

BOSIVA AS AN ANDROID E-BOOK IN DISCUSSION OF ADAPTATION OF LIVING CREATURES FOR FIFTH GRADE OF ELEMENTARY SCHOOL: A RESEARCH AND DEVELOPMENT

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Abstract— Science subject in elementary school is a subject that invites students to reason about the surrounding natural conditions. The findings of the researchers indicate that there is a shortage of science learning facilities at several elementary schools in Blitar. As much as 84% of students in the observation stated that science lessons were difficult to understand. In addition, teachers and students who were interviewed stated that e-book teaching materials were interesting as science teaching materials, especially in materials on adaptation of living things to grade V SD. Therefore, researchers proposed Bosiva as a solution for developing new teaching materials in natural science material for adaptation of living things in digital form. This research is based on modified R&D which includes potential and problem formulation, data collection, product design, design validation, design revision, product testing, and product revision. Researchers developed Bosiva to find results for material expert validation of 86%, language validation of 93%, and media validation of 95% which all stated very feasible. In addition, the results of the teacher's readability test were 95% and the student's readability test was 97% which were also classified as very feasible. So, it can be concluded that Bosiva is a breakthrough in the development of android-based teaching materials to support learning adaptation of living things.

Keywords— *E-Book Teaching Materials, Teaching Product Development, Living Creature Adaptation*

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I. INTRODUCTION

Science (IPA) is a subject that studies living things around humans. This subject essentially studies the identity of living things along with natural processes from nature which are processes, products, and implementation in the real world [1]. Currently, under the mandate of Kurikulum Merdeka, science is a subject that is accepted in elementary schools (SD). This subject requires form, example, and critical reasoning from students, but [2] science learning is still not perfect due to the lack of innovative learning technology for elementary school students, especially the realization of applications that provide examples of the material.

In recent developments, intertwined technology is needed to support Science Learning and Teaching Activities (KBM) in the classroom [3]. The form of assistance from KBM IPA SD can be delegated in the form of teaching materials. Teaching materials are supplements for teachers to assist the implementation of KBM in the form of written and unwritten [4]. Teaching materials are useful to spur the absorption of student material that can be arranged in accordance with the instructional program in accordance with its function to assist teachers in KBM [5].

Preliminary study carried out in the topic of analyzing the needs of teachers and students of fifth grade in the subject of science in the class was in the form of observation checklist and interview. This study was conducted on four elementary schools in Blitar Regency. In tabulation, teachers stated that science teaching materials in their schools were still not available to support student understanding. As many as 84% of students stated that science material was difficult to understand, especially in adaptation material to living things. The results of the observation checklist stated that 90% of students were happy with the materials based on digital books (e-books). This finding hinted at the researcher to develop science e-book learning media on adaptation materials for living things.

E-books have an important role to support the quality of KBM, because the material can be packaged in the form of e-books and can be accessed via smartphones. Observational findings showed that smartphones based on the Android operating system were chosen because most students already have Android smartphones. The material packaged in android can be conceptualized by teachers according to the analysis of student needs, characteristics, and behavior for a more positive and fun KBM [6]. Based on the above findings, researchers developed science e-book teaching materials adapted to living things based on android

smartphones under the name Bosiva. Bosiva is developed by discussing written and audiovisual materials that have the potential to attract students in order to increase learning achievement. The previous android e-book was developed by [7] with fifth grade material about digestive system. The teaching materials are also equipped with audiovisual materials, self-reflection, literacy, and illustration. Meanwhile, the difference between Bosiva and e-books is the material presented and the appearance.

The development of Bosiva brings out problems, objectives, and significances in it. First, the research problems that are “how is the validity of the development of Bosiva as teaching materials?” and “how are the readability of the students and teachers to Bosiva as teaching materials?”. This study aims to determine the feasibility of developing Bosiva as teaching materials and determine the readability of students and teachers to Bosiva as teaching materials. This research and development is useful for researchers in adding insight into the development of Bosiva on adaptation material for living things. Additionally for schools, it is usefully to get information knowing that Bosiva is a supplement to science learning in adaptation material for living things, and for teachers, it can be used as an alternative learning media that can support the absorption of material by students.

II. METHODS

This research applies research and development procedures or Research and Development (R&D). R&D is a research method that aims to create products that are tailored to their needs and efficacy testing [8];[9];[10]. There are 10 stages in the implementation of R&D, but due to the lack of time, cost, and energy researchers only apply the 7 stages listed in the following chart.

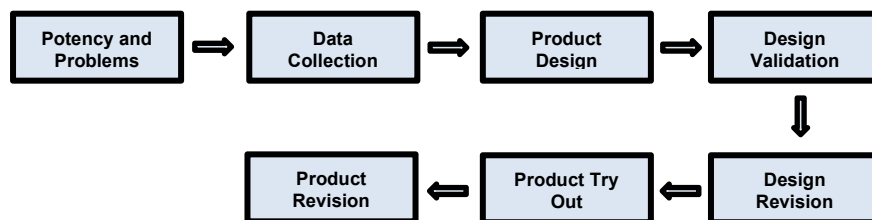


Figure 1. Sugiyono's Modification of R&D steps

In the first stage, researchers conducted a *preliminary study* in the form of teacher interviews and questionnaires for students. This activity targeted fifth grade elementary school teachers at SDN Gogodeso 2 and SDN Babadan 1 Blitar Regency. Meanwhile, the

questionnaire targeted fifth grade students at SDN Ngeni 5, SDN Gogodeso 2, SDN Babadan 1, and SDN Ngeni 8 Blitar Regency.

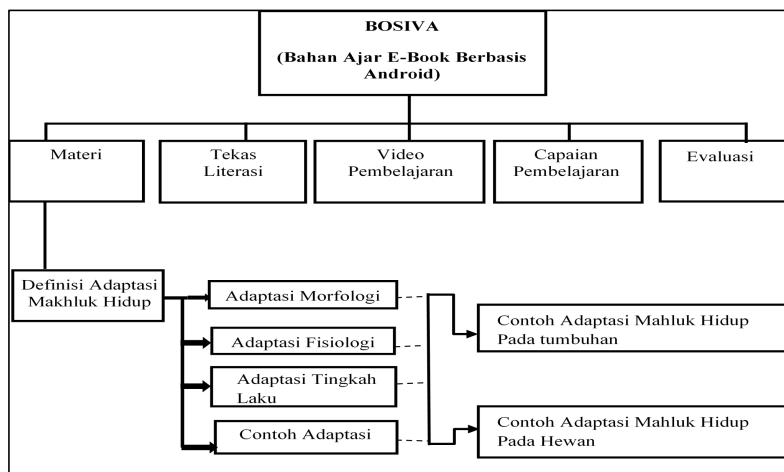


Figure 2. Hypothetical Chart of Materials in Bosiva

In the second and third stages, the research researchers conducted an analysis of *Kurikulum Merdeka* in phase F. This analysis includes CP, TP, and ATP class V elementary school on adaptation material for living things. After that, researchers compiled hypothetical material charts, learning video prototypes, and literacy content in the form of images, quizzes, and videos to fill in the form of the Bosiva application using Canva and Coreldraw. Then Bosiva was created with the Smart Apps Creator application.

Table 1. Bosiva Product Specifications

Parts of BOSIVA	Information
Display Design	✓ Bosiva can be accessed through a link that has been created a <i>barcode</i> .
	✓ Bosiva can be accessed via android <i>mobile</i> media RAM at least 4 <i>gigabytes</i> .
	✓ BOSIVA design using Canva design application then developed into an android application assisted by <i>smart apps creator software</i> .
	✓ Font sizes are 12, 14, 16, with Times New Roman and Arial models.
	✓ The selection of cover illustrations is tailored to the theme of adaptation of living things.
Content design	✓ The material presented is in accordance with competencies, indicators and learning objectives.

✓	Literacy readings are presented to encourage students to be interested in reading.
✓	The language of material delivery is simplified to make it easier for students to understand the content of the learning material presented.
✓	The material is also related to the surrounding environment as a concrete example of learning.
✓	Adding learning images and videos to support learning.
✓	Illustration as decoration and has meaning.

Table 2. Media Expert Validation Instrument Hints

No	Aspect	Indicator	Statement Number
1	Display Quality	1 Suitability of instructions for using teaching materials	1
		2 Appearance and color presentation	2
		3 Clarity of color selection	3
		4 Selection of font type and size	4
		5 Accuracy of feature selection in presenting BOSIVA teaching materials	5
2	Software Engineering	1 Ease of operation of BOSIVA	6
		2 Ease of management	7
3	Implementation	1 Proper presentation of dubbing and visualization	8
		2 Use of teaching materials that can be used on Android	9

Table 3. Material Expert Validation Instrument Hints

No	Aspect	Indicator	Statement Number
1	Material Suitability	1 Suitability of the material to learning outcomes	1
		2 Suitability of the material to the Learning objectives	2
		3 The presentation of learning materials is interrelated	3
		4 Systematic presentation of material	4
		5 Presentation of completeness of illustrative images	5
		6 Clear presentation of learning videos	6
		7 Presentation of illustrations on clear learning videos	7
		8 Presentation of literacy in accordance with learning outcomes	8
2	Curiosities	1 Presentation of appropriate evaluation	9

Table 4. Linguist Validation Instrument Hints

No	Aspect	Indicator	Statement Number
1	Straightforward	1 Presentation of sentence structure in the instructions for use.	1
		2 Literacy	2
		3 Learning Materials	3
		4 Language Use	4
		5 Clear and precise paragraph separators	5
2	Communicative	1 The presentation of the language provided provides convenience	6
		2 Clarity of the learning material presented	7
3	Language Compatibility	1 The use of language is in accordance with the EYD and is easily understood by students	8

The fourth and fifth stages of design validation apply for validation to media, material, and language experts [11]; [12]; [13]; [14]; [15] to validate the Bosiva prototype. After that, researchers get results that state in the form of conclusions that Bosiva must be improved in terms of interface appearance and usage menu. Furthermore, the researcher carries out revisions to the above weaknesses to be corrected on expert advice until repeatedly improved.

Table 5. Teacher Readability Questionnaire Hints

No	Aspect	Indicator	Statement Item
1.	Presentation of Teaching Materials	Instructions for using teaching materials.	1, 2, 3, and 4
2.	Presentation of Material	Clarity in the display, visualization and dubbing of teaching materials.	5, 6, 7, 8, 9, 10, 11, 12, 13, and 16
3.	Presentation of the Language Used	Suitability of material presentation with learning content.	14 and 15

Table 6. Student Readability Questionnaire Hints

No	Aspect	Indicator	Statement Item
1.	Presentation Display of teaching materials	The display presentation and instructions for use are clear.	1, 2, dan 3
2.	Presentation of Material	Use of teaching materials.	4, 5, dan 6
3.	Presentation of the language	Presentation of appropriate illustrative images and learning videos.	7

used

In the sixth and seventh phases, researchers conducted a try-out of 15 students to identify students' responses to Bosiva's learning media. After that, the researcher revises for product refinement. In addition, researchers conducted teacher and student readability tests to determine the response to the use of Bosiva.

Finally, researchers carried out quantitative statistics-based data analysis using the Likert scale. The Likert scale is used by researchers to measure the opinions, attitudes, and views of individuals or groups related to social phenomena (Sugiyono, 2019). This instrument is used to measure the results of teacher readability questionnaires with score intervals of 1 to 5.

III. RESULT AND DISCUSSION

The researchers' findings on the stages of implementing research and development of Bosiva teaching media began with the preliminary study findings. The findings of the observation questionnaire of teachers and students in interviews with four elementary schools in Blitar Regency indicate that adaptation materials for living things experience a lack of teaching material facilities. Meanwhile, the results of the analysis of student needs stated that 84% of students experienced difficulties in science lessons on adaptation material to living things. Meanwhile, 90% of students stated they were happy to use digital-based teaching materials that could be accessed through devices. This can provide researchers with the conclusion that it is necessary to develop digital teaching materials for adaptation materials for living things. Thus, researchers created a prototype of the Bosiva application to be developed as a teaching medium for science material in the chapter on adaptation of living things in the fifth grade of elementary school.



Figure 3. Sets of Bosiva Product Creation Process

Furthermore, the findings in the initial design of Bosiva development researchers compiled subject matter with Microsoft Word that was adapted to CP, TP, and ATP Phase F of Kurikulum Merdeka. After the material was compiled, researchers looked for image

references through freepik.com sites and designed the interface with Coreldraw. Then researchers fill in content, including learning materials, audio, and images, with the iSpiring Suite 9 application.

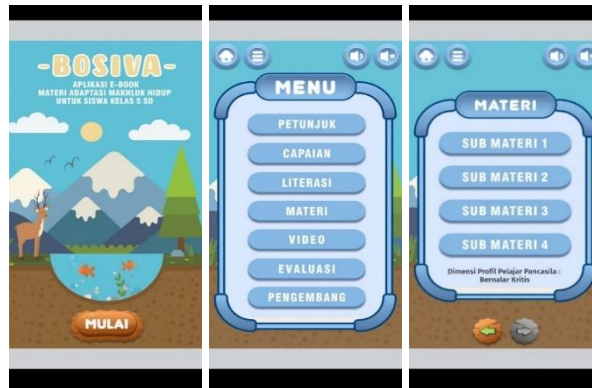


Figure 4. Bosiva Application Development Product Display

Results at the product validation stage are collected for material, media, and language validation. For each validation addressed to 3 experts in each field, there are a total of 9 experts in accordance with their disciplines. First, the validation of Bosiva material gets the following score:

Table 7. Language Validation Results

Statement Number	Validator 1	Validator 2	Validator 3	Total Score
1	4	4	5	13
2	4	4	5	13
3	4	4	5	13
4	4	5	5	14
5	5	5	4	14
6	3	5	5	13
7	3	4	4	11
8	5	4	5	14
9	3	4	4	11
Total score				116
Criteria score				135
Percentage				86%

In accordance with the results in the table above, it shows that the assessment of material expert validators gets a score of 86%, so Bosiva development materials can be included in the category of suitable use. The highest assessment is found in the suitability and completeness of the presentation of learning material that is arranged systematically and in the suitability and presentation of learning images that are clear and in accordance with the content of learning materials that are in accordance with the flow of learning objectives.

Meanwhile, the lowest assessment was on the selection of illustrations on learning videos and suitability for the practice questions presented.

Second, the results of language validation related to Bosiva linguistic elements are contained in the table as follows.

Table 8. Media Validation Results

Statement Number	Validator 1	Validator 2	Validator 3	Total Score
1	5	4	5	14
2	5	4	5	14
3	4	4	5	13
4	4	5	5	14
5	4	4	5	13
6	5	5	5	15
7	5	5	5	15
8	5	4	5	14
Total score				112
Criteria score				120
Percentage				93%

The assessment of media experts gets a score of 95% with very feasible criteria. The highest score is found in the presentation of the display design and colors in the teaching materials. The BOSIVA application has a beautiful and aesthetic value, and the presentation of features and icons on BOSIVA as teaching materials is easy to access, as is the attractiveness of BOSIVA teaching materials as a means of supporting learning activities.

Bosiva, which has received product validation and revision by researchers, enters the readability test stage. First, the teacher readability test was addressed to 4 teachers of SDN Babadan 1 and 1 teacher of SDN Gogodeso 2, who were certified educators. This test aims to determine the readability of teachers on Bosiva media applications conducted on the 27th of elementary school. July 29, 2023 The following are the results of the teacher readability test.

Table 9. Teacher Readability Test Results

Statement Number	1	2	3	4	5	Sum
1	5	5	5	4	4	23
2	5	4	5	5	5	24
3	5	5	5	5	5	25
4	5	4	4	5	4	22
5	5	5	5	5	5	25
6	5	4	5	5	5	24
7	5	5	5	5	5	25
8	5	5	5	5	5	25
9	5	5	5	5	5	25
10	5	5	4	5	5	24

11	5	4	5	5	5	24
12	4	5	4	5	5	23
13	5	4	4	5	4	22
14	4	5	5	5	4	23
15	4	5	5	5	5	24
16	5	4	4	4	5	22
Total Score						380
Criteria Score						100%
Percentage						95%

The results showed a score of 95% and were categorized as very decent. These details conclude that Bosiva media has the potential to support student learning. Furthermore, researchers conducted a student readability test on five students at SDN Babadan 1 with the following results:

Table 10. Student Readability Test Results

Statement Number	1	2	3	4	5	Sum
1	1	1	1	1	1	5
2	1	1	1	1	1	5
3	1	1	1	1	1	5
4	1	1	1	1	1	5
5	1	1	1	1	0	4
6	1	1	1	1	1	5
7	1	1	1	1	1	5
Total Score						34
Criteria Score						100%
Percentage						97%

The student readability test in the form of a Likert scale above got a result of 97%, with qualifications very worthy of use. After that, researchers carry out product evaluations according to field results. Based on the results of expert validation of material, language, media, teacher readability questionnaires, and students, it can be concluded that Bosiva is very good as a learning supplement. Bosiva has advantages in presenting an attractive appearance; it can be accessed via Android; adaptation materials for living things are arranged systematically and animated; and there are interesting student worksheets (LKPD). In addition, Bosiva has the disadvantage that there is no material other than the adaptation of living things presented.

IV. CONCLUSION

Based on the results of the R&D product, Bosiva's android-based e-book teaching materials for fifth grade elementary school students are very feasible. Material validation obtained a percentage of 86% of material experts with very decent categories. Then the language validation obtained a percentage of 93%, which is a very decent category. Meanwhile, media validation obtained a percentage of 95%, which is a very decent category.

In the results of the readability test by grade V elementary school students, Bosiva teaching materials are considered very suitable to be used as learning support with a percentage of 97%. In the readability test, the teacher obtained a percentage of 95% with a very decent category. Based on the acquisition of this percentage, thus android-based e-book teaching materials on adaptation materials for living things in grade V elementary school are ready to be used to support the student learning process.

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