

# Development of Mathematics Song Lyrics on Whole Numbers for Students With Special Needs

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## ABSTRACT

This study investigates the development and effectiveness of math song lyrics as a pedagogical tool to enhance the learning experiences of students with special needs in Class XC Tunagrahita. The research follows the Plomp development model, comprising three stages: preliminary research, prototyping, and assessment. During the preliminary research phase, observations and interviews were conducted to gather information on classroom learning processes. The prototyping phase involved creating song titles, intros, and verses tailored to the students' needs. In the assessment phase, the product was evaluated using expert validation sheets. Data collection methods included observation, interviews, and documentation. Findings indicate that the developed math song lyrics, focused on numerical material, are suitable for use in the classroom. The validation process confirmed the lyrics' appropriateness and potential to support the learning needs of students with intellectual disabilities. The study underscores the utility of integrating music into mathematics education for special needs students, providing an engaging and accessible learning medium. Math song lyrics designed through a structured development model can serve as an effective educational resource for enhancing learning outcomes among students with special needs. Further research could explore the long-term impacts of this approach and its application across different subjects and student populations.

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## 1. INTRODUCTION

Education plays a crucial role in fostering the mental and cognitive development of children (Lambert, 2018; Suyitno & Junaedi, 2020; Zhang et al., 2017). For children with special needs, particularly those with intellectual disabilities, early learning experiences can present unique challenges. Feelings of embarrassment and alienation often arise when their learning environment lacks adequate support or understanding (Bouck et al., 2021; Kivirähk & Kiive, 2024). However, intellectual

disabilities do not equate to an absence of functionality or potential; for instance, a child who uses a wheelchair has limited mobility but retains other vital abilities and values (Bouck & Long, 2023).

Cognitive differences, including learning disabilities, are significant barriers for special needs students, especially at the elementary school level. These obstacles often manifest as difficulties in reading, writing, and spelling, which can impede their academic progression (Darnanta et al., 2020; Stephan & Akyuz, 2018). Such delays require targeted interventions to support their academic and personal development. Unlike their peers, students with special needs face heightened challenges, necessitating deeper investigation into methods that can enhance their educational experiences and outcomes (Lewis et al., 2020). Understanding these differences is essential to fostering inclusive and effective education for all learners.

Children with special needs encompass not only those with disabilities but also those with exceptional intelligence and talents, both of which require specialized educational approaches (Polo-Blanco, González López, Bruno, & González-Sánchez, 2024). When students feel bored, they are not able to understand the explanation of the lesson that will be delivered by their teacher (Bennadi et al., 2020; Muchyidin et al., 2022). One of the learning media that teachers can use is song lyrics media, because basically everyone likes songs in Javanese terms, songs can also be called *tembang* (Schnepel, Sermier Dessemontet, & Moser Opitz, 2024) because songs (singing) are believed to stimulate imagination and bring out hidden things that are stored within a person so that he or she will remember something. Based on the results of observations in the XC Tunagrahita class, the learning outcomes of XC Tunagrahita class students at school X still do not meet the minimum competency standards. This is because learning is monotonous and the media used is not only uninteresting, but also not creative. This causes students to not understand and accept the material presented by the teacher, and students' concentration is not optimal during the learning process.

The American Association on Mental Retardation (AAMR) classifies the level of intelligence of the mentally retarded into 4, namely mild mentally retarded (IQ 55-70), moderate (IQ 40-54), severe (IQ 25-39), and profound (IQ 24). Mild mentally retarded is also called *debildan educable*. According to the American Association on Mental Retardation in Special Education in Ontario Schools (Purnami, Mulyoto, & Winoto, 2020; Root, Saunders, Cox, Gilley, & Clausen, 2024), *educable* means that this mentally retarded child still has the ability in academics equivalent to regular children in grade 5 of Elementary School. So that the cognitive development of mentally disabled children stops at the concrete operational stage. According to Piaget (Schnepel et al., 2024), at the concrete operational stage, children can add, subtract, change, and are able to solve problems logically. If so, the ability of a 14-year-old mild mentally disabled child will remain at the concrete operational stage at the age of 7 to 11 years.

According to Root et al. (2024), teachers must create a classroom environment that captivates students' attention and motivates their learning. This aligns with the findings of Deveci Topal, Kolburan Geçer, and Çoban Budak (2023), who highlighted that incorporating songs into mathematics learning can help students better retain mathematical concepts. Using songs as a medium adapts the material into a format that is more engaging and memorable for students. Khamidova (2021) notes that many students harbor negative perceptions of mathematics, considering it difficult, boring, or intimidating. Songs serve as an effective tool to address these challenges, as they not only make learning more enjoyable but also enhance cognitive engagement.

Hardiansyah and AR (2022) emphasized that the use of songs in learning offers multiple benefits, such as supporting brain development, fostering interest in learning, and creating a more humanistic and enjoyable educational experience. Furthermore, AR and Hardiansyah (2022) identified additional advantages, including enhancing physical sensitivity, activating gross motor skills, improving coordination, boosting self-confidence, and providing a sense of happiness and enjoyment. Thus, songs are a valuable pedagogical tool, particularly in transforming challenging subjects like mathematics into more approachable and engaging experiences for students.

In learning mathematics in the field, children with mild mental retardation experience many obstacles, one of which is in terms of counting, often not sequentially, such as from number 9 to 12, and from number 15 to 17, some are fluent from 1 to 19, but number 20 is not mentioned but returns to number 10. This shows that children with mental retardation understand the value and sequence of numbers. Arithmetic lessons are one of the important lessons for everyone, including children with mild mental retardation. For example, in everyday life, when shopping, children do calculations, adding and subtracting. Children must know how much money to give to the seller and, if it is less, how much they have to pay, if there is money left, and how much they should receive. These skills have the implications of adding and subtracting. In a more advanced setting, they also learn the addition of two or more numbers and the results of subtracting large and small numbers.

Research (Sellings, Felstead, & Goriss-Hunter, 2018) shows that learning integers for mentally disabled students can be done through concrete, representative, and symbolic approaches. The concrete approach uses natural objects that students can hold to help them understand the concept of integers directly. The representative approach is carried out through pictures or diagrams, making it easier for students to conceptualize integers. Meanwhile, the symbolic approach provides gradual practice questions that increase students' understanding of the material. In addition, according to research conducted by (Hardiansyah & Wahdian, 2023), using cooperative learning methods is also effective in improving the understanding of mentally disabled students on integer material. By working together in groups, students can help and motivate each other to understand the concept of integers. Thus, learning integers for mentally disabled students requires an approach and method appropriate to the student's needs and abilities. Teachers must guide and support students during the learning process to fully understand the material. This research has theoretical and practical benefits. From a theoretical perspective, the research will add to the knowledge in special education about mathematics learning for children with mild disabilities. In practical terms, the research will help mentally disabled students learn mathematics, which will help them count and train mentally disabled students to have a diligent soul and solve simple problems. The research will also help select learning media to improve the mathematics achievement of mentally disabled students. The study's results will also be used as a consideration for schools to enhance the quality of mathematics learning for mentally disabled students.

Departing from the description above, this research tries to develop mathematics song lyrics for students with special needs in the XC class with mental retardation using whole number material. The rationale for why this research must be carried out is because, 1). Songs are the easiest media for children to imitate, so including whole number material in songs will make it easier for children to learn, 2). Learning through songs will reduce children's learning fatigue. Therefore, the problem formulation that is formulated is How is the Process of Developing Mathematics Song Lyrics for Children with Special Needs in Class XC with the Mentally Impaired at School X.

## 2. METHODS

This study uses research and development (R&D) with the Plomp development model (Faltýnková, 2021). The Plomp development model is more general in designing development consisting of three stages, namely: a) preliminary research is a preparation stage consisting of needs analysis and curriculum analysis, literature review, development of a conceptual or theoretical framework; b) prototyping phase, combining the cycles of analysis, design and development, evaluation, and revision. c) The assessment phase is a semi-summative evaluation to conclude whether the final prototype or product is desired. The product evaluation used in this research and development uses the Tessmer Evaluation. The first stage, namely the introduction, consists of 2 activities: needs analysis and student characteristics analysis. The next stage is the prototype, which consists of the design and formative evaluation of the Tessmer model (self-evaluation, expert review, one-to-one evaluation, small group). Then, the assessment stage will consist of field test activities (Tessmer model).

Meanwhile, data analysis techniques use validity data, qualitative descriptive analysis and quantitative descriptive analysis. To obtain the validity percentage, the formula used is:

$$V = \frac{TSh}{TSe} \times 100\%$$

Information:

V = Percentage of validity

TSh = Total expected score (sum of assessment scores by validators)

TSe = Total empirical score (maximum score)

Whether or not the learning media that have been developed by researchers are valid can be compared with the validity criteria put forward by Akbar (2013) as follows:

No	Level Validity	Criteria Validity
1	$85.01\% < v \leq 100.00\%$	Very valid
2	$70.01\% < v \leq 85.00\%$	Valid
3	$50.01\% < v \leq 70.00\%$	Invalid
4	$01.00\% \leq 50.00\%$	Invalid

The success of the indicator is determined to be valid if the percentage of media validity criteria for song lyrics meets or exceeds the established measurement threshold of  $\geq 70\%$  (Hardiansyah, 2022). According to these criteria, the song lyrics related to whole number material must achieve a minimum validity score of 70% to be considered valid, and a score of 85% or higher to be classified as very valid.

### 3. FINDINGS AND DISCUSSION

#### 3.1 Description of Student Characteristics

##### 1. Subject A1

A1 is one of the students in the XC Tunagrahita class. In the academic field, A1's ability is still below A2. When working on questions given by the teacher, A1 always asks for attention. This proved that he did not want to do the next question number if he was not asked to do it. This looks like the image below.



**Figure 1.** Student A1 is being guided by the teacher

This is similar to the results of previous research that students with intellectual disabilities do not want to do their assignments, so teachers must be more firm and provide more intensive guidance so that they do not neglect their duties (Avi, 2020). In socializing, A1 is a shy child and tends to avoid meeting people he has just met. So he sits still more often than playing with his friends. This is in line with research from (Ardha, 2017) that there are some mentally retarded children who will feel anxious if they are not with the people they like or the things they like. This is visible in the following image.



**Figure 2.** Student A1 looks embarrassed when spoken to

For friendships between peers at school, there are students who don't want to be approached and there are those who like to be approached, it all depends on the student's *mood* (Desiningrum, 2016). Mentally retarded children who tend to be introverted, quiet and like to be alone are often invited by teachers to join in playing with normal children.

## 2. Subject A2

The next second subject is A2. In the academic field, A2's abilities are classified as better than those of A1 at his age. In mathematics subjects, the material that A2 has mastered is the operations of addition, subtraction, multiplication and division. It's just that the numbers used in these four operations are of course smaller, that is, the numbers used are still in the tens and hundreds. This looks like the image below.



**Figure 3.** Student A2 works on practice questions

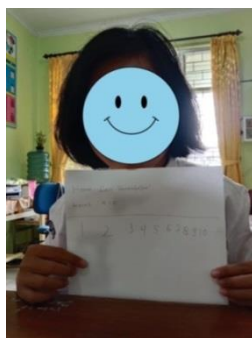
As explained by (Kurniadi, 2018), the peer tutoring learning method relies on the expertise of peers to act as tutors or guides in learning. Then the teacher only intervenes when students really need help from the teacher and motivates students to be active in learning (Wahyuni, 2018). This is visible in the following image.



**Figure 4.** Student A2 helps student A4 in solving problems

## 3. Subject A3

The subject with the initials A3 is a student who is paralyzed but whose spirit is very high. Based on the findings, it was found that student A3 was able to write numbers 1-10 well. If you look at the way students write numbers, A3 students are correct, namely from top to bottom. However, the measurements written do not match the examples given by the teacher. This is like the image below.



**Figure 5.** Results of writing numbers 1-10

This is in line with (Susilowati & Kusuma, 2019) which states that mentally retarded students can master numeracy gradually. The ability to recognize numbers is a person's ability to understand and read number symbols and be able to count the number of objects around them (Humairo & Amelia, 2020). From the results of the practice questions given by the teacher to student A3, it shows that A3 has not been able to answer questions about hundreds in the sequential division operation. As in the following image.



**Figure 6.** Student A3 performs the division operation

#### 4. Subject A4

In the academic field, A4 is not much different from A3. In learning Mathematics A4, the material includes addition, subtraction and multiplication operations up to hundreds of numbers where the process of adding, subtracting and multiplying the numbers is done with all ten fingers. This is visible in the following image.



**Figure 7.** Student A3 Counting with your fingers

The use of multiplication math is the most appropriate method for students who find it difficult to memorize multiplication when they get a problem that requires solving by calculating multiplication (Afianah, 2023). Not only that, the use of the Jarimatics method can improve multiplication calculation skills and of course student learning outcomes will increase (Mariyati & Sari, 2017). Numeracy ability is an ability that consists of numbers, numbers in the form of addition and subtraction (Raghubar & Barnes, 2016). In the social field, A4 is able to communicate with other friends. He also seemed like a regular student. A4 often hangs out with A3, who in fact is his seatmate because A3 is a disabled person, so A4 always helps push A3's wheelchair and helps A3 if he needs something. They can help each other. A4 feels motivated. This looks like the image below.



Figure 8 Student A4 helps push wheelchair A3

### 3.2 Plomp Development Results

This research and development yielded mathematics song lyrics media focused on whole number concepts, designed for kids with special needs in the classroom. This research utilizes the Plomp development model (2010), which encompasses three stages: preliminary research, development stage (prototyping phase), and assessment phase (assessment phase). The rationale for using the Plomp development model is its superior flexibility, as each phase encompasses developmental activities that can be tailored to the specific characteristics of the research (Rawa, 2016). At this juncture, preliminary study was conducted to ascertain the requirements of pupils with special needs in the XC Tunagrahita class. Data collection at this stage was conducted through interviews with the homeroom instructor and a student with intellectual disabilities from the XC class.

Interviews with the XC Tunagrahita class teacher revealed that engaging instructional media had not been utilized, resulting in pupil boredom. Secondly, educators lack the capability to develop learning materials, particularly those involving song lyrics. The media represented by song lyrics is quantitatively restricted. Fourth, educators encounter challenges in selecting engaging media for pupils in the XC Tunagrahita class due to their lack of pedagogical training, and fifth, the school's facilities are exceedingly limited. Consequently, it will undoubtedly become the focal point and inspire both educators and students in the XC Tunagrahita class by offering media featuring song lyrics developed by researchers to facilitate the continuity of teaching and learning activities.

The task performed involved synthesizing the concepts of song lyrics and tune. The initial process involves composing and constructing song lyrics that align with the subject, as well as conferring with specialists. The utilized material pertains to whole number operations and aligns with the content found in the instructional resources employed by pupils. Compose song lyrics utilizing vocabulary that is easily memorable for students. Composing the lyrics and melody of a selected song is an engaging endeavor, particularly for a piece frequently enjoyed by children. The process of composing music lyrics involves multiple steps, specifically: Generating song titles: At this stage, the researcher identifies song titles that are suitable for the educational content, namely whole numbers. Creating an Introduction: The introduction is located at the commencement of the song. This section includes song lyrics pertaining to the regulations for manipulating whole numbers succinctly. Composing Verses: The composition of verses constitutes the fundamental aspect of a song. The salient feature of this section is that the music is consistent while the lyrics vary. The initial stanza has operational components. The second stanza elucidates the components of the operational framework. The third stanza offers motivation and an invitation to explore full numbers. This is a compilation of generated song lyrics.

#### First Song Lyrics

Count Operation Rules

To the tune of the song (Reaching for the Stars)

links: <https://youtu.be/LrcMRO-G-fg?si=3yp2nSUhvt8k3bSd>

Lyrics: Elisabeth Rambu Mura

*Hey kawan-kawan semua*

Jangan malu bertanya  
 Bersama kita belajar operasi hitung campuran  
 Dimulai dari tanda kurung dikerjakan lebih dulu  
 Operasi hitung dalam tanda kurung  
 Kali bagi sama kuat hendaknya dahulukan sebelum mengerjakan  
 Penjumlahan dan pengurangan  
 Penjumlahan, pengurangan sama kuat  
 Dikerjakan kemudian dari kiri lalu ke kanan  
 Reff  
 Yo yo ayo...yo ayo Yo yo ayo...  
 Yo ayo Yo yo ayo...yo ayo Yo yo...ooo...ooo  
 Yo yo ayo...yo ayo Yo yo ayo...  
 Yo ayoyo yo ayo...itu dia aturan operasi hitung campuran

### Second Song Lyrics

Count Operations

To the tune of a song (Come on friend)

links: <https://youtu.be/IAD3SOIVEo?si=2aExEK31fXmPD8w>

Lyrics: Elisabeth Rambu Mura

Ayo teman-teman mari kita belajar  
 Operasi hitung bilangan cacah  
 Ada penjumlahan ada pengurangan  
 Perkalian dan pembagian  
 Reef  
 Ayo-ayo ingatlah kembali  
 Operasi di hitung dengan cara  
 Bersusun pendek dan bersusun Panjang

### Third Song Lyrics

Number Line

With the tune of the song (Cikini Gondangdia)

links: [https://youtu.be/RVVL3jMpadE?si=y7KC44L2\\_qR4eVUd](https://youtu.be/RVVL3jMpadE?si=y7KC44L2_qR4eVUd)

Lyrics: Elisabeth Rambu Mura

Garis Bilangan itu adalah suatu garis yang memuat  
 Bilangan berurutan semakin ke kanan nilainya semakin besar  
 Ada dua simbol membandingkan bilangan  
 Yaitu lebih dari ( $>$ ) dan kurang dari ( $<$ ) Thermometer dan penggaris  
 Itu dia contoh benda garis bilangan

### 3.3 Assessment phase

An evaluation of the developed mathematics song lyrics is conducted at this step. The song lyrics undergo initial validation by professionals. Validation was conducted by three experts: song content specialists, music professionals, and educators. Learning media is considered valid if the outcomes of the validation data analysis align with the established criteria (Maulana, 2017). The table below presents a summary of the song lyric validation results.

**Table 2.** Validator 1 Assessment Results (Song Content)

No.	Assessment Items	Score	Criteria
1	The song lyrics reflect the concept of whole numbers in the learning material or curriculum	4	Very good
2	The song lyrics are accessible and understandable to students with special needs at their level of understanding	3	Good
3	The language used in the song lyrics is appropriate to the cognitive level of students with special needs	3	Good
4	Song lyrics and musical accompaniment according to students' sensory preferences (audio, visual, multisensory)	3	Good
5	Song lyrics cover a variety of learning styles and the needs of students with special needs	3	Good
6	The song's lyrics reach and motivate students with special needs to learn mathematics	4	Very good
7	Changing the key of the arranged song is simpler	3	Good
8	Changing the music genre with a harmonious koplo version	3	Good
9	The vocal arrangement looks satisfactory	4	Very good
10	A series of notes arranged and sounded in a coherent and orderly manner	4	Very good
11	Forms of development or repetition of regular rhythms smoothly	4	Very good
12	A combination of notes and melodies with a rhythmic pattern that is harmonious and harmonious	4	Very good
Amount		42	
Average		87.5%	Very Valid

Based on the validity criteria in Table, the percentage of validator 1 (song content) is 87.5 % . This percentage is in the range  $85.01\% < v \leq 100\%$  with very valid criteria. So, it can be concluded that the validation results from the song content validator meet the very valid criteria.

**Table 3.** Validator 2 Assessment Results (Song Content)

No.	Assessment Items	Score	Criteria
1	Musical instruments support the mathematical concepts conveyed in the song lyrics	4	Very good
2	The precision of instrument selection provides variations that suit the context of the song	4	Very good
3	Match the musical accompaniment to the song lyrics	4	Very good
4	Clarity of information conveyed	3	Good
5	Use of language that is easy to understand	3	Good

6	Appropriate tone tempo	4	Very good
7	Affordable note intervals/jumps	4	Very good
8	The level of ease in singing songs	3	Good
9	Simplicity of song arrangement	3	Good
10	Recording quality	3	Good
Amount		35	
Average		87.5%	Very valid

Based on the validity criteria in Table, the percentage of validator 2 (music experts) is 87.5 %. This percentage is in the range  $85.01\% < v \leq 100\%$  with very valid criteria. So, it can be concluded that the validation results from the song content validator meet the very valid criteria.

**Table 4.** Validator 3 assessment results

No	Assessment Items	Score	Criteria
1	Language is easy for children to understand	4	Very good
2	Easy words to say	4	Very good
3	Sentence breaks/breathing pauses	3	Good
4	Conformity with the material being developed	4	Very good
5	Clarity of information conveyed	4	Very good
6	Children's interest in learning mathematics	4	Very good
7	Children's enthusiasm for learning mathematics	4	Very good
8	Children's ability to follow the lyrics of math songs	4	Very good
Amount		31	
Average		96.875%	Very valid

Based on the validity criteria in table, the percentage of validator 3 (teachers) is 96.875%. This percentage is in the range  $85.01\% < v \leq 100\%$  with very valid criteria. So, it can be concluded that the validation results from the song content validator meet the very valid criteria.

The evaluation of the songs' quality is based on their validity. The examination revealed that the generated song fell under the highly valid group. The song's validity is assessed using a validation sheet completed by three evaluators. The results indicate that the generated song falls inside the highly valid category. This is deemed standard as the song in development fulfills the stated requirements. Additionally, the lyrics and melody employed might serve as an incentive for children to engage in learning. The songs created are classified as highly valid, with a percentage of 85.01%. Multiple factors justify the inclusion of this song in the legitimate category; primarily, the words serve as an accessible learning medium for students to sing. Secondly, the language employed is lucid, and thirdly, the tune of this song is captivating and enhances the passion of students in the XC Tunarahita class for learning. The research findings indicated that students became more engaged, as seen by their heightened enthusiasm during singing activities and their improved ability to recall information regarding whole numbers. Consequently, the lyrics of the mathematics song pertain to whole numbers for students with special needs in the classroom. This song can be utilized for mathematics instruction in the XC Tunagrahita class concerning whole number concepts. The produced learning medium is anticipated to serve as a reference for supporting other researchers.

### Discussion

Motivation is a drive within a person to try to make behavioral changes that are better at meeting their needs (Hardiansyah, Armadi, Ar, & Wardi, 2024). The stronger the drive, the more optimal the effort is so that something that is targeted can be achieved, whereas if something that is desired can be achieved, a person will feel successful and satisfied (AR & Hardiansyah, 2022). Education is essential

for everyone, including children with special needs, who have the right to be educated to realize their inner potential (Malungo, 2023). Children who are successful academically and educationally are considered intelligent children. At the same time, children who experience obstacles or problems in learning are often considered children with lower IQs (Pratama et al., 2019). Part of intelligence can be reflected in IQ measurements. However, many still assume when they get a picture that children who have an IQ level below average are children who cannot do anything, such as mentally disabled children. However, these children have abilities that need to be developed despite being limited.

Education for children with special needs, such as mentally disabled children, can be obtained in inclusive educational institutions or segregative education (Widodo, Azizah, & Ikhwanudin, 2019). From this theory, it can be seen how important education is for children with special needs, such as mentally disabled children who have significant intelligence below average, resulting in an inability to adapt behavior that appears during development and has obstacles in doing academic tasks (Karimi, 2022). This is due to imperfect brain development and nerve function. During mathematics learning activities in class, the material given by the teacher is general and classical, and the material provided is not arranged individually. According to (Anjarsari, Masitoh, & Budayasa, 2019), The main characteristic of mentally disabled children is weakness in thinking or reasoning. The lack of children's ability to think and reason results in low-average learning abilities and social adaptation. By looking at the characteristics of learning in mentally disabled children, the material given should be individual and based on the student's initial abilities. Students will be slower in receiving information than regular students, and the material provided must be repeated so that students do not forget easily. Students also need intensive assistance if they need significant aid at any time. According to (Fitriya & Eliasa, 2023), in the mathematics learning approach, positive reinforcement must be given immediately for mentally disabled children to follow the correct response. This applies as extrinsic reinforcement, for example, gifts, praise, and rewards. There are two main obstacles in mathematics learning for mentally disabled children. The first is cognitive barriers.

Based on the results of observations and interviews, mentally disabled children in this class have difficulty remembering the lesson material. This is evident when they have difficulty sequencing numbers 1-10, even though the material has been studied previously. In addition, they also need help staying focused during the learning process, as they are easily distracted by the presence of researchers during observations. This situation is due to the characteristics of mentally disabled children who experience memory disorders and difficulty maintaining focus (Raouf, Alenizi, & Mahmoud, 2016). The second obstacle is emotional obstacles. Based on the results of interviews with teachers, the teaching and learning process in the classroom is hampered by emotional conflicts experienced by students. This conflict often comes from home, such as being scolded by parents, and from school, such as fighting with friends. This condition hurts students' moods and reduces their interest in learning. This is due to the characteristics of mentally disabled children who tend to have unstable emotions (Muchyidin et al., 2022).

According to (Zhang et al., 2017), in the approach of learning mathematics for mentally disabled children, evaluation needs to be done to determine how students learn in each teaching material to be more effective. Learning will be more effective for mentally disabled children if the material is arranged based on the assessment results and refers to the student's initial abilities. After learning, an evaluation is conducted to determine whether the program is appropriate and shows improvement or vice versa. During the implementation of mathematics learning for mentally disabled children in the class, the material provided is general and given classically, and no program is arranged individually, so there are no specific objectives set for each subject. This is not in line with the opinion put forward by (Schnepel et al., 2024) that in the approach to learning mathematics for mentally disabled children, the material given to students must support the achievement of previously determined specific objectives, and the material provided must be by the limits of the abilities of the students who will learn it. According to (Lewis et al., 2020), the arrangement of materials must also consider the needs of children by organizing materials with classification/grouping according to the child's cognitive development,

the child's mental age, concrete to semi-concrete stages then abstract. Based on the findings in the field, in the process of learning mathematics in the class of mentally disabled students, who can be educated on several things, the success of the learning can be determined. Some of these things include the readiness of the mathematics teacher; in the preparedness of the mathematics teacher itself, there are two essential things, namely the teacher's understanding of the existence of students with special needs and the stage of learning planning that will be carried out (Suyitno & Junaedi, 2020). In addition to teacher readiness, implementing and evaluating learning determines learning success (Kivirähk & Kiive, 2024). Educational services for children with mental retardation are more directed towards individual services because the differences between individuals in children with mental retardation are very diverse (heterogeneous). So, the Individual Service Program is a characteristic or soul of their education, although classical services are still needed to a certain extent. In teaching mathematics to mentally disabled children, teachers must do a lot of special exercises using simple language so that it is easier for students to understand, considering that mentally disabled children have difficulty in abstract thinking (Deveci Topal et al., 2023). In addition, teachers also plan Individual Teaching Plans for each student, which refer to individual assistance that will be carried out in teaching, especially in class.

Meanwhile, for cognitive assessment, teachers provide many practice questions and conduct evaluations at the end of each learning chapter with different difficulty levels for each student according to the material taught by the teacher, which is then processed at the end of the semester. For mentally disabled children, the evaluation carried out is almost the same as in regular schools; there are daily tests, midterm exams, and semester exams, and only mentally disabled children do not take the national exam. All exam questions are submitted to each teacher who teaches, and the questions made are different for each student, adjusted to their abilities. The assessment carried out to see the learning outcomes of mentally disabled children certainly has differences with children in general; not a few children have verbal or written communication disorders, so assessments are sometimes based on actions or oral communication. The limitation of this study is that the researcher did not conduct interviews with the student's parents, so the data obtained in this study could have been more in-depth.

#### 4. CONCLUSION

This study aimed to develop valid math learning materials based on song lyrics tailored for students with special needs in the XC Tunagrahita class. Utilizing the Plomp development model, the research included three stages: preliminary research, development, and evaluation. During the preliminary research phase, observations and discussions with teachers and students helped identify the need for engaging whole-number learning materials. This led to the development phase, where song lyrics were crafted, accompanied by selected musical instruments, recorded, and tested with the target students. In the evaluation phase, validation sheets completed by teachers and experts in song content and music confirmed that the song lyrics were a highly valid learning tool for teaching whole numbers to students with special needs. The findings imply that integrating music into learning materials can enhance engagement and effectiveness for special-needs students. However, the study's limitations include its focus on a single subject (whole numbers) and its application within a specific class. Future research should explore expanding this approach to other mathematical concepts, involve larger and more diverse student groups, and investigate long-term impacts on student learning outcomes and engagement.

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