

# Development of Digital Orthopedagogic Teaching Materials to Support Online Lectures during the Covid-19 Pandemic for Students with Special Needs in Education

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## ABSTRACT

The aim of the development is to produce learning materials in digital format for orthopedic courses as a support for online learning for orthopedic lectures, which can be used by all students who take a specialization in special education. The development method used to achieve these goals is the multimedia development model (William, Lee and Owen, 2004). The results of the development of teaching materials through the expert and user assessment process include material experts 88.12%, media experts 97.9%, and users 95.8%, which indicate that they are in very feasible criteria. The results of the assessment from the validators are categorized as very feasible or feasible to be used as learning support materials, which are adequate in the era of the Covid-19 pandemic, where the expiration time cannot be predicted.

**Keywords:** digital teaching materials, online lectures, orthopedagogic

## 1. INTRODUCTION

In line with the Institution's policies in the Covid-19 pandemic situation, the presentation of this lecture will be carried out online based on ICT. The revolution in informatics and communication engineering, after the application of various multimedia products in education, provides supporting evidence that the application of information technology devices can increase student appreciation of objects or objects introduced to them (Nazaruddin & Efendi, 2018). For example, the use of Augmented Reality for learning can direct the user's attention to relationships that focus on an Augmented Reality perspective and a more artificial perspective (Wickens, 1992). Much development has been made on the application and effectiveness of Augmented Reality in education and training (McLellan, 1996, 2003).

Considering the effectiveness of using ICT devices as an assistive and accommodating medium to improve student performance in learning activities for distance learning, the development of learning materials in digital format for orthopedic subjects may improve the mindset of stimulated student understanding patterns. In effect, it

is hoped that it can become a necessity and increase good learning motivation, even though it is constrained by the Covid-19 pandemic. In turn, it will improve the academic achievement of PLB students.

Orthopedagogics, in accordance with the terminology of its name, will examine educational perspectives for students with special needs. On the basis of this understanding, the formal object that becomes the discussion of orthopedagogic science is students or students with special needs. Students with special needs are those who are visually experiencing obstacles in the physical-motor, mental-intelligence, socio-emotional, interaction and social communication aspects, so they have their own problems in their educational services. Interventions to develop their capabilities require special educational services (Hallahan & Kauffman, 2006), hereinafter referred to as Special Education or Special Education.

The use of orthopedagogic work methods in certain scientific research or studies is the same as in similar fields of science by still considering its suitability with needs, namely the use of deductive thinking and

inductive thinking methods. The deductive thinking method is used whenever to draw out fundamental principles related to religion, philosophy, ethics, and to use previously proven principles (Sadiq, 2004). Inductive thinking methods are used to summarize individual experiences in the field, the results of experiments in the laboratory or field, surveys, or case studies. Observed facts or experiments collected from the field or laboratory are used to reach conclusions that can explain these facts coherently (Stenberg, 2006). To some extent, orthopedagogy becomes a method to ensure the provision of education rights for children with special needs, nothing more. The presence of orthopedic science in human life is the same as others, namely as a tool to help humans in overcoming the problems they face on a daily basis (Suriasumantri, 2003) because the function of science itself in human life is for the welfare of humans.

The learning component that contributes significantly beyond the curriculum is the availability of learning materials and resources. One of the components of learning resources that cannot be separated in the learning process is teaching materials. The availability of teaching materials can be one of the supporting factors for the successful implementation of the learning process. Teaching materials are a set of learning materials arranged systematically that can create an environment that allows students to learn. One of the goals of providing teaching materials is to facilitate the student learning process.

Teaching materials can also help teachers carry out the process of teaching and learning activities in the classroom. Therefore, the teacher must be able to choose suitable teaching materials to be applied in the teaching and learning process to make it easier for students to understand the learning material so that they can achieve the expected learning objectives. The selection of teaching materials must also be adjusted to the learning curriculum that is being implemented in schools (Ighfir Rijal Taufiqy, Sulthoni, Dedi Kuswandi, 2016). The essence of teaching materials, which acts as a learning media, serves as a communication tool to streamline the teaching and learning process (Hamalik, 2010). In order for the learning process to be successful, a good teacher must be able to take advantage of available teaching materials as media and communication in learning and always update learning materials according to the times.

Digital textbook media as a medium and learning resource is a learning medium that combines images, text, animation, and audio into one medium, which can be called multimedia. Multimedia is a combination of various media (Rustini, 2014). Learning activities using digital textbook media will certainly be more optimal if they are supported by a learning model that can increase students' critical thinking levels (Zahro, 2019).

The development of teaching materials is very important for educators to provide material according to

the needs and backgrounds of students. The teaching materials developed should be collected from various sources and contain tasks carried out by students in the form of learning activities that will form scenarios or learning procedures that structured and systematic. However, conditions in the field show that the teaching materials used still have many shortcomings, including the shape of a thick printed book so that it is burdensome for students to bring printed books in each subject.

## 2. METHOD

The development method used to achieve these goals is the multimedia development model (William, Lee and Owen, 2004). Procedurally this development step is carried out through needs analysis, making program designs, compiling a device or prototype model, testing a device or prototype model and evaluating the device or prototype model.

The first stage of research, the collection of initial information through the results of FGDs with about four heads of departments and study programs of PLB / PKh (Dept. Special Education) universities in Indonesia, will then be followed up by mapping courses with orthopedagogic origin.

The second stage of research is the collection of information about the validity of the prototype of teaching materials developed. The research subjects who become the validators are respondents who come from education & learning technology experts, lecturers of orthopedic courses, chair of the PLB / PKh study program, and special education / PKh students who come from various universities, especially those from the special education program/department of special education or PKh.

Data collection is done through filling out questionnaire sheets and interviews. Data analysis in the second stage is the description and verification of the orthopedagogic digital teaching material prototype. Quantitative data analysis uses descriptive statistics, while for qualitative data, the analysis is carried out through the following work references, namely: (1) data reduction, (2) data presentation, (3) drawing conclusions and verification (Miles, Huberman, Saldana, 2014). The interpretation data of the result follows Table 1.

**Table 1 Interpretation of Analysis Results**

No.	Range	Qualification	Description
1	81 % - 100%	Very worthy	No need for revision
2	61 % - 80%	Well worth it	No need for revision
3	41 % - 60%	Pretty decent	Revised
4	21 % - 40%	Not worth it	Not Used
5	0 % - 20%	Very less feasible	Not Used

### 3. RESULT

The first step before compiling orthopedagogic teaching materials as a medium and communication of learning between lecturers-students, students, according to the flow described in the previous section, namely Focus Group Discussions with senior lecturers from several universities, including UPI Bandung, UNS Surakarta, UNLAM Banjarmasin, UNESA Surabaya on the 2nd week of March 2020.

The information from the discussion explicitly concluded several aspects. First, the term

“orthopedagogic” or orthopedagogy since the inception of the department/study program has become a unique “icon” that adorns student activities study program/department of special education or special education and the identity of the subjects at various universities in Indonesia

Second, specifically, the term “Orthopedagogics” is the same as the field of other similar sciences in its working parameters, among others; orthopedics, orthodontics, so it is necessary to promote the word “Orthopedagogics” as a scientific discipline in special education.

**Table 2 Material Expert Assessment Result**

No	Rated aspect	Score	%	Conclusion
<b>A</b> Material				
1	The material is in accordance with the standard of graduate learning achievement (SCPL)	18	90	Very worthy
2	The material according to course learning outcomes	18	90	Very worthy
3	The material in accordance with the scope of the field of Special Education	17	85	Very worthy
4	The material is in accordance with the character of students/student in the first year	18	90	Very worthy
5	The material is in accordance with the level of needs of students	18	90	Very worthy
6	The material presented is easy for students to understand	19	95	Very worthy
7	The truth of the concept of the material presented in terms of educational, scientific aspects	17	85	Very worthy
<b>B</b> Language				
8	Politeness of language use	18	90	Very worthy
9	The language used is easy to understand by students	17	85	Very worthy
10	The suitability of sentence length with the level of understanding of students	18	90	Very worthy
11	The use of language in each paragraph makes it easier to understand the message of the material	17	85	Very worthy
12	Use of words that do not contain double meanings	18	90	Very worthy
<b>C</b> Graphics				
13	Use of fonts, types and sizes as needed	19	95	Very worthy
14	Layout or layout of the presentation of the material	17	85	Very worthy
15	Illustrations/pictures to support material clarity	16	80	Very worthy
16	Textbook display design to increase learning motivation	17	85	Very worthy
<b>Total</b>		<b>282</b>		
<b>Average</b>		<b>17,62</b>	<b>88,12</b>	

**Table 3 Media Expert Assessment Result**

No	Rated aspect	Score	%	Conclusion
<b>A</b> Material				
1	The material for each chapter presented is in accordance with the standard of graduate learning achievement (SCPL)	12	100	Very worthy
2	The material for each chapter presented is in accordance with the learning outcomes of the course	12	100	Very worthy
3	The material presented is in accordance with the scope of the field of Special Education	12	100	Very worthy
<b>B</b> Media Appeal				
4	The use of pictures/illustrations supports the clarity of the material in the textbook	10	83,3	Very worthy
5	Textbook design and appearance to increase students' interest in learning	12	100	Very worthy
<b>C</b> Book Quality and Appearance				
6	The sentence text in the presentation material is quite clear and easy to read	12	100	Very worthy
7	The design of the presentation pages in each chapter of the textbook is organized	12	100	Very worthy
8	Use of fonts, types and sizes as needed	12	100	Very worthy
<b>Total</b>		<b>100</b>		
<b>Average</b>		<b>12,5</b>	<b>97,9</b>	

**Table 4 User Assessment Result**

No	Rated aspect	Score	%	Conclusion
A	Material			
1	The material is in accordance with the Graduate Learning Outcomes Standards (SCPL)	35	97,2	Very worthy
2	The material in accordance with Subject Learning Outcomes	35	97,2	Very worthy
3	The material according to student needs	34	94,4	Very worthy
B	Language			
4	Polite use of language and does not reduce the meaning of nature	36	100	Very worthy
5	The length of the sentence corresponds to the level of understanding of the student	33	91,6	Very worthy
6	The use of language supports the ease of students understanding the flow of the material	35	97,2	Very worthy
7	The use of language is in accordance with the characteristics of first-year students	35	97,2	Very worthy
C	Quality and Appearance			
8	Just the design and shape of the book attracts readers/students	34	94,4	Very worthy
9	Textbook shapes and prints are done neatly	36	100	Very worthy
10	The textbook form is easy for readers/students to recognize and remember	35	97,2	Very worthy
11	The text is clear and easy to understand for students/readers	33	91,6	Very worthy
D	Book Appeal			
12	The book display supports the teaching and learning process	32	88,8	Very worthy
13	The use of textbooks supports readers/student learning	35	97,2	Very worthy
14	The existence of this textbook increase's student motivation	36	100	Very worthy
15	This textbook is easy to use in learning	34	94,4	Very worthy
16	The condition of the book is in accordance with the development of students	34	94,4	Very worthy
	<b>Total</b>	<b>552</b>		
	<b>Average</b>	<b>34,5</b>	<b>95,8</b>	

Third, the material content that will be developed comprehensively must include scientific foundation, educators, students, educational processes, facilities and infrastructure, as well as a model for providing education for children with special needs.

Lastly, considering that the PLB field of study intersects with or intersects with other fields of expertise, academic explanation through orthopedic science is expected to be a bridge "misunderstanding" internally and externally.

Taking into account the responses and perceptions that developed in the discussion, the existence of textbooks as a possible bridge to base the understanding of students or anyone who wants to be involved in special education or special education needs to be realized immediately with the scope and depth of material according to point (3) in on.

The accessibility of books that have been prepared academically to be accounted for, then in real terms after an assessment of the reliability of the language in textbooks, Orthopedagogics: Education for Children with Special Needs. A complete assessment of the prototype of teaching materials from various parties can be presented in Table 2, Table 3, and Table 4.

#### 4. DISCUSSION

Overall, the draft of teaching materials in the form of textbooks to support orthopedagogic lectures is 100% complete. To finish, some improvements are still needed in some parts of the book according to the suggestions of

the evaluator (validator). Books are media that can be used as teaching materials. Textbooks are textbooks that are used in learning as a standard reference or reference for certain subjects (Akbar, 2015). However, before developing textbooks, it is necessary to conduct a needs analysis study. In this case, to support the orthopedic course, a good textbook is needed, namely textbooks that are arranged in accordance with social and cultural life and are made by integrating the dimensions of scientific literacy, containing tasks or activities, presenting attractive illustrations or pictures (Windiyariani, 2016).

To arrive at the perfection of this book, there are five aspects assessed by the evaluators of this teaching material consisting of material experts, media experts and users (target use), including material quality, language use, graphic quality, quality and appearance of teaching materials. And book appeal.

The quality of the material presented in each chapter is in accordance with the standard of graduate learning achievement (SCPL), course learning outcomes (CPMK), the scope of the Special Education field, the character of students/students in the first year, the level of needs of students/students as an insight into about The PLB, the ease of understanding for students/students who are just exploring the special needs, as well as the correctness of the concept of the material presented in terms of educational, scientific aspects, show that the quality of digital teaching materials is categorized as very feasible to use.

In terms of language, the aspects that are assessed include politeness in the use of language in the presentation without reducing the values of education, the use of language in the presentation of material that is easy for students to understand, the suitability of the length of the sentences presented in each paragraph with the level of understanding of students, the use of language in each paragraph to support easier understanding of the message of the material presented, the use of words in the presentation of material that does not contain multiple meanings, the suitability of length or sentence patterns with the level of understanding and characteristics of first-year students, all aspects assessed from the linguistic sideshow that the quality of this digital teaching material is categorized as very feasible. The main criteria in terms of the language used must be easy to understand, interesting, the content contained in the book is arranged based on the applicable educational curriculum, and the contents of the book are in accordance with the author's ideas (Prastowo, 2014).

From the graphic side, the aspects that are assessed include: the suitability of the use of the type and size of the font to the needs, the layout of the presentation of the material, illustration/images to support the clarity of the material, and the design of the textbook display to increase learning motivation shows that the quality of teaching materials digital is categorized as very feasible to use. Good teaching materials should have a high degree of readability so that students can understand them. The sentence structure must comply with grammar rules and use a rich, yet easy to understand, commonly used vocabulary. Notation, letters, pictures, photos, and other illustrations were chosen to convey the message content must have high meaning (Bahtiar, 2015).

In terms of quality and appearance of books, indicators include: the shape and print of textbooks are carried out neatly, the design and form of the book only attract readers/students, the form of textbooks is easy to recognize and remember by readers/students, clear text and easy to understand for readers/students, as well as a medium to support the teaching and learning process, it shows that the quality of this digital teaching material is categorized as very feasible to use

In terms of attractiveness, the aspects include: textbook contributions to increase student motivation to study PLB material, ease of use of textbooks in learning, use of pictures/illustrations to support the clarity of material in textbooks, textbook design to increase interest in learning students, clarity and readability of sentence text in the presentation material, the regularity of the presentation page design in each chapter of the textbook, shows that the quality of this digital teaching material is categorized as very feasible to use

The existence of digital orthopedic textbooks as a medium of communication in learning, especially for: (1) clarifying messages; (2) make time, space, and sense

power effective; (3) generate motivation to learn; (4) enabling students to learn independently according to their talents and needs; (5) provide the same experience to children; (6) the learning process contains five communication components, lecturers, learning materials, learning media, students, and learning objectives (Daryanto, 2013). The existence of the media based on the book "Encyclopedia of Educational Research" details the benefits of instructional media are (1) using concrete basics for thinking so as to reduce verbalism; (2) increasing student attention; (3) laying the foundations that are important for the development of learning, so that learning is more stable; (4) provide real experiences; (5) foster systematic and continuous thinking; (6) foster language development; (7) provide experiences in new ways and variations in learning activities (Suryani et al., 2018).

Above all, whatever types and forms of media are used in learning, including digital textbooks that are developed, at least it is necessary to pay attention to the principles of selecting good learning media, including: (1) the suitability of the learning media with the objectives; (2) learning media adapted to the abilities and needs of students to support material that is facts, concepts, and generalizations; (3) practical, easy to use, and can be used continuously; (4) educators are able to use media skillfully; (5) paying attention to the target of the study group; and (6) pay attention to technical quality (Arsyad, 2013).

## 5. CONCLUSION

Considering the validation results of media experts, material experts and users who come from the State University of Malang and outside the State University of Malang (UNS, UNESA, UNJ, UNP, UNM, UNINUS) who assess the textbook entitled, "Orthopedagogy: Child Education Science. "Special Needs" should be considered as a reference for students who take a specialization in Special Education or Special Education, because in terms of quantity, the results of the assessment from the validators are categorized as very feasible or feasible to be used as learning support material which is adequate in the era of the Covid-19 pandemic that cannot yet be used. predicted expiration time.

To arrive at the level of operationalization of the textbooks to implementation in the field, the first step before disseminating textbooks to users (target groups) there needs to be a special workshop related to how to implement these textbooks in learning activities carried out online (online). and outside the network (direct instruction). This step is carried out as an effort so that the existence of the textbook "Orthopedagogics: Education for Children with Special Needs" can provide maximum benefits to students of Special Education.

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