rated 4.60 with a verbal interpretation of “Strongly Agree”, further confirms the availability of quiet spaces that help students relax and refocus when needed, showing that the school is attentive to students emotional and sensory regulation. Item 3 received a mean of 4.40 00 with a verbal interpretation of “Strongly Agree” demonstrating that environmental modifications are applied as needed even in the absence of specialized equipment. This showcases the teachers’ hands- on and responsive approach adjusting classroom elements based on student comfort levels in real time. Item 4 with the lowest mean of 4.00 and a verbal interpretation of “Agree” pertains to the use of assistive devices like noise cancelling headphones. While these devices are recognized as helpful, the slightly lower rating reflects the non- reliance on such tools at Big Steps as the school’s face-to-face learning environment and sensory conscious practices often make them unnecessary. Instead, the school builds comfort and focus through structured interaction, visual cues, and a safe, inclusive atmosphere where learners feel at ease without needing additional sensory devices.

These findings are consistent with Nasir et al. (2018), who emphasized the value of structured, low-distraction classrooms in reducing sensory overload and improving focus—closely mirroring the highest-rated item. Additionally, Dockrell and Shield (2017) underscored the benefits of assistive technologies like noise-canceling headphones, which supports the responses related to Item 4. While Big Steps School may not commonly use such devices, the results show that its natural, well-managed environment offers comparable sensory support.

**Table 6.** Sensory Support given by the Parents/Guardian

Statements	Mean	Verbal Description
1. The classroom helps my child stay focused with fewer distractions.	4.50	Strongly Agree
2. Hands-on materials are available for my child to use.	4.70	Strongly Agree
3. The teacher adjusts lights or noise to make my child more comfortable.	4.80	Strongly Agree
4. My child can use assistive devices (e.g., noise-canceling headphones) as needed.	3.10	Slightly Agree
5. There is a quiet space available to help my child relax and focus.	4.40	Strongly Agree
<b>Overall Mean</b>	<b>4.30</b>	<b>Strongly Agree</b>

As shown in Table 6, presents the perceptions of parents/guardians regarding the sensory support provided to their children with special needs in mathematics. The overall mean of 4.30 with a verbal interpretation of “Strongly Agree” indicating that parents generally believe the school environment is effective in addressing their children's sensory needs during learning. Item 3 received the highest mean of 4.80 with a verbal interpretation of “Strongly Agree” suggesting that teachers are highly responsive in modifying the classroom environment to promote student comfort and focus. This reflects a thoughtful, individualized approach consistent with inclusive practices observed at Big Steps School where educators actively adjust sensory conditions based on each learner’s needs, without necessarily relying on high-tech interventions. Item 2 with a mean of 4.70 with a verbal interpretation of “Strongly Agree” highlights the availability of hands-on learning materials, a signature aspect of the school’s tactile and interactive instructional strategies. This supports student engagement through multi-sensory experiences especially in mathematics education for special needs learners. Similarly, Item 1 has 4.50 with a verbal interpretation of “Strongly Agree” indicating that the learning spaces at Big Steps are structured and calm environment where students are less likely to experience sensory overload. Item 5 received a mean of 4.40 with a verbal interpretation of “Strongly Agree”, showing that the school ensures access to calming spaces where learners can self-regulate, refocus and reduce sensory stress—further supporting the inclusive and mindful design of the learning environment. In contrast, Item 4 received the lowest mean score of 3.10 with a verbal interpretation of “Slightly Agree”. This suggests that while assistive sensory devices such as noise-canceling headphones may be recognized as helpful, their availability or usage may be limited. This aligns with the nature of Big Steps School which emphasizes a face-to-face, welcoming, and naturally sensory-friendly environment over the use of specialized devices.

Instead of relying heavily on tools like earphones, the school fosters comfort and focus through proactive teacher strategies, environmental design, and consistent emotional support.

These findings are supported by Ashburner et al. (2019), who emphasize the value of environmental adjustments—like light and noise regulation—in improving comfort and focus among students with sensory processing challenges. Furthermore, Schaaf et al. (2015) noted that individualized sensory tools can enhance learning outcomes, but their effectiveness depends on consistent implementation and the context in which they are used.

**Table 7.** Availability of Tailored Resources given by the Teachers

Statements	Mean	Verbal Description
1. The learners have learning materials that match their needs.	4.70	Strongly Agree
2. There are special tools or technologies available to help the learner.	4.10	Agree
3. Math materials are adjusted to fit the learners learning level.	4.50	Strongly Agree
4. The learners can use special software to practice Mathematics.	3.90	Agree
5. Learning materials are reviewed and updated regularly to meet the learner needs.	4.20	Strongly Agree
<b>Overall Mean</b>	<b>4.28</b>	<b>Strongly Agree</b>

As shown in the Table 7, the availability of tailored resources to support learners with special needs in understanding mathematics received an overall mean of 4.28 with a verbal interpretation of “Strongly Agree”. This suggests that parents/guardians perceive that the school provides individualized and appropriate materials to meet their children's learning needs. Item 1 got the highest mean of 4.70 with a verbal interpretation of “Strongly Agree” indicating that learners are consistently provided with learning materials that match their specific learning profiles. Similarly, Item 3 and Item 5 has mean 4.20-4.50 were also received a verbal interpretation of “Strongly Agree” which implies that math materials are appropriately adjusted to learners’ developmental levels and are updated when necessary. However, Item 4 received the lowest mean of 3.90, verbally interpreted as “Agree”. This reflects a key limitation in Big Steps School’s current instructional setup, which operates solely through face-to-face learning and does not utilize educational software or digital tools for mathematics instruction. Instead, teachers rely on physical, hands-on learning materials such as colored shapes, popsicle sticks, flashcards and counting blocks especially for teaching foundational concepts like counting, recognizing numbers, and basic operations.

This finding aligns with Desimone et al. (2016), who emphasized the importance of designing materials tailored to individual learning needs, especially in inclusive environments. Furthermore, Zhang et al. (2018) explored the role of specialized software in delivering differentiated mathematics instruction and practice, noting its potential to strengthen engagement and retention for students with disabilities.

In conclusion, Big Steps School excels in delivering hands-on, tailored materials in a face-to-face setting, effectively meeting the foundational learning needs of its students. However, the lack of software or technology-based learning tools presents an area for growth. Incorporating even simple digital resources or assistive technologies could enrich the current instructional model, enhance individualization, and offer additional practice opportunities for learners who respond well to visual or interactive stimuli.

**Table 8.** Availability of Tailored Resources given by the Parents/Guardian

Statements	Mean	Verbal Description
1. My child has learning materials that match their needs.	4.20	Agree
2. There are special tools or technologies available to help my child.	2.50	Disagree
3. Math materials are adjusted to fit my child's learning level.	3.90	Agree
4. My child can use special software to practice Mathematics.	3.10	Slightly Agree
5. Learning materials are reviewed and updated regularly to meet my child's needs.	4.50	Strongly Agree
<b>Overall Mean</b>	<b>3.64</b>	<b>Agree</b>

As shown in the Table 8, the availability of tailored resources provided by parents to support learners with special needs in mathematics received an overall mean of 3.64 which falls under the verbal interpretation "Agree." This indicates that parents believe they are able to provide moderately appropriate learning materials for their children but there are noticeable gaps in access to more specialized or technology based resources. Item 5 got the highest mean of 4.50 with a verbal interpretation of "Strongly Agree" suggesting that many parents actively review and update learning materials at home to match their child's evolving needs. In contrast, Item 2 received the lowest mean of 2.50 with a verbal interpretation of "Disagree" reflecting a significant gap in access to educational technologies and assistive tools at home. Similarly, Item 4 received 3.10 with a verbal interpretation of "Slightly Agree" indicating minimal or inconsistent use of math-related digital programs.

According to Campado et al. (2023) highlights the importance of integrating assistive technologies to better support learners with special educational needs, particularly in mathematics. Additionally, Baog et al. (2024) stress the value of continuously updating and differentiating instructional materials which supports the finding that many parents do make an effort to adapt materials regularly. However, the lack of software and technological tools presents a missed opportunity for more individualized and engaging practice.

These findings align with the current instructional setting of Big Steps School where face-to-face learning is prioritized and digital software is not integrated into the curriculum. Both teachers and parents primarily utilize tangible learning materials such as counting objects, popsicle sticks, flashcards, and physical math manipulative to support foundational skills

like counting, recognizing shapes, and basic operations. As a result, parents mirror this approach at home often lacking access to or familiarity with digital educational tools or software that could reinforce learning. Encouraging school-led initiatives such as parent training workshops, community-based lending programs for educational tech, or simple digital tool recommendations may help bridge the gap and empower families to provide more holistic and varied support for their children's mathematics learning.

**Table 9.** Connection to real world applications given by the Teachers

Statements	Mean	Verbal Description
1. Math lessons include real-life activities.	4.70	Strongly Agree
2. The learners are encouraged to solve real world problems using mathematics.	4.20	Agree
3. Teachers use everyday objects to explain math concepts.	4.80	Strongly Agree
4. There are field trips or projects that show the relevance of mathematics in daily life.	3.80	Agree
5. The learners learns how math is used in different jobs and career.	4.30	Strongly Agree
<b>Overall Mean</b>	4.36	Strongly Agree

As shown in the Table 21, the support given by teachers in connecting mathematics to real-world applications for learners with special needs the support given by teachers in connecting mathematics to real-world applications for learners with special needs, the Overall Mean is 4.36 with a verbal interpretation of "Strongly Agree" suggests that respondents believe teachers make considerable efforts to relate mathematical concepts to everyday life experiences. This suggests that respondents believe teachers make considerable efforts to relate mathematical concepts to everyday life experiences. Item 3 got the highest mean of 4.80 with a verbal interpretation of "Strongly Agree" indicating that teachers effectively use everyday objects to demonstrate math concepts like using coins for counting, clocks for telling time, or fruits for simple addition and subtraction. This approach allows learners at Big Steps School who are still mastering foundational math skills, to grasp abstract concepts through concrete, familiar materials. On the other hand, Item 4 which refers to field trips or projects showing the relevance of math received the lowest mean of 3.80 with a verbal interpretation of "Agree". This reflects the current structure of Big Steps, where classes are half-day and face-to-face focused, leaving little room for extracurricular activities such as field trips or long-term math projects. As such, real-world application tends to occur within the classroom rather than through off-campus or project-based learning experiences. Similarly, while Item 5 on career connections has a mean of 4.30 with a verbal interpretation of "Strongly Agree", the instructional emphasis is on the present developmental needs of the child rather than career readiness. Students are primarily focused on learning basic mathematical skills such as counting, sorting, and recognizing shapes and numbers. However, teachers creatively introduce real-life contexts—such as singing number songs, role-playing with play money, or using analog clocks to help learners

understand how math is used in day-to-day life, even if broader career discussions are not emphasized.

According to Research by Bottge et al. (2015) affirms the effectiveness of using contextualized problem-solving and hands-on objects to make abstract math more meaningful. Hughes et al. (2019) also support the use of real-world and project-based learning, though these are limited in practice at Big Steps due to time constraints. Meanwhile, Krawec et al. (2018) emphasize the motivational value of making math relatable and applicable, which aligns with how teachers at Big Steps embed math in routine, real-life scenarios to sustain student interest and comprehension.

The results affirm that teachers at Big Steps School effectively incorporate real-life elements into their math lessons, primarily through concrete materials, classroom-based examples, and routine activities. However, opportunities like field trips and career-oriented applications are limited by the school's half-day structure and focus on foundational skills, teachers compensate by using everyday situations—like telling time or shopping role plays to ensure that mathematics remains meaningful and relevant to learners' immediate lives. This practice supports deeper understanding and builds a bridge between academic concepts and real-world function.

**Table 10.** Connection to real world applications given by the Parents/Guardian

Statements	Mean	Verbal Interpretation
1. Math lessons include real- life activities.	4.30	Strongly Agree
2. My child is encouraged to solve real world problems using mathematics.	3.40	Slightly Agree
3. Teachers use everyday objects to explain math concepts.	4.60	Strongly Agree
4. There are field trips or projects that show the relevance of mathematics in daily life.	2.00	Disagree
5. My child learns how math is used in different jobs and career.	3.10	Slightly Agree
<b>Overall Mean</b>	<b>3.48</b>	<b>Agree</b>

As shown in the Table 22, the support for connecting mathematics to real-world applications as perceived by parents of learners with special needs resulted in an overall mean of 3.48, with a verbal interpretation of "Agree". This indicates that while parents recognize some real-life application of math in the classroom, there is still room for improvement, particularly in offering broader and more immersive experiences beyond the school environment. Item 3 got the highest mean of 4.60 with a verbal interpretation of "Strongly Agree" showing that parents observe how teachers use everyday objects—such as clocks, coins, or household items—to explain math concepts. This hands-on approach aligns well with the practical and developmental stage of students at Big Steps, who are primarily working on basic math skills like counting, sorting, and number recognition. These activities

help learners make sense of numbers in familiar, meaningful contexts. In contrast, Item 4 got the lowest mean of 2.00 with a verbal interpretation of “Disagree” which clearly reflects the current structure of Big Steps. The school operates on a limited, half-day schedule, with a curriculum focused on the present developmental needs of the learners rather than on extended enrichment activities. As such, field trips and extensive project work are not integrated into instruction and most of the learning happens through face-to-face, classroom-based routines. Similarly, Item 5 has a mean of 3.10 with verbal interpretation of “Slightly Agree” suggests that while some effort may be made to connect math to real-world professions, the immediate instructional focus at Big Steps is more foundational, emphasizing what students can apply in the present rather than future job roles. In practice, parents reported that their children experience math through songs, daily routines, and simple real-life scenarios such as learning to tell time on a clock or count change while role-playing a store activity.

The findings suggest that teachers at Big Steps successfully make math relatable through the use of familiar, everyday objects which parents clearly observe and appreciate. However, parents also highlight a gap in experiential learning noting a lack of field trips, projects or career-linked activities that could broaden their children’s understanding of how math connects to the larger world.

## 4 Discussion

The present study offers valuable insights into the current landscape of support systems for learners with special needs in mathematics education at Big Steps Center, as perceived by both teachers and parents. While highlighting significant strengths in existing practices, it also identifies crucial areas for development, particularly concerning the integration of technology and broader experiential learning opportunities.

### 4.1 Strengths in Current Support Systems

The findings consistently demonstrate a strong positive perception of the cognitive, communication, and sensory support strategies currently employed. Both teachers and parents strongly agree on the effectiveness of cognitive support, which includes tailored lessons, regular checks for understanding, interactive activities, step-by-step guidance, and extra exercises. This aligns with contemporary research emphasizing individualized and differentiated instruction for students with special needs (e.g., Flores et al., 2019; Doabler & Fien, 2017). Teachers' emphasis on personalized, engaging, and adaptive methods, coupled with parents' observation of positive impacts, underscores the importance of these foundational pedagogical approaches. The use of hands-on, face-to-face learning materials and the strong connection of math to real-life contexts using everyday objects further reinforce effective strategies for concrete learning, a critical component for many learners with disabilities (e.g., Bouck et al., 2016).

Communication support is also highly rated, with teachers employing simple language, visual aids, and flexible communication methods. Regular contact with parents to discuss student progress fosters a collaborative environment, which is widely recognized as essential for student success in special education (e.g., Epstein & Sanders, 2016). The use of

visual aids is particularly effective for learners who benefit from multi-modal instruction (e.g., Mechling, 2017).

Furthermore, the study highlights effective sensory support through structured, low-distraction classrooms, tactile materials, and environmental adjustments. These proactive teacher strategies and environmental modifications promote focus and comfort, creating an inclusive learning environment. Such practices are crucial for students with sensory processing differences or attention challenges, contributing to their ability to engage with academic content (e.g., Ainscow & Messiou, 2017).

#### *4.2 Identified Gaps and Areas for Improvement*

Despite these strengths, the study reveals significant gaps, particularly in the integration of modern educational tools and broader experiential learning. A notable deficiency is the limited integration of digital tools, assistive technologies (AT), and specialized software. While the school excels in foundational, tangible instruction, the lack of access to and utilization of AT, such as noise-canceling headphones or augmentative communication devices, represents a missed opportunity. Research consistently demonstrates the transformative potential of AT in enhancing accessibility, engagement, and individualized learning for students with disabilities (e.g., Edyburn, 2015; Alquraini, 2017; Basham et al., 2020). The absence of these tools can hinder students' ability to overcome barriers and participate fully in learning.

Another critical gap lies in experiential learning opportunities. While efforts are made to relate math to everyday life through songs and role-playing, there is a noted absence of off-campus activities like field trips and career-linked projects. Parental feedback underscores the need for broader experiential activities to enhance understanding of math's relevance to the larger world. Real-world applications and community-based instruction are vital for developing functional skills and promoting generalization of learning for students with special needs (e.g., Test et al., 2016).

The investigation into modified mathematics instructional videos also revealed areas for improvement. While cognitive, communication, sensory, and emotional supports are recognized, there are gaps in video quality, particularly concerning engagement, visual clarity, and content organization. This is crucial given the increasing role of multimedia in education. Effective instructional videos for learners with special needs require careful design based on principles that enhance accessibility and comprehension (e.g., Kagohara et al., 2019). The finding that no significant link was found between video features and perceived opportunities for learners suggests that current video offerings may not be optimally designed to leverage their full potential for learning enhancement.

Finally, while communication is strong, there is an identified area for improvement in encouraging more open questioning among students, suggesting a need to foster greater student agency and active participation in the learning process.

#### *Recommendations and Future Directions*

The study strongly emphasizes the need for a framework based on Universal Design for Learning (UDL) to create more effective, inclusive math videos and educational materials.

UDL principles – providing multiple means of representation, action and expression, and engagement – are paramount for designing instruction that is accessible and effective for all learners, including those with special needs (e.g., CAST, 2018; Rao & Meo, 2016; Novak & Rodriguez, 2018). Implementing UDL would address the identified gaps in video quality, engagement, and content organization, ensuring that digital resources truly enhance learning.

The findings advocate for the integration of assistive technologies and digital tools into daily instruction. This requires not only acquiring the technology but also providing comprehensive professional development for teachers on how to effectively use these tools to support diverse learners (e.g., Kennedy & Horn, 2019). Furthermore, expanding experiential learning opportunities through field trips and career-linked projects would significantly enhance students' understanding of mathematics' real-world relevance and foster critical life skills.

In conclusion, Big Steps Center demonstrates a commendable foundation of inclusive practices rooted in strong cognitive, communication, and sensory support. However, to truly enhance educational equity and maximize learning outcomes for students with special needs in the digital age, there is an urgent need to embrace assistive technologies, develop UDL-aligned instructional videos, and expand real-world experiential learning opportunities. This comprehensive approach will ensure that the school continues to evolve, providing a truly inclusive and empowering educational experience.

## 5 Conclusions

The findings of the study revealed important insights into the profile of teachers and parents, the opportunities and support systems available for learners with special needs, and the development of a framework for instructional videos in mathematics. The results showed that both teachers and parents were predominantly female, with teachers being relatively young and mostly holding a bachelor's degree, while parents were generally in the middle-aged group. This demographic profile reflects a workforce and parental group that are actively engaged in supporting learners with special needs, albeit with varying backgrounds and resources.

The study also highlighted the presence of positive opportunities and support systems that address learners' diverse needs, particularly in cognitive, communication, sensory, emotional, and psychological domains. While these systems were generally effective, the findings emphasized the need to strengthen access to assistive devices and counseling services, which remain crucial for ensuring holistic development and well-being of learners with special needs.

Finally, the study proposed a framework for developing instructional videos in mathematics tailored for learners with special needs. The framework underscored six key areas of support, with an emphasis on learner engagement, video quality, and inclusivity. Teacher and parent feedback confirmed that the instructional videos had a positive impact on learning, thereby validating the framework's relevance and applicability. These findings support the creation of a practical guidebook to aid educators in designing accessible,

learner-centered instructional materials that promote equity and inclusion in mathematics education.

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