

BIOLAKU APP: INTERACTIVE BIOLOGY LEARNING MEDIA BASED ON MULTICULTURAL ISLAM IN KARIMUNJAWA

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Abstract. Children are the next generation in the future. Children in Karimunjawa consist of various ethnic. This can be a potential conflict if not managed properly. In addition, learning has transformed into virtual learning by smartphone. This study aims to produce an android application for biology learning media based on multicultural Islam that is feasible to apply at the high school level in Karimunjawa. This study is a research and development using the Borg & Gall model. The subjects were all students of class XII MA Safinatul Huda Karimunjawa. Data was collected using a product feasibility assessment sheet, then analyzed using the Rasch Model. The results are that the "biolaku" application is feasible to use, seen from the results of data analysis which shows a raw variance Explained by Measures value of 35.4% so the conclusion is eligible. This research is expected to provide real benefits for education in Karimunjawa.

Keywords: Biolaku, biology, learning media, multicultural, karimunjawa.

INTRODUCTION

Children are buds, potentials, and future generations of the nation's ideals who have a strategic role in ensuring the existence of the nation and state in the future. Based on research, more than 25% of children worldwide have gadgets before they are even 8 years old (Murdaningsih & Faqih, 2014), especially children over that age. Almost every junior and senior high school student already has his own gadget. The 4.0 era was marked by the rapid development of information technology as a basic need in human life. Causing changes in various human activities, including in the fields of education, arts and social. This era places more emphasis on the "Internet of Things" or internet-based. This requires adjustments in various fields, including the world of education.

The development of learning activities has shifted from conventional learning in the classroom to virtual internet-based learning via mobile devices, via Android, which everyone already has. Gadgets, smartphones or Android have become an important need, including school-age children, especially at the high school level, who are used to interacting with gadgets or Android. This is coupled with the outbreak of the Covid-19 pandemic which demands non-face-to-face or online learning.

The Pew Research Center's survey of Android usage in Indonesia ranks 24th in countries with the largest number of smartphone users in the world (Taylor, K. & Argento, L. 2019). However, the use of Android, which should support learning activities and support the achievement of educational goals, has not been maximized, even more sad for school-aged children, it is generally more just for playing media or social media.

Science learning including biology is one of the urgent knowledge to be included in education in Indonesia. Because science is one of the benchmarks for the achievement of a country's education world. Referring to the 2018 PISA results, the average score of Indonesian students is only 389, even though the OECD average score for the sciences is 489. Indonesia is ranked 9th from the bottom or 71st out of 80 countries (The OECD Program for International Student Assessment , 2019). This result needs to be a serious concern for stakeholders in the world of education in Indonesia. There needs to be a development of information technology or an increase in the quality of education, especially in this 4.0 era that we must adapt quickly so we are not getting left behind.

One of the outermost regions of Indonesia and having cultural and ethnic diversity is Karimunjawa Island. Karimunjawa is administratively part of Jepara Regency, Central Java Province. This island is included in the outermost region in the northern coastal region of the eastern part of Central Java province. Karimunjawa Island is occupied by several tribes including Javanese, Bugis-Makasar, Madura, Buton, Bajo, and Mandar. The cultural and ethnic diversity in Karimunjawa can be a challenge and potential for conflict if not managed properly. Smartphones or Androids are very likely to become very effective learning media for use in this 4.0 era. The use of Android applications to support learning is a major requirement at this time. With the development of an Android application, it is hoped that it can maximize the use of Android for the community in general, especially for high school-age students.

This study aims to produce an android application for biology learning media based on multicultural Islam that is appropriate to be implemented in high school or equivalent on the island of Karimunjawa. Android is not just for gaming and social media but is an effective means of learning science, especially biology, especially if it is based on multicultural Islam for the people of the island of Karimunjawa, which is included in the 3T region, which really needs more attention.

RESEARCH METHOD

This type of research is research and development (research and development), namely research to produce a product. The resulting product is the android application 'Biolaku (Multicultural Islamic Biology)', which is an application for learning biology at the high school level or equivalent that links Islamic, multicultural and science (biology) concepts.

This research and development step uses the Borg & Gall development model (Borg, W.R. & Gall, 2003). The reason for choosing this model is based on the systematic and sequential steps and is quite clear in explaining each step. The location of this research is MA Safinatul Huda 2 Karimunjawa, Jepara, Central Java. Subjects as well as data sources in this study were media validators (experts), material and the Koran, prospective biology teachers, MA Biology teachers and as a sample all students of class XII MA Safinatul Huda 2

Karimunjawa were selected. The data in this study included assessment data from validators, data from preliminary trials and data from field trials.

Data collection was carried out using a product feasibility assessment questionnaire sheet with the help of Google form. After trying to use the application developed by the researcher, the respondents were asked to fill out a questionnaire for assessing the feasibility of the product that had been developed. In addition, researchers also collected data from respondents regarding inputs for the application. Data analysis was performed using the Rasch Model assisted by the Ministep application. The analysis was carried out by looking at the Unidimensionalitas table, which is by looking at the value of the raw variance explained by measures.

RESULT AND ANALYSIS

This development research procedure refers to the ten procedural steps of R & D from the Borg & Gall model (Borg, W.R. & Gall, 2003). The ten steps were then adapted and modified into eight steps as follows: 1) Conduct a preliminary study and gather information, 2) Doing research planning and design, 3) Prepare the initial product draft (android application), 4) Conduct preliminary field tests, 5) Perform product revisions, 6) Conducting main field tests, 7) Revise the results of the main field trials, 8) Conduct product dissemination and implementation.

The eight steps are the results of modifications that fall into the limitations of the research, namely related to operational field trial stages, product revisions from operational field trials and dissemination (carried out by exposing research results and distributing android application products to MA teachers and students or equivalent through the play store application).

several stages in this research, namely as follows:

1.1. Preliminary Study

The implementation of this preliminary study was carried out by researchers assisted by a team of field assistants with a literature review related to the importance of biology being taught, how the curriculum should be, how biology learning should be in the 4.0 era, and the arguments of the Koran related to biology material. At this stage the researcher carried out an analysis of KI-KD and SMA/MA Biology Material referring to or in accordance with the PERMENDIKBUD attachment No. 37 of 2018 Concerning KI/KD Subjects in the 2013 curriculum (jdih kemdikbud; 2022).

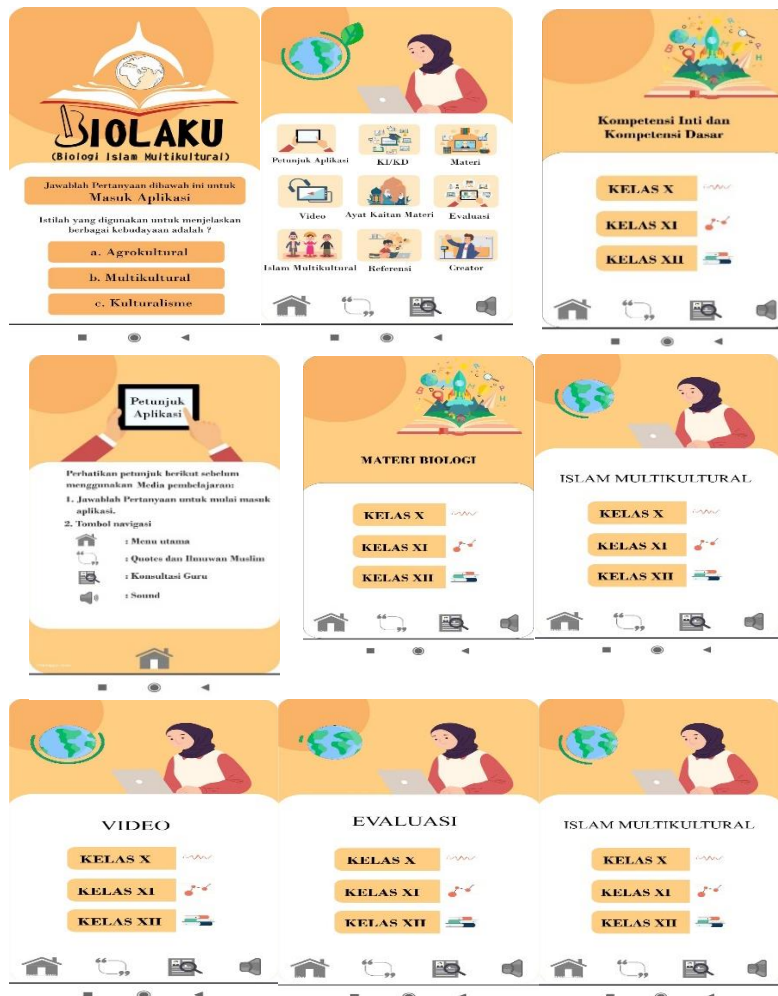
1.2. Research Planning and Design

At this stage the researcher was assisted by a team of field assistants to determine KI-KD and SMA/MA Biology Material referring to or in accordance with the attachment to PERMENDIKBUD No. 37 of 2018 Concerning KI/KD Lessons in the 2013 curriculum. At this stage the researcher also determined the verses of the Koran that related to the biological material that has been determined. Besides that, the researcher also designed the content of the android application to be developed.

1.3. Preparation of the initial product draft

At this stage the researcher is assisted by a team of field assistants to make a draft design and layout for the display of the menu and content in the application to be developed, namely the Biolaku' application starting from its appearance and content. At this stage the researcher uses the services of an application development consultant, so what is important is how to transfer the researcher's concept of the application to be developed to the application developer consultant. During the production process, researchers also coordinate, check and monitor the progress of making applications.

The appearance of the 'Biolaku' application is as follows:



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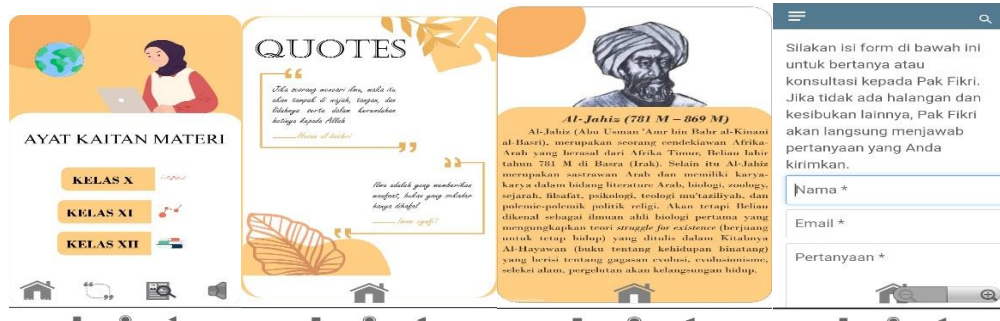


Fig. 1. The appearance of the 'Biolaku' application.

At this stage after the product has been successfully developed, the next step is for the researcher to carry out a product validation test. The validation test was carried out with 3 expert validators, namely application validation to media experts, application content validation to material experts and validation related to the suitability or relevance of Al-Quran verses with biological material to Al-Qur'an experts.

Media expert validation was carried out by filling out an assessment questionnaire <https://docs.google.com/forms/d/e/1FAIpQLSfwUTJNwPhBeggUwaaARLVpkaMkAgG0TdbP7DbvSmIul5XEwg/viewform?usp=sharing> which was adapted from Edy Priyono's research (Edy Priyono; 2021) consisting of 3 aspects, namely: aspects usability, functionality aspects and visual communication aspects. These three aspects are described in 6 questions.

Validation regarding the suitability or relevance of Al-Quran verses with biological material to Al-Qur'an experts. At this stage the Qur'an expert validates the verses of the Koran that are entered into the "Biolaku" application so that the relevance of the verse to biological material can be known. The results of the validation are in the form of a table of the relevance of the verses of the Qur'an to biological material as shown in the following table <https://docs.google.com/spreadsheets/d/1ocPNJnB0ktjT4vgpa8wqFPmW4g1GggJ7/edit?usp=sharing&ouid=104096081162535216056&rtoref=true&sd=true>

Material expert validation was carried out by filling out an assessment questionnaire https://docs.google.com/forms/d/e/1FAIpQLSdlmIrgA4UuxpUue9un3ZJzEG9ny6KpdCkCIDQNmcM9LCikqg/viewform?usp=share_link which was adapted from Edy Priyono's research (Edy Priyono; 2021) consisting of 3 aspects namely; aspects of learning design, aspects of material content and aspects of language and communication. These three aspects are described in 10 statements.

At this stage, the validator provides an assessment and also suggestions regarding product development. Some notes and input for the application are as follows: a) When using sound, it is still lacking, it is recommended to add sound in each menu, b) There are several videos that cannot be played immediately, c) On the multicultural Islamic menu, it would be nice if the writing could be zoomed in so that it could be seen clearly, d) On the menu, ask the teacher and the sound cannot be used, e) There are several parts of the text that are too many and too dense, so it's a bit uncomfortable to read because the text size is small, f) There is little

relation to the holy verses, only 1 grade 1 study of the verses of the Qur'an, g) The discussion about multicultural Islam is still lacking in depth.

After receiving notes and input from expert researchers and the team then coordinated to make revisions and improvements, in addition to coordinating with the application developer consultant to revise the applications that had been developed.

1.4. Conduct preliminary field tests

Preliminary field trials were carried out on prospective Biology teachers, namely related to the use and content of the application. At this stage the researcher was assisted by a team of field assistants distributing application files (APK) and GForm links for pre-trial questionnaire sheets to prospective Biology teachers (students). After conducting the analysis, it was found that the respondents who received the application/APK file when they were going to install it on their smartphone took a long time to download the application because the size of the application was quite large.

From the respondents of this preliminary field trial, it was found that the application developed was good and innovative. With notes namely: a) Adding a back menu to the menu display in the application and b) Adding sound to the application.

1.5. Perform product revisions

After receiving notes and input from the respondents, the researchers and the team then coordinated to make revisions and improvements, in addition to coordinating with the application developer consultant to revise the applications that had been developed. The revisions made were minor revisions, namely related to the notes from the respondents of the preliminary trial.

1.6. Conducting main field tests

At this stage the researcher was assisted by a team of field assistants distributing application files (APK) and GForm links for the main field trial questionnaire sheets to MA Biology teachers and all class XII students of MA Safinatul Huda 2 Karimunjawa, Jepara district. The following are the results of the main field trials that have been analyzed using the Rasch model.

Table 1. Unidimensionalitas

Table of STANDARDIZED RESIDUAL variance (in Eigenvalue units)				
		-- Empirical --		Modeled
Total raw variance in observations	=	7.7	100.0%	100.0%
Raw variance explained by measures	=	2.7	35.4%	37.0%
Raw variance explained by persons	=	1.5	19.0%	19.8%
Raw Variance explained by items	=	1.3	16.5%	17.2%
Raw unexplained variance (total)	=	5.0	64.6%	100.0%
Unexplned variance in 1st contrast	=	1.7	22.5%	34.9%
Unexplned variance in 2nd contrast	=	1.4	18.2%	28.2%
Unexplned variance in 3rd contrast	=	1.1	14.2%	22.1%
Unexplned variance in 4th contrast	=	.7	9.5%	14.7%
Unexplned variance in 5th contrast	=	.0	.0%	.0%

From the table above it is known that the raw variance explained by measures is 35.4%.

Table 2. Raw variance explained by measures criteria

Score	Description
<20%	Not fulfilled
>20%	Can be fulfilled
>40%	Better
>60%	Special

Based on the table of raw variance explained by measures criteria above, it can be seen that the value of raw variance explained by measures of 35.4% indicates that the meaning can be fulfilled, meaning that the eligibility requirements of the developed media can be fulfilled. (Suminto, B., & Widhiarso, W: 2014).

1.7. Revise the results of the main field trials

After receiving notes and input from the respondents, the researchers and the team then coordinated to make revisions and improvements, in addition to coordinating with the application developer consultant to revise the applications that had been developed. The revisions made are minor revisions related to the appearance of the application so that it is more attractive and easy to operate.

1.8. Conducting Product Dissemination and Implementation

Temporary dissemination is carried out by exposing research results and distributing android application products and publication in the form of articles. For widespread implementation in the future, this application will be submitted to the Play Store so that it can be used and utilized by all SMA/MA teachers and students.

CONCLUSION

This research has produced an android application 'Biolaku' which is appropriate for high school students or the equivalent. Stage by stage has been running on the track, referring to the predetermined research stages, namely the ten procedural steps of R & D from the Borg & Gall model (Borg, W.R. & Gall, 2003) which have been adapted and modified into eight steps so that they can be accounted for.

References

- Al, M., Pratama, Q., & Romadhon, T. S. (2022). Pendidikan Islam Multikultural Dan Nilainya Dalam Pembelajaran Sejarah Peradaban Islam. 10, 96–108. <https://ejournal.undiksha.ac.id/index.php/JJPS>.
- Ali Fikri, A. (2018). Pengembangan Perangkat Pembelajaran Model Guided Inquiry Untuk Meningkatkan Creative Thinking Siswa. *Thabiea*, 1(1).
- Asoko, H. Learning to teach science in the primary school. In R. Millar, J. Leach, & J. Osborne (Ed.). (2000). *Improving Science Education: The contribution of research (1st ed., hal. 79–92)*. Buckingham, Philadelphia, USA: Open University Press.
- Bybee, R. W. (2013). *The case for STEM education: Challenges and opportunity*. Arlington, VI: National Science Teachers Association (NSTA) Press.
- Benardi, A. I. (2020). Kehidupan dan Penghidupan Masyarakat Jawa di Karimunjawa (Analisis Tingkat Pendidikan dan Pola Interaksi antar etnik). *Ijtimaia :Journal of Social Science Teaching*, 4(2), 72–85. <http://journal.stainkudus.ac.id/index.php/Ijtimaia>.
- Cahyono, B. A. (2020). *Peran Yayasan Pendidikan Safinatul Huda Terhadap Pendidikan Masyarakat Nelayan Miskin Di Karimunjawa Tahun 2001-2012*. Universitas Negeri Semarang.
- Dudung, A. (2018). *Model Pendidikan Daerah 3T*. Pusat Penelitian Kebijakan Pendidikan dan Kebudayaan, Badan Penelitian dan Pengembangan, Kementerian Pendidikan dan Kebudayaan.
- Priyono, Edy. (2012). *Pengembangan Media Pembelajaran Edu-Game Adventure Pada Standar Kompetensi Mengomstalisasi Pc di SMKN 1 Tuban 1, no.1*, diakses pada 14 Januari 2021, <http://ejournal.unesa.ac.id/index.php/jurnal-pendidikan-elektro/article/view/204>.
- Firmansyah. (2009). *Mudah dan aktif belajar Biologi*. Pusat Perbukuan Departemen Pendidikan Nasional.
- Gall, Meredith D. Gall Joyce P. & Borg. Walter R. (2003). *Educational Research An Introduction, Seventh Edition*. Boston: Pearson Education Inc.
- Haryati, T. A., & Stain, T. (2009). Islam Dan Pendidikan Multikultural Tri Astutik Haryati. *Tadris*, 4(2), 155–171.
- Houtsuite. (2018). *Digital in 2018: Asia Pacific*. Diambil 13 Agustus 2018, dari <https://hootsuite.co>.
- Mardapi, D. (2008). *Teknik Penyusunan Instrumen Tes dan Nontes*. Yogyakarta: Mitra Cendikia Press.
- Mardianto, A. (2021). *Pendidikan Bagi Anak di Daerah 3T*. Kemdikbud RI.
- Mustaqim, M. (2015). Pengilmuan Islam dan Problem Dikotomi Pendidikan. *Jurnal Penelitian*, 9(2), 255–274.
- Purwaningrum, S. (2015). Elaborasi Ayat-Ayat Sains dalam Al-Quran: Langkah Menuju Integrasi Agama dan Sains dalam Pendidikan. *Inovatif*, 1(1), 124–141.
- Putera, M. T., & Rhussary, M. L. (2018). Terdepan, Terpencil Dan Tertinggal Di Kabupaten. *Ekonomi Dan Manajemen*, 12, 144–148. <https://journals.umkt.ac.id/index.php/JEM/article/view/119>
- Rois, A. (2013). Pendidikan Islam Multikultural: Telaah Pemikiran Muhammad Amin Abdullah. *Epistemé: Jurnal Pengembangan Ilmu Keislaman*, 8(2), 303–321. <https://doi.org/10.21274/epis.2013.8.2.301-322>.
- Rustaman, N. Y. (2003). *Strategi Belajar Mengajar Biologi: Common Textbook*. Patta Bundu.
- Suartama, K. (2012). *Evaluasi dan Kriteria Kualitas Multimedia Pembelajaran* (U. P. Ganesha (ed.)). Sugiyono. *Metode Penelitian Kuantitatif Kualitatif dan R&D*. Bandung: Alfabeta.
- Sumintono, B., & Widhiarso, W. (2014). *Aplikasi Model Rasch untuk Penelitian Ilmu-ilmu Sosial*. Cimahi: Trim Komunikata Publishing House.
- Supriadi, G. (2016). Analisis Pola Interaksi Sosial Dalam Bentuk Toleransi Antara Masyarakat Transmigrasi Dan Masyarakat Asli. *Pendidikan Dan Pembelajaran Untan*, 2(1), 234. <https://jurnal.untan.ac.id>.
- Taylor, K. & Silver, L. (2019). Overview: Smartphone Ownership is Growing Rapidly Around the World, but Not Always Equally. *Pew Research Center*.
- The OECD Programme for International Student Assesment, P. PISA 2015 Results in Focus. OECD. <https://doi.org/10.1787/9789264266490-en>.
- Trianto. (2012). *Model Pembelajaran Terpadu*. PT Bumi Aksara.

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- Wahyudi, T. (2019). *Pengaruh Penerapan Media Pembelajaran Berbasis Tutorial Terhadap Hasil Belajar Siswa Pada Mata Pelajaran TIK Kelas XII IPA 2 SMAN 4 Bulukumba*. Universitas Muhammadiyah Makassar.
- Wibawanto, W. (2017). *Desain dan Pemrograman Multimedia Pembelajaran Interaktif*. Cerdas Ulet Kreatif.