Jurnal TAM (Technology Acceptance Model) Volume 11, Nomor 2, Desember 2020 Hal. 73-79
p-ISSN : 2339-1103
e-ISSN : 2579-4221

DEVELOPMENT OF ELECTRONIC LEARNING SYSTEMS FOR SPECIAL NEEDS CHILDREN (AUTISM) AT ELEMENTARY SCHOOL LEVEL IN EFFORTS TO INCREASE COGNITIVE INTELLIGENCE

Rulin Swastika[1], Imam Prasodjo[2], Daeroby[3]
[1,2,3]Program Studi Teknik informatika STIKOM Al-Khairiyah, Cilegon, Banten
[123]Jl. H. Enggus Arja no 1 Citangkil, Cilegon, Banten, Indonesia
E mail : swastikarulin@gmail.com iprasodjo@gmail.com daerobby96@gmail.com

Article history:
Received: Oct 17, 2020
Revised: Nov 06, 2020
Accepted: Nov 16, 2020

Keywords:
e-learning;
moodle;
special need children;
php;
autism;

Abstract
In an effort to increase cognitive intelligence in children with special needs at the elementary school level, many factors can influence one of the proper learning model specifically for children with autism. In the learning process in the classroom, most of them still use the lecture method, therefore in the learning process students tend to be less interested in the learning process This study aims to develop a learning system using e-learning for children with special needs at the elementary school level using the multimedia to increase cognitive abilities. The research of Learning Management Moodle System is one of the solution that can solve learning problems for students with special needs. Data collection methods used in this study are: observation, interviews, literature study, literature study, questionnaires, and systems development methods. The steps for systems development method are analyzing data requirements, analyzing process requirements, analyzing software and hardware requirements, analyzing user needs, designing business models, systems designing, systems implementing and system testing. With the existence of an e-learning learning system for children with special needs, it can overcome learning deficiencies in class and students can carry out remote learning anywhere, anytime and repeatedly in a more interactive and fun way, so as to increase student understanding.

I. INTRODUCTION

Zatta Amani Islamic School (ZAIS) Elementary School is one of the formal educational institutions under control of the Miftahul Al Manan foundation founded in 2009 which has a commitment that learning or studying is a process without limits such as age, ethnicity, social status, religion. or a person's physical or mental condition.

In the implementation of SD ZAIS education adopts an inclusive education system, namely as an educational service that includes special needs children (SNC) learning with normal children (non-SNC) of the same ages in regular classes, this is evident in that 30% of the total of students are categorized as students with special needs in this case specifically people with autism.

In applying the learning strategy to them, they must comply with their limitations. Referring to the results of the semester report cards for the 2017/2018 Academic Year that most of the SNC are still below the average grade promotion test score (PTS), this is a concern of the school so that SNC students can understand learning material by improving cognitive abilities. Based on these data the writer will analyze and evaluate the learning model for students with special needs. The difficulty are Teachers are not ready to handle children in their class with different characteristics. Teachers have difficulty teaching the same method with the same treatment so that learning objectives are not achieved as expected. In implementing the curriculum for special needs children (autism), demonstration and training are needed for these students. Students are less interested in participating in the learning process and feel bored quickly in understanding the material presented.

In an effort to increase cognitive abilities in special needs students, many factors can influence one of them is the appropriate learning model specifically for children with autism. There are several ways to help children with autism learn new skills and behaviors, including: visual / verbal sign, modeling, visual support, prompting, fading, shaping and chaining (Dodd, 2007).

This research aims to design an e-learning system application for special needs children at the elementary school level. With this application, learning problems are expected to be resolved by teachers in dealing with children with special needs effectively and efficently, to give motivation for special needs children to increase their interest in learning with multimedia-based learning media

that is easy to understand and fun, to increasing cognitive abilities gradually.

The moodle system of students, the teacher enters the "Digital Classroom". This system will make changes from conventional learning methods to Hypertext Preprocessors (PHP) based. The teaching materials that will be given are a combination of various media from computers in the form of video, audio, images and text, so that learning more attractive and attractive.

In developing e-learning for special needs children at the elementary school level, the following steps are required: conducting data requirements analysis, process requirements analysis, software and hardware requirements analysis, user needs analysis, business model design, system design, system implementation and analysis of e-learning system development by conducting pre-test and post-test which aims to determine the response of parents and teachers to the development of e-learning.

II. LITERATURE

2.1 Information Systems

The system is elements that are interconnected with each other that forms a unity in an effort to achieve a goal (Budi, 2002: 168). Meanwhile, information is data that is processed into a form that is more useful and more meaningful for those who receive it, Jogiyanto HM (2005: 8) [9]. Then, an information system is a system within an organization that meets the needs of daily transaction processing, supports managerial operations and strategic activities of an organization and provides certain outsiders with the necessary reports (Jogiyanto, 2005: 11).

E.2 E-Learning

E-Learning is an educational system or concept that used a technology. Information in the teaching and learning process. According to Rusman (2013) [14], e-learning is a web technology application in the world of learning for an educational process. Or e-learning is a type of teaching and learning that allows teaching materials to be delivered to students using the internet, intranet or other computer network media. (Darmawan, 2013) [3]. There are two methods of delivering teaching materials in e-learning, that is:

1. *Synchronous E-Learning*
   Teachers and students in the same class and time even though they are different places. The role of the teleconference is here.
2. *Asynchronous E-Learning*
   Teachers and students in the same class (virtual classroom), although in different times and places.

2.3 Children with Special Need

Directgov (in Thompson, 2012), [19] saidthatthe term special needs children (SNC) refers to children who have learning difficulties or disabilities that make it more difficult to learn or access education than most children their age.

2.4 WEB

According to Arief (2011) [10], the Web is an application that contains multimedia documents (text, images, sound, animation, video) in it that uses the HTTP protocol (hypertext transfer protocol) and to access it uses software called the browser.. According to J. Simarmata (2011) [8], the Web is a system with information presented in the form of text, images, sound, and others stored on an Internet Web server which is presented in hypertext form. The Web can be accessed by Web client software called a browser. Browsers read Web pages stored on a Web server via a protocol called HTTP (Hypertext Transfer Protocol).

2.5 PHP

According to Abdul Kadir (2014) [1], PHP is a programming language aimed at creating WEB-based applications. According to Bertha Sidik (2012) [2], said: PHP (Hyper Text Preprocessor) is the main language for server-side scripts that are embedded in HTML that is run on the server, and can also be used to create desktop applications. " PHP is generally known as a script programming language - scripts that create HTML documents on the fly that are executed on a web server, HTML documents generated from an application are not HTML documents created using a text editor or HTML editor, also known as language server side programming.

2.6 Unified Modeling Language (UML)

According to Sri Mulyani (2016) [16], In the development of object-oriented programming techniques, a standardized modeling language emerged for software development that was built using language (UML). UML is a language based on graphics / images for visualizing, specifying, building and documenting a software development system based on OO (Object-Oriented). UML itself also provides a standard for writing a blueprint system which includes the concept of business processes, writing classes in a specific programming language, database schemes and the components needed in a software system.

III. RESEARCH METHOD

The data collection method in this study is to use primary data, the data is directly collected from the source research, that is data on students of

special needs children at the Zatta Amani Islamic School Serang - Elementary School.

This research is divided into several steps where each stage is divided into several activities that support the completion of the research, namely:

a) The first step is the préparation which consists of activities ranging from data requirements, process requirements analysis, software and hardware requirements analysis and conducting literature studies related to basic theory requirements and support.
b) The second step is the business model, which consists of three important facilities are : data, processes and networks. The third step of the model information system research, where there are several series carried out, class structure and description, activity flow in the system, displaying the interactions between objects in the e-learning system with the Zachman framework method.
c) The fourth step is to create a menu model technology, dialog boxes, presentation form using Moodle, pre-test and post-test.

The framework at SD Zatta Amani Islamic School using the zachman framework is described in the following figure:

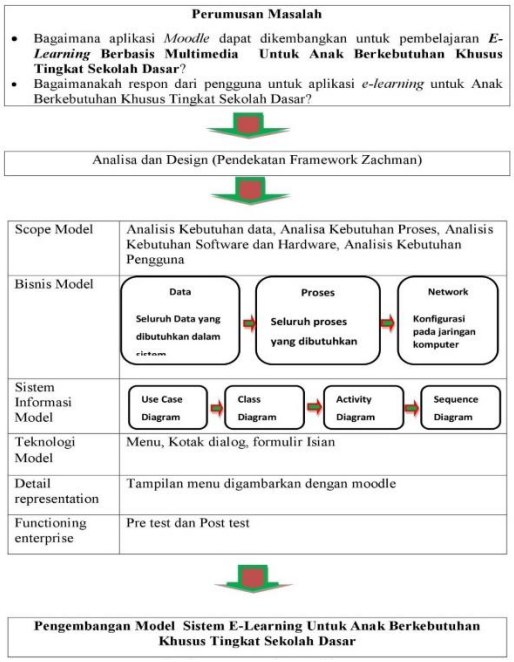

Figure 1. Zachman Framework

IV. RESULT

a. Design System

Use Case diagrams in this system explain the events that are carried out by users to the system. Use Case diagrams function to connect and model the behavior of a system. This is a use case diagram for the main admin, teachers and students.

Use Case Diagrams are the highest part of the functionality of the system which will describe how a person or actor will use and utilize this system:

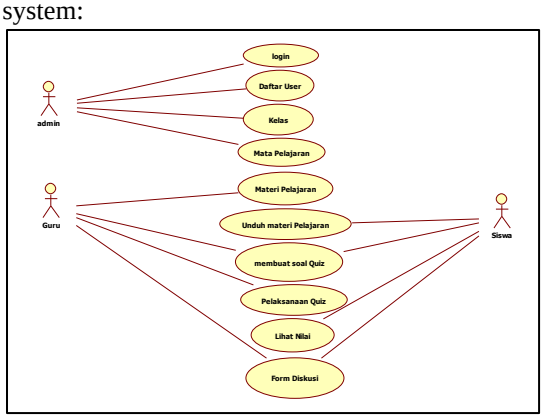

Figure 2. Use Case Diagram

there are 3 (three) users in the use case diagram: Administrators, Teachers and Students. With the following scenario:

1) Admin Menu Use case Scenarios

The following is a table description of the use case diagram with the Admin actor in the e-learning system for children with special needs at SD ZAIS.

Table 1.Use case login admin scenario

No.	1		
Usecase name	Login		
Aim	Admin can login to the system		
Initial conditions	The system displays the login menu		
The final condition is successful	Admin Main Menu appears		
Failed Condition	Cannot enter the main admin menu		
Main actor	Admin		
Main Flow	Step	Actor	System
	1	Login	Enter the main menu
	2	Selecting User List Menu	Displays the User List Menu
	3	Selecting the Class menu	Displays the class menu
	4	Choose a menu of subjects	Displays the course menu

2) Use Case Menu Teacher Scenarios

The following is a table description of the use case diagram with the teacher actor in the e-learning system for children with special needs at SD ZAIS.

Table 2. Use case Login Teacher scenario

No.	2		
Usecase name	Login		
Aim	Teachers can log into the system		
Initial conditions	The system displays the login menu		
The final condition is successful	The Student Main Menu Shows		
Failed Condition	Cannot enter the Master main menu		
Main actor	Teacher		
Main Flow	Step	Actor	System
	1	login	Enter the main menu
	2	Selecting Input Subject Materials	Displays the Subject Material Menu
	3	Choose to Make Quiz Questions	Displays the quiz question input menu
	4	Choosing a Discussion Form	Displays the discussion form

3) Student Use Case Menu Scenarios

The following is a table description of the use case diagram with the student actor in the e-learning system for children with special needs at ZAIS Elementary School.

Table 3. Student Login Use Case Scenarios

No.	3		
Usecase name	Login		
Aim	Students can log into the system		
Initial conditions	The system displays the login menu		
The final condition is successful	The Student Main Menu Shows		
Failed Condition	Unable to enter the Student main menu		
Main actor	Students		
Main Flow	Step	Actor	System
	1	Login	Enter the main menu
	2	Choose to download Lesson Materials	Displays the Download Menu Material
	3	Choosing a Quiz	Displays the quiz menu
	4	Choosing a Discussion Form	Displays the discussion form

a. Activity Diagram design

Activity diagram describes the flow of activity in the system, how it is began, decisions that may occur and how the activity ends. Activity diagrams can also describe parallel processes that may occur in multiple executions. Activity diagrams can be divided into several swim lane objects to illustrate which objects are responsible for certain activities. The activity diagram of the e-learning information system for special needs children is following:

Admin Activity Diagram

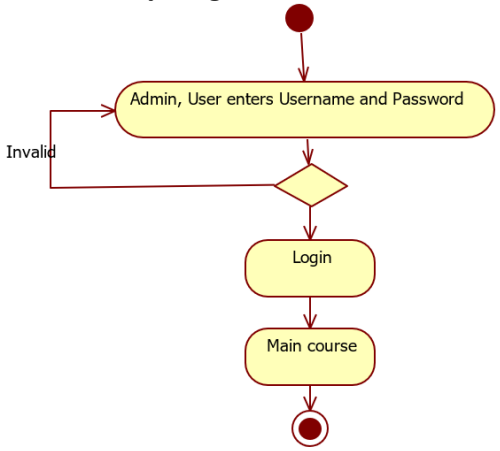

Figure 3. Admin Activity Diagram

Login is the initial activity that must be done in order to enter the application. Both admins, lecturers and students log in in the same way, by entering a username and password. After entering the username and password, the system will check (validate), if it is valid, the home page of the e-learning web will appear. If it is not valid, an error message will appear.

Jurnal TAM (Technology Acceptance Model) Volume 11, Nomor 2, Desember 2020 Hal. 73-79
p-ISSN : 2339-1103
e-ISSN : 2579-4221

Activity Diagram of Subject Materials

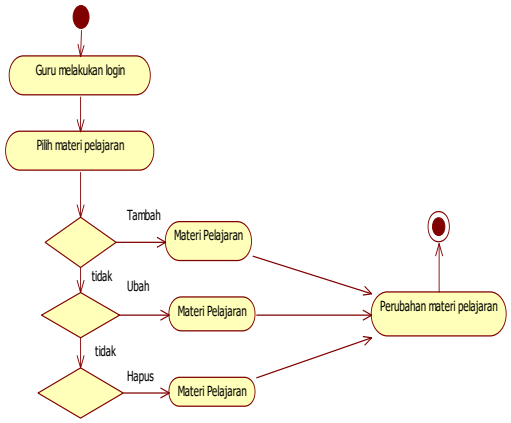

Figure 4. Activity Diagram of Subject Materials

The process of managing subject matter is used to add, change and delete subjects on e-learning. Registration of subject matter management is carried out by the teacher.

***Activity Diagram* Download Study Materials**

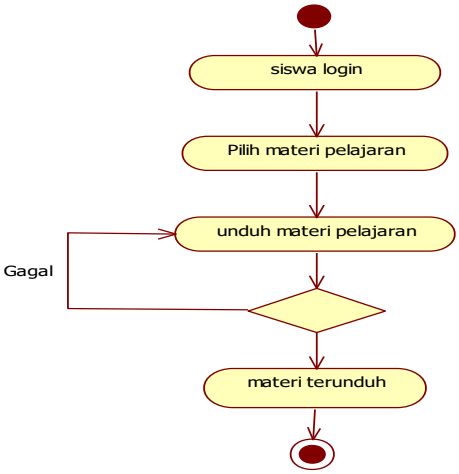

Figure 5.Activity Diagram download subject matter

The process of downloading subject matter describes the process of downloading subject matter carried out by students.

B. Implementation

The e-learning information system for special needs children at the elementary school level has the following display facilities

Administrator page

The Administrator main page is the main menu for Administrator login.

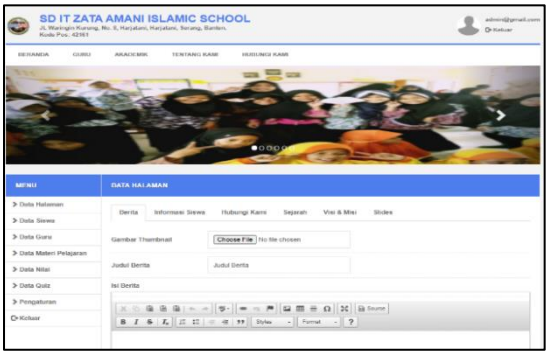

Figure 6. Administrator Main Menu Page

Login page

Login password is the first display when the program is run. This form display functions for data security where the user is asked to input a name and password first. The login form display can be seen in the following image:

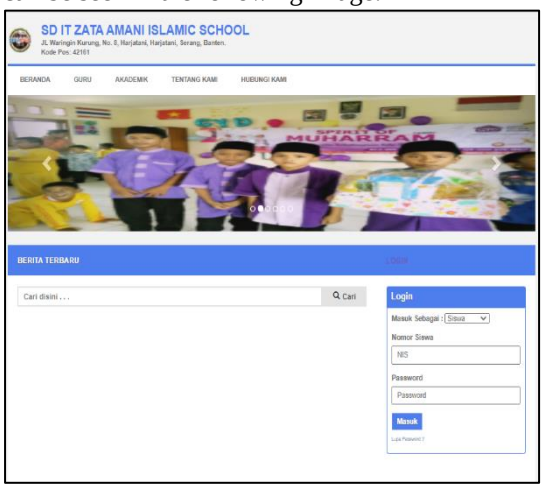

Figure 7. Administrator Main Menu Page

Lesson Data page

On this page the admin can input and change subjects at ZAIS Elementary School, as for the display as follows:

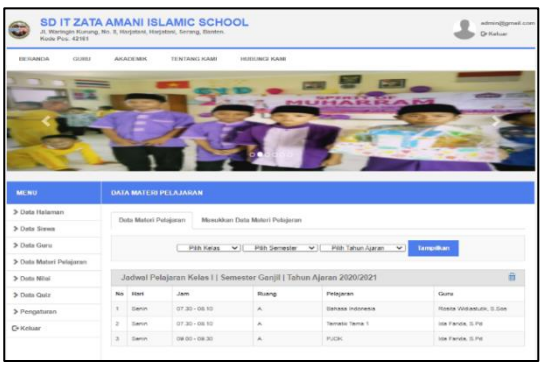

Figure 8. Administrator Main Menu Page

Study Materials page

In the subject menu the teacher can add, change and delete subject to be taught.

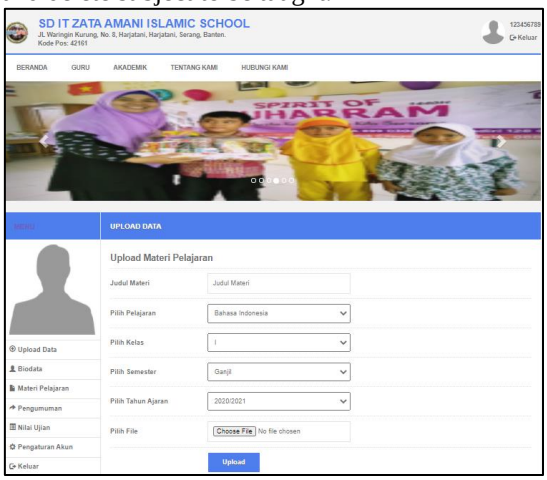

Figure 9. Administrator Main Menu Page

System Testing

The Test by testing each process in knowing possible errors that occur for each process. This test is doing in black box that is, testing is focus to the input to the system and system output

Table 4. Teacher Menu Black Box Testing Results

No.	Item Testing	Test Case	Expected results	Desired Results	Information
1	Login	Enter username and password	Displays the main view of the teacher menu	The system displays the teacher's main menu	Succes
2	Subject matter	Add a course material data	Displays lesson data that has been added	System Displays lesson data that has been added	Succes
3	Quiz	Add a data about Quiz	Displays the quiz questions that have been added	System Displays the topics that have been added	Succes
4	discussion forum	Add a discussion topic	Displays discussion topics that have been added	System Displays quiz questions that have been added	Succes

V. CONCLUSION

From the results of the discussion above, the conclusions are with the existence of an e-learning system for children with special needs in inclusive elementary schools, it can reduce the problems of the learning process for students with special needs, help teachers to facilitate the delivery of subject matter, increase student focus in learning so as to increase student interest in learning and facilitate understanding of subject matter delivered by the teacher so that it is expected to improve cognitive intelligence for students with student needs. With the existence of e-learning for children with special needs, it makes it easier for teachers to deliver subject matter innovatively and evaluate learning outcomes according to the abilities of students with special needs and optimize learning activities in inclusive primary schools.

REFERENCES

[1] A. Kadir, *Pengenalan Sistem Informasi Edisi Revisi*. Yogyakarta: Andi Offset, 2014
[2] Sidik, *Pemrograman Web Dengan PHP*. Bandung: Informatika, 2012
[3] Darmawan, *Pengembangan E-Learning Teori dan Desain*. Bandung: PT Remaja Rosdakarya, 2014
[4] Djunaidi, Much. Dkk. 2005. Penentuan Jumlah Produksi Dengan Aplikasi Metode Fuzzy – Mamdani. *Jurnal Ilmiah Teknik Industri Universitas Muhamadiyah Surakarta*. Vol 4(2): 95-104
[5] Dodd, Susan (2007), *Undestanding Autism*, Sydney: Elsevier
[6] Fatmawati, Wiwin. Dkk. 2015. Aplikasi E-learning Sekolah Dasar (SD) Muhammadiyah 2 Kauman Surakarta Untuk Menambah Interaksi Guru dan Siswa. *Jurnal TIKomSin STIMIK Sinar Nusantara Surakarta*.Vol 3(2).
[7] https ://moodle.or
[8] J. Simarmata, *Rekayasa WEB*. Yogyakarta: Andi Offset, 2011
[9] Jogianto, (2005), *Analisis dan Desain Sistem Informasi*, Yogyakarta : Andi
[10] M. R. Arief, *Pemrograman Web Dinamis Menggunakan Web dan PHP*. Yogyakarta: Andi Offset, 2011
[11] Purnomo, Agus. Dkk.2017. Pengembangan Aplikasi E-Learning Sekolah Menengah Atas. *Simetris :Jurnal Teknik Mesin, Elektro dan Ilmu Komputer*. Vol 8(2) : 619-628
[12] Riyanto, Rit. 2016. *Teknik Pembelajaran E-Learning dengan LMS Moodle.Yogyakarta*: Pendidikan Deepublish
[13] Romindo. Perancangan Aplikasi E-Learning Berbasis Web Pada SMA Padamu Negeri Medan. *SinkrOn*,[S.I.], v. 2(2): 75-80.
[14] Rusman, *Model-Model Pembelajaran*. Depok: PT Raja Grafindo Persada, 2013
[15] Rusman,Dr , (2012) Belajar dan Pembelajaran Berbasis Komputer, PT. Alfabeta, Bandung
[16] S. Mulyani, *Analisis dan Perancangan Sistem Informasi Manajemen dengan Notasi UML*. Bandung: Abdi Sistematika, 2016
[17] Satrianah. Dkk. 2020. *Development Of E-Learning Applications As A Means Of Online*

Learning In Smp Al Azhar 1 Bandar Lampung, Jurnal TAM Vol 11(1) : 10-19

[18] Sugiyono.2017. *Metode Penelitian Pendidikan: pendekatan kuantitatif, kualitatif, dan R&D*. Bandung: Alfabeta

[19] Thompson, J. 2012. Memahami anak berkebutuhan khusus. Jakarta : Erlangga

[20] Zachman, J.A, (2008) *John Zachman's Concise Definition of The Zachman Framework*, Zachman CEO International, Inc, USA

[21] Zyainuri, Marpanaji, Eko. 2012. Penerapan E-Learning Moodle Untuk Pembelajaran Siswa Yang Melaksanakan Prakerin. *Jurnal Pendidikan Vokasi*. Vol 2.

[22] Purnomo, Agus. Dkk. 2017. Pengembangan Aplikasi E-Learning Sekolah Menengah Atas. *Simetris :Jurnal Teknik Mesin, Elektro dan Ilmu Komputer*. Vol 8(2) : 619-628

[23] M. Sabri, 2019, "International Journal Of Asian Social Science Instructional Feedback Analysis Of An Online Virtual Languange Learning Platform Through Ez-Arabic Among Malaysian Teachers Of Primary School Keyword s". vol. 9, no. 2, pp. 204–212.

[24] A. Alahmari and L. Kyei-blankson, 2016, "Adopting and Implementing an E-Learning System for Teaching and Learning in Saudi Public K-12 Schools : The Benefits , Challenges , and Concerns," vol. 3, no. 1, pp. 11–32.

[25] H. Dwipa., L.Hendarman., Jesika, 2019, "Perancangan Aplikasi Media Pembelajaran Untuk Melatih Motorik Anak Berkebutuhan Khusus (Autis) Berbasis Android", Jurnal Rekayasa Informasi., Vol. 8, no.2,hal. 88-93.

[26] P.H. Moyo., W.W. Wing., Sukoco., 2016, "Perancangan Multimedia Pembelajaran Untuk Terapi Anak Berkebutuhan Khusus", SMATIKA JURNAL., vol. 6, hal 1-9.

[27] K.K.Devi., A.I. Tina., N. Any., 2020, "Penerapan E-learning Pada Sekolah luar Biasa", Dialetika., vol. 7, hal 30-43.

[28] D. B. S. R. Naresh B, 2015, "Challenges and Opportunity of E-Learning in Developed and Developing Countries- A Review," vol. 9359, no. 6, pp. 2005–2008.

[29] D. A. F. Aysha., A.F.Sarah., A.A.Reema.,A.S. Sarah., A. Muneerah, A. Daniah, ..., A.K. Mutasem K, 2020, "Developing and Implementing an Online Learning Platform for Children with Autism", International Journal of Scientific Research in Science and Technology, vol. 7, no. 2, pp.176-188.