

Original Research Paper

## Development of Online Courseware for Low-Achieving Special Education Students Learning Communication

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**Abstract:** In 2019, the government announced the Movement Control Order due to pandemic covid19. The situation leads to the closure of every school and premises to avoid the number of cases increasing. Every teacher conducts online classes where most of the students also facing difficulties in following the session. The study aims is to propose an online courseware for a lowly-achieving student based on communication subject. This study focuses on the development of courseware for form 1 of secondary school user. Lowly functional students are referring to students who unable to master the skills of reading, writing, and counting at a minimal level. The methodology used in this research is the evolutionary prototype with the integration of the SAM model, an instructional design model. A quantitative study was made among teachers and parents. As a result, a courseware called the BrightEdu were developed to help the children agree with the theoretical conclusions and research results of other authors.

**Keywords:** Courseware, Lowly-Achieving Students, Online Class, Special Education.



## 1. Introduction

The Ministry of Education (MOE) has established a Special education Program to help students with special needs in their studies. The programs that are offered are the Special Recovery Program, Inclusive Special Education Program, Integrated Special Education Program (PPKI), and Special Education Service Centre. Now, in Malaysia, a total of 93,951 special in need students were recorded in 2020 [1].

In special education, there are 3 levels of functionality of students with special education which are highly functional, moderately functional, and lowly functional. Current literature defines special education as individually pleased, systematically implemented, and carefully evaluated instruction to help exceptional children achieve the greatest possible personal self-sufficiency and success in the present and future environment [2].

In April 2019, the government of Malaysia announced to all Malaysian to stay at home due to covid 19, and all schools and almost all business premises have to be shut down. However, schools need to continue whether students couldn't go to school, which study online. A lot of students facing difficulties in studying online due to bad internet connections and special education is one of the areas of education that is directly affected by these common learning constraints [3].

The content of this research will be more focused on communication subjects. Communication is one of the core subjects for low-functioning students. The focus of this subject is to emphasize the application of communication and interpersonal skills in their daily life. Communication subjects consist of three main components, Malay language, English, and mathematics. This research is an idea of developing courseware to help teachers, low-functioning students, and parents in conducting and following the online classes.

The study by Norazmi [3] was conducted to study the implementation of the teaching process and facilitation at home for students with special needs with hearing impairment. Based on the findings, with position 100%, materials or facilities are the main challenging part of online learning class for parents, 92% on family management, 72% on the skill, and 60% on knowledge [3]. The challenging part of this study shows that parents have difficulties in guiding their children in following the online classes. Children with special educational needs all have learning difficulties or disabilities that make it harder for them to learn or access education than most children of the same age [4].

The development of the courseware also found a comfortable way for the students to study at home. An inclusive and learning-friendly climate and environment can stimulate students, increasing participation in learning activities as well as unearthing the latent potential of students [5]. There are differences when teachers use supportive co-learning when there is an improvement in terms of students' social skills such as being ready to socialize with group members and being more responsible and independent in managing life [6]. Every student has their style in understanding what they are learning. For special education students, the way of learning must be different and most of these students have to be taught individually.

## 2. Literature Review

### 2.1. Concept and Terminology

"Learning experience is important as it is part of teaching and learning process for students in this age need to get more attention to increase their motivation and satisfaction in a classroom [7]." This part consists of several concepts and terminology on special education, reviewing the current issue and showing some similar prototypes use by the research.

Special education is designed for each infant, toddler, preschooler, and elementary through high school student with disabilities and individuals up to the age of 21 to meet the unique learning needs [8]. Educators, parents, and students have different opinions and responses regarding the education concept. López et al [9] stated some may have the positive personal experiences of benefiting from special educational services, witnessing growth in supported students.

Low-functional students are students who are unable to master the skills of reading, writing, and counting. In addition, some pupils are weak in terms of fine motor, gross motor, and cognitive who need a medium to assist all the time [10]. These constraints result in them not being able to master other job skills that have a complex level of performance level. Abrahamson et al [11] mentioned that some children inherit a genetic propensity toward lower cognitive abilities. Even so, they are still there to go to school because they want to be dedicated human beings and want to own work [12].

E-learning commonly found in primary and secondary schools to teach children language, mathematics, and typing skills while many corporate institutes use them as major means for the

delivery of courses they offer [13]. Based on Kisanjara [14] mentioned that e- learning is defined as the application of computers with assistive software by both students within the class and for private study.

## **2.2. Challenges of Low-functional Students in Facing Online Classes**

As soon as the movement control order started, schools conduct classes online and students starting to face difficulties in following the online classes. Some of the teaching and learning methods that are suitable to use by instructors during the MCO are video clips, pictures, student presentations, and sketches [1]. However, if normal students face difficulties accepting and implement learning at home, the greater constraints are faced by special needs and their parents as well [3].

Haris & Khairuddin [6] explores the implementation of inclusive pedagogy and examine the impact of inclusive pedagogy on the social development of students with special needs learning problems. They found that there are problems when mainstream teachers do not master the skills of handling inclusive pedagogy well. So, they used qualitative methods to study the case. From the research, some teachers shared their teaching strategies such as story-telling, cooperative, and active instead of spoon-feeding. Based on the research, the teachers said that the techniques and strategies used to make students learn actively in class. As a result, students gain self- confidence, being cooperative, actively involved in class, sharing thoughts, and being more independent.

Based on the data gained by Norazmi [3], it is shown that the highest percentage of learning online challenges is because of lack of materials and facilities and also family management. Therefore, parents also need to have sufficient knowledge in formulating effective teaching strategies with the help of relevant teaching aids. The work presented by Norazmi [3] provides guidance to parents and families of hearing MBK in preparing to support the continuous learning process. Since normal pupils also having difficulties following online learning at home, it will be more difficult for MBK students and their parents to follow the online class. So, to do that, a quantitative survey was conducted among families with children categorized as hearing in Johor. This technique has been done and it guides parents and families of hearing MBK.

## **2.3. Review on Similar Courseware**

Teachers need several setups for conducting the online classes. There are a lot of applications or software that could assist teachers to prepare their lessons and easy for the teacher to stay connected with students and parents. Educational systems around the world are under increasing pressure to use the new information and communication technologies to teach students the knowledge and skills they need in the 21st century [15].

### **2.3.1. Seesaw**

Seesaw is an application that helps teachers in conducting online classes, upload assignments, and preparing for a class activity. These application assists teachers in arranging and managing the workflow of the lesson. Teachers, parents, and students can sign up for this application. Mostly, kindergarten teachers will use the seesaw application to make online classes more fun and easy to follow. The parent may be involved in helping their children from home.

### **2.3.2. Nearpod**

An interactive lesson app, that allows the teacher to prepare for their lessons as well. Teachers only get started with what they already have. By uploading favorite resources interactive like PowerPoint or slides. Real-time checks like audio responses allowing students to ask the teacher in real-time class. These platforms help teachers to guide parents and students in conducting the online class. Other than that, teachers also may build their simple platform for the student by using google classroom or google sites to manage online lessons.

### **2.3.3. Schoology**

Schoology is a learning management system that gives educators the tools to personalize learning for every learner and can be accessed by teacher, parent and student. Schoology provides a platform for educators to arrange their lesson, provide assessment to student, and running a quiz. Teacher may monitor the student's performance based on the activity that the student perform.



Figure 1. Seesaw Interface



Figure 2. Nearpod Interface

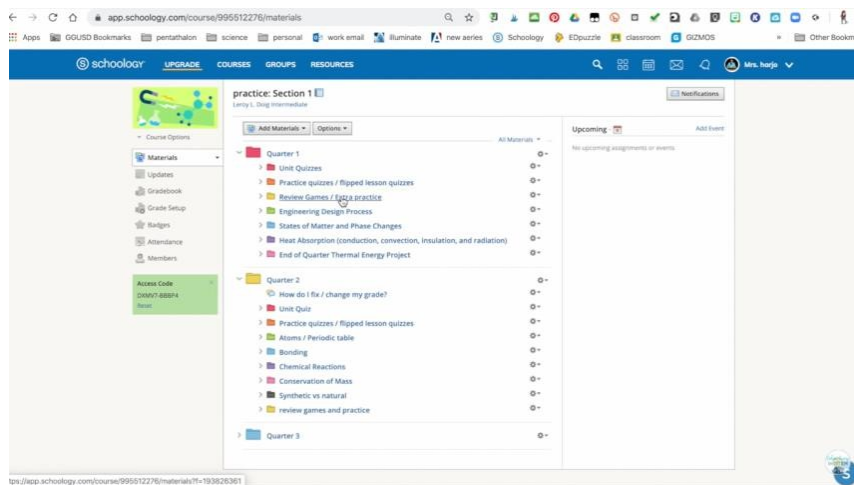


Figure 3. Schoology Interface

### 3. Methodology

This research proposed Evolutionary Prototype for the development of the BrightEdu courseware. The methodology that was proposed is the combination of an evolutionary prototype and the SAM model. The first phase (requirement gathering) identifies and describes the gathered information. The second phase shows the quick design of the courseware where the storyboard is used in this phase. The third phase (build prototype) involves the development of the courseware based on designing, prototyping, and reviewing.

Jaya et al. [16] explained “a prototype is an initial version of a software system that is used to demonstrate concepts, try out design options, and find out more about problems and its possible solutions” (pg8). The prototyping methodology is interactive and involves iteration in prototype development. There are two types of prototyping methodology; throwaway and evolutionary prototyping. This research will use an evolutionary prototype as the main methodology.

Evolutionary prototype is a software development method where the developer or development team first constructs a prototype [17], user will give feedback on every phase until it meets the requirement.

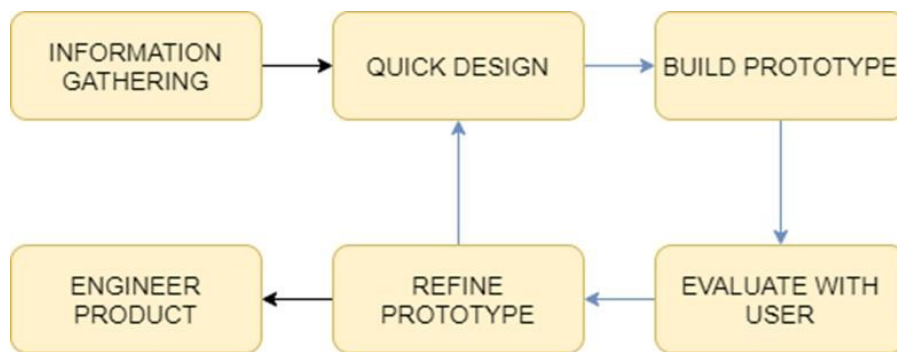


Figure 4. Evolutionary Prototype

SAM model was built in three main phases which are preparation, iterative design, and iterative development phase. The intent of provide increased flexibility with more agile development, responsiveness, and collaborative opportunities than offered by traditional ADDIE [18]. Successive Approximation Model (SAM) is suggested as an alternative ISD model for ADDIE with its agile and iterative approaches [19]. SAM model is an iterative process that gives out the experience to test, experiment, and revise the designs.

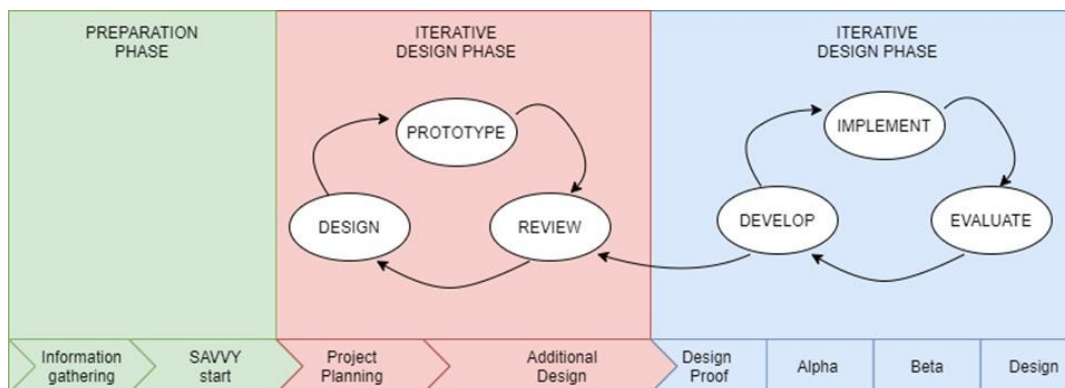


Figure 5. SAM Model

SAM model is an alternative to the ADDIE model and the SAM model more to an agile approach. SAM model starts with the preparation phase that consists of information gathering and SAVVY Start. Next, the iterative design phase is where we will see the research running plus additional design. In this phase, we will start to design a prototype and will be reviewed it from time to time. The process of designing, building prototypes, and reviewing will keep repeating until it meets the specification. Thirdly, the iterative development phase. In this phase, there will be a design proof, alpha, beta, and gold. The proof of the design will be passed to the alpha version, which is the first version of the development, then evolve to the second version named beta after receiving an evaluation from the Alpha version. Lastly, after the beta version is revised and evaluated, it will pass to the gold version where the final version of the development. So, the process of this phase will be the development, implementation, and evaluation.

The goal of this research is to develop online courseware for lowly-achieving special education student and the development of this research have to develop within 3 months or less. Choosing an evolutionary prototype alone eventually will lead to a successful development moreover, prototypes are tangible realizations of research plans that can be easily referenced by stakeholders when trying to describe desired changes. The development of the research is for educational use. So, the syllabus, learning materials, and subjects need to be implemented in this research. Therefore, the SAM model will be implemented together with the evolutionary prototype. To explain more about the combination, the figure below will show how the iteration will work together.

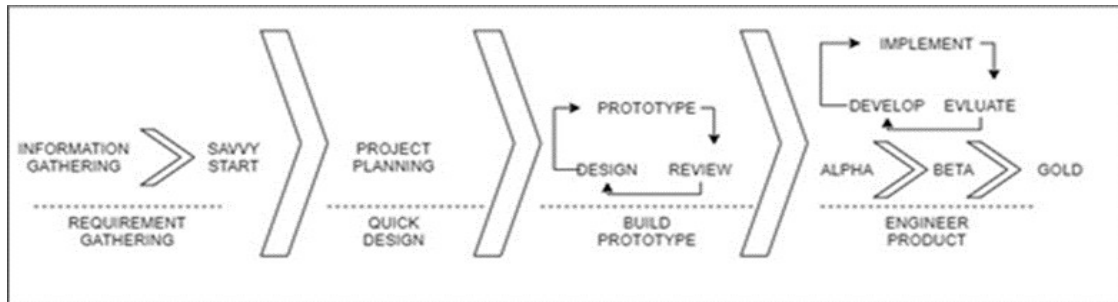


Figure 6. Combination of Evolutionary Prototype and SAM Model

## 4. Result and Finding

### 4.1. BrightEdu Courseware

Figure 7 shows the main page of BrightEdu courseware. This will be the first page that the user will see as they open the courseware. In this page, user will see the “TEACHER” button and the “STUDENT” button to clarify their identity before logging into the system.

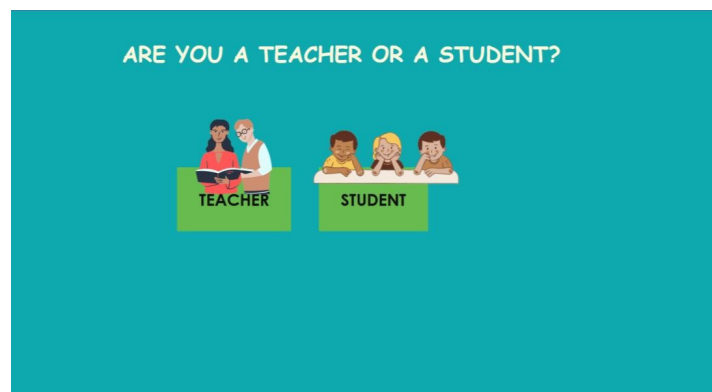


Figure 7. Main Page

Figure 8 shows the Home Page (Student) of BrightEdu courseware. On the home page, there will be several options for the user to choose which activity they are heading to, while Figure 9 shows the Home Page (Lecturer) of BrightEdu courseware

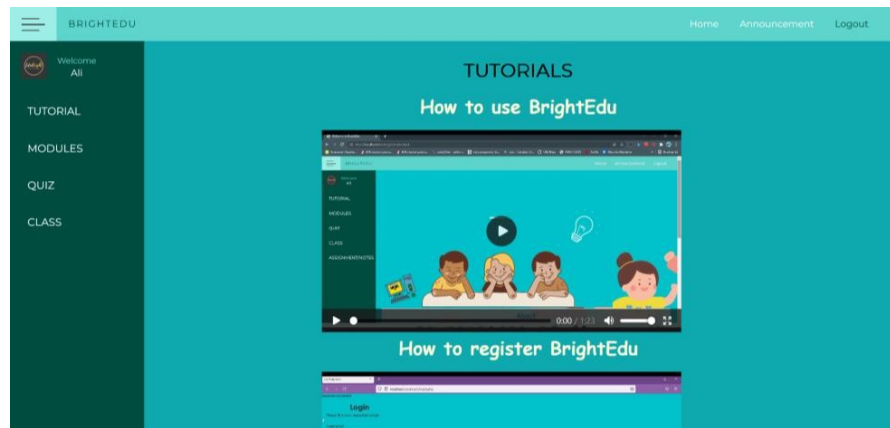


Figure 8. Home Page: Student

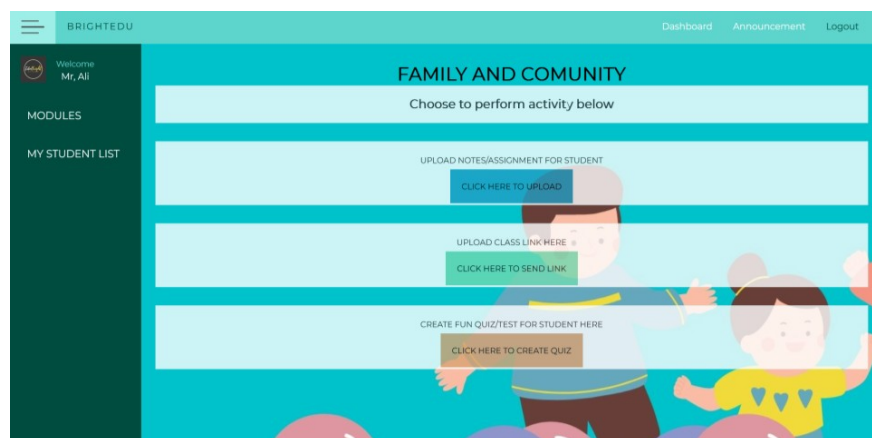


Figure 9. Home Page: Lecturer

#### 4.2. Usability Test

In this research, usability testing is done by giving realistic tasks to participants who represent the real survey respondent. A usability test was conducted to measure how usable the courseware was for low-achieving special education students aged between 13- 15 years old. Due to pandemic covid-19, face-to-face meetings are really strict and most of the schools shut down. So this survey is done by sending out a google form with the attachment of the demo video, for them to see how the courseware works. The test was participated in by 20 respondents.

The result of usability was collected based on the lists of tasks that were given to the respondent. The result is calculated based on a task that was divided into 5 segments which are functions and arrangement, user convenience, colors, fonts, ratings, and feedback. Based on the survey, only teachers and parents were involved. Assuming parents become presentative of the student. About 75% of teachers involve taking part in the survey and 25% of the parents in a total of 100% adult.

Table 1 shows finding for functions section. In this section, a few questions were asked on the functionality of the courseware. Users were asked to rate the interface, asking for their feedback on the interface and the sequences. After the user, watch the demo video, about 55 percent of users liked the

courseware's interface. However, still, 10 percent still don't really like the interface of this courseware. It also shows that about 11 percent and 12 percent of the user understand the sequences of the interface.

Table 1. Usability Test: Design and Arrangement

Result	Strongly Agree	Agree	Not Agree	Strongly not Agree
I like this interface	6	11	1	2
This interface is easy to understand	4	11	3	2
The sequence of the screen was clear	4	12	3	1

Table 2 consists of 2 questions for users to ask whether they are comfortable in using the system if they will give a hand on for the system. The overall result for this section, about 13 out of 20 found that users agree that this system is easy to use and to find information such as the courseware about.

Table 2. Usability Test: User Convenience

Result	Strongly Agree	Agree	Not Agree	Strongly not Agree
It was easy to use	5	12	2	1
It was easy to find the information needed	4	15.3	0.3	0.4

Table 3 shows a guiding statement for the user to rate the suitability of the color. According to the surveys, users mostly agree on the use of color, the combination, and its suitability for the student. The color used in this courseware are turquoise and its group colors.

Table 3. Usability Test: Interface Section - Color Suitability

Result	Strongly Agree	Agree	Not Agree	Strongly not Agree
The color used is clear	4	15	1	0
Good color combination	6	11	2	1
Color used is suitable for student	6	8	6	0

Table 4. Usability Test: Interface Section - Font

Result	Strongly Agree	Agree	Not Agree	Strongly not Agree
The font used is suitable	3	14	2	1
The size of the font in every screen is suitable	4	11	3	2
Font color is suitable	1	14	3	2

Table 4 shows that the font used in this courseware is suitable for every screen. However, there're still about 2 out of 20 users who don't really agree with the suitability of the font.



Table 5 shows the finding for the navigation section, the user asked to test if the navigation of this courseware can navigate the user to the screen that they want. In this section, it is shown that users are quite satisfied with the navigation in this courseware.

Table 5. Usability Test: Interface Section - Navigation

Result	Strongly Agree	Agree	Not Agree	Strongly not Agree
When I clicked the button, I was brought to the right screen	12	8	0	0
"Home" button brings me to home page	7	13	0	0
"Module" button brings me to module page	7	13	0	0
"Announcement" button brings me to announcement page	7	13	0	0
When I clicked the button, I was brought to the right screen	12	8	0	0

Table 6 shows the finding for the button section. Button is one of the main parts in a system, the button is the main way to get to the next page or for media to play. In this section, users are reallyl satisfied with the button. About out 65% user strongly agree that the button mentioned is working, meaning that this system is working to.

Table 6. Usability Test: Interface Section - Button

Result	Strongly Agree	Agree	Not Agree	Strongly not Agree
"Log in" Button works fine	13	7	0	0
"Home" Button works fine	13	7	0	0
"Module" Button works fine	12	8	0	0
"Done" Button works fine	11	9	0	0
Audio can be played	10	10	0	0

Table 7. Usability Test: Interface Section - Use of Media

Result	Strongly Agree	Agree	Not Agree	Strongly not Agree
Photo used is suitable for all range of ages	14	6	0	0
Photo used is sensitive	1	1	1	17
Audio is clear and not crack	5	14	1	0
Video used is suitable for all range of ages	8	12	0	0
Song used is suitable and fun	10	10	0	0
Overall media is good	10	10	0	0

Table 7 shows the finding for the use of media. In this section user were asked to rate the useness of media wether it is appropriate, suitable and proper for all range of ages. Table 7 shows that about 70% of user strongly agree that the photo used in this courseware is suitable for all range of age. Beside, about 85% user don't agree if the photo used is sensitive. Meaning, most of the photos used is appropriate. The rest of the result, mostly user are satisfied with the audio, song, and video used in this courseware.

Table 8 shows the finding for the overall functions of the courseware. The overall result is satisfying although there some user whom still not really satisfy with the overall system.

Table 8. Usability Test: Overall Functions of the Courseware

Result	Strongly Agree	Agree	Not Agree	Strongly not Agree
Overall, I am satisfied with the system	5	11	2	2
The system is easy to use	1	17	0	2
I am comfortable to use this system	2	12	0	2
This system ease my work	3	14	1	2

Table 8 shows that about 85% users agree that this system is easy to use which is actually suitable for children and for parent to guide them. About 17 over 20 user agree that this courseware is easy to use. They agreed that this courseware also can be use by the students. About 14 over 20 user also agree that this courseware make their work easier. Lastly, the most if the user, satisfied and comfortable with this courseware where this fulfill the requirement.

#### 4. Conclusion

About 85% user found it really suitable for the low-achieving special education student. It is important to know this student's need in visual and media. It is also shown that about 89% of the user accept this research as a courseware that can assist the student. The use of media is really important to attract the student attention especially in understanding the subject.

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