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*by* Mahilda Dea Komalasari

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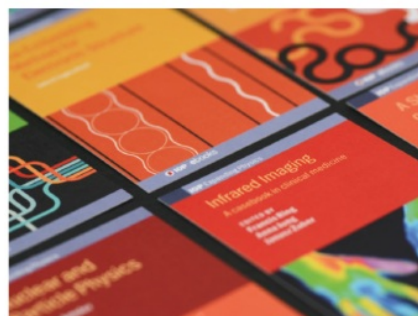
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## Interactive Multimedia Based on Multisensory as a Model of Inclusive Education for Student with Learning Difficulties

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## INTERACTIVE MULTIMEDIA BASED ON MULTISENSORY AS A MODEL OF INCLUSIVE EDUCATION FOR STUDENT WITH LEARNING DIFFICULTIES

Mahilda Dea Komalasari<sup>1</sup>, Bayu Pamungkas<sup>2</sup>, Ahmad Mabruhi Wihaskoro<sup>3</sup>,  
Padrul Jana<sup>4</sup>, Ahmad Bahrum<sup>5</sup>, Nadea Zulfa Khairunnisa<sup>6</sup>

<sup>1</sup>Universitas PGRI Yogyakarta, Indonesia,

<sup>2</sup>Universitas PGRI Yogyakarta, Indonesia,

<sup>3</sup>STPI Bina Insan Mulia Yogyakarta, Indonesia

<sup>4</sup>Universitas PGRI Yogyakarta, Indonesia

<sup>5</sup>Universitas PGRI Yogyakarta, Indonesia

<sup>6</sup>UIN Sunan Kalijaga Yogyakarta, Indonesia

<sup>1</sup>mahilda\_dea@yahoo.com

<sup>2</sup>bayu.pamungkas@upy.ac.id

<sup>3</sup>ahmadwihaskoro@gmail.com

<sup>4</sup>padrul.jana@upy.ac.id

<sup>5</sup>ahmadbahrum@ymail.com

<sup>6</sup>deakhannisa@gmail.com

**Abstract.** Students with learning difficulties, especially those who have trouble learning to read, write, and count often occur in low-grade inclusion primary school. Inclusion primary school teachers need skills and knowledge on inclusive education to help students learn to read, write, and count. Inclusive education is one of the educational approaches that can be applied in inclusion in primary schools that have students with diverse abilities, one of which is the learning disabilities of reading, writing, and counting. Efforts to optimize inclusive education can be made through interactive multimedia based on multisensory. Interactive multimedia based on multisensory is a learning medium that can accommodate various types of student learning by optimizing different senses owned by students, namely auditory, visual, kinesthetic, and tactile. There are two objectives in the application of interactive multimedia based on multisensory, i.e. (1) interactive multimedia based on multisensory forming student variously learning culture in the model of inclusive education; and (2) students can overcome the difficulties of learning to read, write, and count through the application of interactive multimedia based on multisensory.



## 1. Introduction

Children are the successors of family and nation generation, so that requires good education till their potential can develop and grow into a terrible human being, and has various abilities and benefits that will help in developing scientific insights that are useful for his daily life[1]. Children aged 6-12 years occupy of primary education and fast growth, need to be optimized learning process from learning difficulties. Children who experience problems in learning to read, write, and calculate inflict lack of ability to think of children[2] and can affect their lives in the future.

There are still many children who have learning difficulties seen in the results of Fardana & Suprapti's research[3] which shows that 19.5% of elementary students indicated learning disorders. If this is not immediately addressed, it will create a domino effect that will change the nation's competitiveness in the international world. Therefore, special attention needs to be paid to the quality of learning.

Demands for improving the quality of learning from the Presidential Regulation of the Republic of Indonesia No. 45 of 2016 concerning Government Work Plans for 2017[4] with one of the priority policy directions in the education sector, namely the development of quality learning. One of the efforts to develop quality learning is inclusive education. Inclusive education is a process that can support children's diversity[5]. Inclusive education is not seen for diversity and difference as problems. Inclusive education is formed by the mandate of the 1945 Constitution of the Republic of Indonesia Article 31 Paragraph 1 that every citizen obtains education[6], including those who have learning difficulties. Inclusive education, teachers and students can help in diversity and difference, and support Indonesia's motto "*Bhinneka Tunggal Ika*" different but still one (Unity in Diversity)[7].

The government has enacted inclusion schools as a model for inclusive education through the Ministry of National Education's Director General of Primary Education Circular No. No.380 / C.C6 / MN / 2003 concerning Inclusive Education[8] that each city/district holds a minimum of 4 inclusion schools consisting of elementary schools, Middle school, high school. The central concept of inclusion schools is the focus of learning adapted to children's needs in learning. Inclusion school efforts are directed at: (1) prevent external factors become obstacles children's learning (preventive efforts); (2) Overcoming difficulties in children (intervention efforts); and (3) cover for functions that are lost or related to other features (compensation efforts)[9]. Difficulties and obstacles are in the form of physical, sensory, motoric, intellectual, emotional, and social barriers[10].

Regarding the diversity of abilities and needs of students, students who have learning difficulties especially at the primary school level, intervention efforts are necessary. Teachers interventions in the learning process with challenges and obstacles that students experience. However, in reality, the teacher's sustain dilemma when students need specific intervention regarding learning[11] because many teachers emphasize continuous student learning outcomes, lack of motivation, attention, and response to education [12]. The existence of a curriculum, limited time and teacher's understanding of the diversity of students, makes students have difficulty learning 'dark' in learning. To overcome this problem, the development of an inclusive education model that allows performance in challenges.

One of the intervention efforts said is to use interactive media in a general context. One media that can be used is interactive multimedia. Interactive multimedia is a technology-based learning media that emphasizes user response (students) till students can learn according to their needs and type of learning, while interactive multimedia based on multisensory means being able accommodate various types of student learning (auditory, visual, kinesthetic, tactile) using all the students' senses,

thus, interactive multimedia based on multisensory can help students with learning difficulties and can assist teachers in handling learning problems experienced by students, so that the process is effective and efficient. Therefore, it is expected that with the use of interactive multimedia based on multisensory, the ability and needs of students with learning difficulties attending inclusion primary school will be better accommodated.

## 2. Discussion

### 2.1. *Students with Learning Difficulties*

Learning difficulties mean a difficult situation to try to gain intelligence[13]. Learning challenges are defined by the National Joint Committee for Learning Disabilities (NJCLD)[14] that learning difficulties refer to a group of problems manifested in the form of real issues in the kind of proficiency and low ability to listen, speak, read, write, reason, and count. These disorders are intrinsic and are thought to be caused by central nervous system dysfunction. Clement[15] states that learning difficulties are the conditions of students who have average or above average intelligence abilities, but experience inability or failure in learning related to the process of perception, conceptualization, language, memory, focus, self-mastery and the motor-sensory integration function.

Abdurrahman explained that in general, learning difficulties could be classified into two groups, i.e. (1) learning difficulties related to development (developmental learning disabilities) and (2) academic learning difficulties (educational learning disabilities) [16].

Learning difficulties related to developmental include motor impairment and perception, difficulty in learning language and communication and learning challenges in adjusting social behavior. Failures in the academic performance show academic learning difficulties compared to the capacity possessed.

Based on the explanation above, it can be concluded that learning difficulties are one of the disturbances in the learning process that occurs in a child that causes the child to experience a significant gap between learning achievement and intellectual ability so that children obtain learning outcomes that are not in accordance with academic skills that should be achieved. These learning achievement gaps and intellectual skills are not affected by other disabilities (visual, hearing, or physical disability, mental retardation, emotional disturbances).

### 2.2. *Inclusive Education*

Inclusion schools are special education services that are appropriate for children with learning difficulties. Inclusion schools are the right model for inclusive education because inclusion schools are regular schools that implement the fulfillment of the needs of children who have differences and potential intelligence and unique talents in a single systemic unit[17].

The implementation of inclusion schools in Indonesia is motivated by the mandate of the 1945 Constitution of the Republic of Indonesia Article 31 Paragraph 1 that every citizen has the right to education[18], including students who have learning difficulties. Through inclusive education, teachers and students can feel comfortable in diversity and diversity and support Indonesia's motto "*Bhinneka Tunggal Ika*" differently but still one (Unity in Diversity)[19].

The Government has enacted inclusion schools as a model for inclusive education through the Ministry of National Education's Director General of Primary Education Circular No. No.380 / C.C6 / MN / 2003 concerning Inclusive Education[20] that each city/district holds a minimum of 4 inclusion schools consisting of primary schools, middle school, high school. The central concept of inclusion schools is the focus of learning tailored to the needs of children in learning. Suggested that inclusion schools should be able to accommodate all children regardless of physical, intellectual, social-emotional, linguistic or other conditions [21]. The efforts of inclusion schools are directed at: (1) preventing environmental factors from obstructing children's learning (preventive efforts); (2) dealing with learning difficulties in children (intervention efforts); and (3) replacing lost functions or experiencing obstacles with other features (compensation efforts)[22]. These difficulties and obstacles are physical, sensory, motoric, intellectual, emotional, and social[23].

Inclusion schools that are applied at the level of primary education units are called inclusion primary schools. Inclusion primary school is a school where students who are learning difficulties can learn together with regular students in regular classes, but still, receive individual guidance from accompanying teachers. The task of the companion teacher is to carry out preventive, intervention and compensation for students with learning difficulties. Preventive efforts can be made with a flexible and comfortable classroom arrangement for students to study. Intervention efforts are carried out flexibly and comprehensively, tailored to the needs of each student. Compensation efforts are carried out by optimizing talents or potential, as well as the advantages possessed by students to replace the shortcomings that students have. For inclusion primary school level, students who have learning difficulties are generally tricky in learning to read, write, and count.

### 2.3. *Interactive Multimedia Based on Multisensory*

Multimedia comes from the words 'multi' and 'media.' The definition of multimedia before the 1980s was different from the description after the 1980s. Stated that multimedia traditionally before the 1980s refers to the use of several media, while multimedia today relates to the combined method of several media in presenting computer learning [24]. Furthermore, interactive multimedia is defined as interactive and integrated information delivery that includes text, images, sound, video or animation[25]. The benefits of interactive multimedia are making the learning process more meaningful because it can display audio, animation, video, text and graphics, color, motion, images and can present an interactive process. In line with this, states that the term interactive multimedia is more focused on interactivity between the media and media users. The advantage of interactive multimedia is that students can learn independently, not dependent on teachers [26]. Students can start learning at any time and can end learning as they wish. There is also a repeat function, useful for repeating the material repeatedly for overall mastery.

### 2.4. *Optimization of Inclusive Education for Students with Difficulties in Learning Through Interactive Multimedia Based on Multisensory*

Inclusive is a word derived from the English term that is inclusive which means including or inclusion. Whereas stated, inclusive is a general term used to educate students who have or do not have specific disabilities in a regular class [27]. Besides, Smith [28] explains that inclusive is a term to describe the integration of children with learning difficulties into school programs.

Inclusive education is used to initiate the rights of children who have specific disabilities to be educated in an educational environment (school) that is not separated from other children who do not have particular limitations. Inclusive education aims to realize a comprehensive education for students who have barriers to being involved in school life. Inclusive education can be interpreted as acceptance of children having difficulty learning into the curriculum, environment, and social interaction in the classroom.

In the implementation of inclusive education in the classroom, learning can be combined with methods that support the diversity of students' abilities. This method is a multisensory method. The multisensory approach is also known as the phonic-visual-auditory-kinesthetic system method developed [29]. That is, this method includes viewing (visual), listening (auditory), writing (movement), and tracking (touching). According to [30], a multisensory method is a learning method that utilizes the functions of each sensing device. When learning by using various modalities possessed by students, then he will learn better. These modalities are visual (vision), auditory (hearing), kinesthetic (motion), and tactile (touching). In its implementation, all four patterns must exist so that learning can take place optimally.

States that to create a multisensory environment that supports certain ways of learning interactive multimedia can be used [31]. Interactive multimedia is useful in several teaching and learning situations. States that the use of interactive multimedia can accommodate different ways of learning [32]. It was also in line with [33] study entitled the effectiveness of multisensory methods in improving reading ability in dyslexic students in primary schools. The results showed that the multisensory way could improve the reading ability of dyslexic students. This was indicated by an increase in the number of word recognition, reading time, and the number of words reads per minute. Other research results are in line, namely research [34] which states that there are differences in learning achievement between before and after using interactive multimedia. In front with the analysis above, research from [35] show that interactive multimedia can improve the character of primary school students.

Based on this description, it can be concluded that the inclusive education model through interactive multimedia based on multisensory is an educational model that places students with learning difficulties with other students (who have no learning difficulties) with programs and learning settings that are tailored to the abilities and learning needs of each student. The inclusive education model through interactive multimedia based on multisensory can generate desires, interests, and motivations, as well as provide stimulation of learning activities, even bringing psychological influence on students which ultimately increases students' concentration to learn to read, write and count.

### 3. Conclusion

Based on the study above, it can be concluded that interactive multimedia based on multisensory is suitable to be used as a model to overcome student learning difficulties in primary school.

#### 3.1. Implications

Based on the above conclusions, the following theoretical and practical effects can be presented.

##### 1. Theoretical Implications

The study results can add new knowledge and insight into interactive multimedia based on multisensory to overcome student learning difficulties in inclusive primary schools.

##### 2. Practical implications

The results of this study can practically be used as an educational practitioner's consideration in developing interactive multimedia based on multisensory, so that motivated students follow each learning process and overcome learning difficulties. By using interactive multimedia based on multisensory, students are expected to be more excited and motivated in listening to learning material.

#### 3.2. Suggestion

Based on the results of the study, the following recommendations were obtained.

##### a. For Educators

- 1) Educators are advised to carry out innovations in learning, one of which is by utilizing interactive multimedia based on multisensory.
- 2) Learning media that is made should pay attention to the needs of students, characteristics of learning materials, one of which is interactive multimedia based on multisensory.

##### b. For Educational Institutions

- 1) Educational institutions are advised to provide facilities to support learning activities.
- 2) Facilities of education institutions should be utilized as much as possible, primarily to support learning activities.

##### c. For further researchers

- 1) This research can be used as a basis for new interactive multimedia development research.
- 2) Interactive multimedia developed by researchers can then be further designed for other material.

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