Digitizing the Android-based Ecology Course Practicum Guide

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Abstract. Digitizing the Android-based Ecology Course Practicum Guide, especially Aquatic Ecology, is a development research innovation that aims to provide learning resource materials for Biology students majoring in Educational and Non-Educational Study Program at the Faculty of Mathematics and Natural Sciences, Medan State University, on a digital basis, building students scientific competencies and skills according to the Ecology course material. compiled digitally to easily solve problems in the field. This research is a research and development (Research and Development) with a 4 D model, with the stages of Define, Design, Development and Disseminate which are modified as needed. The test subjects consisted of 3 material expert validation, 3 teaching materials expert validation, 3 design expert validation and 30 students responses from Biology Department, FMIPA UNIMED. The research instrument used a validation sheet and a questionnaire. Qualitative data analysis with the stages of data collection, data reduction, data presentation and drawing conclusions. Digitization which is the development of an Android-based aquatic ecology practical guide application, an android application is declared valid and can be used as a learning medium for students in the biology department in the aquatic ecology course. In this case, based on the results of expert validation, the overall results of the expert team's validation showed that the aspects that received an average score of 96.30%. The result of validation by material expert is 98.12%. The results of the validation by media experts were 96.20% and, while the validation by design experts was 94.60. The results of expert validation are properly and validly used. The results of the validation of students majoring in Biology who took the Aquatic Ecology course showed an average result of 97.50% so that it can be stated that the Android-based aquatic ecology practicum guide is valid and can be used.

Keywords: digitalization, practice guide, ecology, android

1 Introduction

At this time student in the Department of Biology, FMIPA, State University of Medan are familiar with using Android as a smartphone that can be used for the purpose of accessing the internet and using other applications. In 2020, it was recorded that there were thousands of android-based applications on the Google Play Store, some reported an increase of around 260.000 compared to the same month from 2019 [1].

The number of uses of applications as learning media has been felt to have a positive influence on students and students [2]. With the application of various applications on Android, it can increase the understanding and enthusiasm of students in learning [3][4].

Because it is felt to be so useful, the Android-based application is one of the interesting media to use in learning. This situation is in accordance with the analysis conducted by Surata et al., (2020) [5] that multimedia is the most effective learning media, with online, blended, or android-based specifications so that it is more easily accessible to students. The same is true for students in the Biology department. FMIPA State University of Medan.

2 Method

In this research, development research is used which is a research method to produce a certain product and test the feasibility of the product. The research model used is the 4D Development model of Thiagarajan et al., (1974) [6] which includes the define, design, develop, and disseminate stages. The 4D development model was chosen because the stages are suitable for developing learning media and at each stage it is followed by a revision process.

The research developed is a field practice book for aquatic ecology courses with Android-based digital. The reason for choosing this development model is because this development model is more detailed and systematic. Researchers conducted validation tests on experts who are competent in their fields, namely 3 (three) learning experts, 3 (three) media experts, and 3 (three) design experts.

In this study, the subjects were material experts, design experts, learning experts and also 30 students majoring in Biology at the State University of Medan as many as 30 people.

The data analysis technique used is a quantitative descriptive analysis technique in the form of percentages and averages. The results of the percentage calculation are used to make decisions about the level of validity and whether revisions are needed (Table 1).

Table 1. Criteria for Validity Level and Revision Decisions

Results Validity (%)	Qualification	Information
81 – 100	Very good	No need for revision/valid
61 – 80	Well	No need for revision /valid
41 – 60	Enough	Revised/invalid
21 – 40	Less	Revised/invalid
0 - 20	Very less	Revised/invalid

3 Results and Discussion

The validation results of expert team on the developed learning resource showed an average score of 96.30%. The results of the validation by material experts of 98.12% is the highest percentage. The results of the validation by media experts were 96.20% and, while the validation by design experts was 94.60 (Table 2). The overall expert validation results after being averaged showed a

percentage of 96.30% so it can be stated that the application of practicum book guide is valid as a learning resource and does not need to be revised.

Table 2. Expert Validation Results

Material Expert	Media Expert	Design Expert	Average	Decision
98.12 %	96.20 %	94.60 %	96.30 %	Valid and very good

The last stage of the 4D development stage is the disseminate stage, by applying an Android-based marine ecology practical guide to the real class. The Android-based aquatic ecology practicum guide is applied to the learning of the marine ecology course which is carried out face-to-face and combined online.

From students majoring in Biology who took the Aquatic Ecology course, the average results showed an average of 97.50%, so it can be stated that the Android-based marine ecology practicum guide is valid and does not need revision. Because the application used on Android is designed offline, it has the advantage that it can be used in all areas and regions because it does not depend on the signal or telephone network. This is in line with the opinion that with the application of Android-based applications, space and time are no longer a barrier to the learning process [7].

The use of an Android-based aquatic ecology practicum guide application as part of learning is increasingly in demand. In this case, because the biology learning process is often faced with material that cannot be visualized directly so that it is difficult for students and students to understand [8]. The use of this Android-based aquatic ecology practicum guide also creates motivation to learn because it is easy to get under where students move, can be read at any time and the presentation is attractive to students. This research finding is in line with the opinion of other researchers that mentioned that the using of android in learning process can increase student motivation [9].

The fourth stage is the disseminate stage, which includes implementation in real classes, and dissemination. The application in the real classroom is to apply an android-based aquatic ecology practice book as a student learning medium. Application of Aquatic Ecology course activities. This application was carried out involving 15 educational students and 15 non-educational students. Dissemination via download is so that lecturers and others can use it as a medium in aquatic ecology courses. Percentage of test results The material presented is easy to understand, Images and reading texts are clear, The language is simple and understandable, Can help students learn, Can make students excited to learn, The colors are interesting, The writing can be read, Easy to use, A sense of pleasure arises from using the media, There is a sense of pleasure by using media, Users want to have media. The average obtained is 97.50% so it can be stated that the android-based aquatic ecology practice book is valid and does not need revision. Based on the test results, the aspects above that get a high score, the students think that the android-based aquatic ecology practice book is a tool that is an interesting, fun, and suitable learning medium for distance learning. Android-based aquatic ecology practice books can be accessed easily through the smartphones of each student and lecturer [10] . This is in line with the opinion that with the

application of android-based applications, space and time are no longer a barrier to the learning process (Ali & Ahmad, 2014; Walsh, 2015).

4 Conclusion

Digitization which is the development of an Android-based aquatic ecology practical guide application, an android application is declared valid and can be used as a learning medium for students in the biology department in the aquatic ecology course. In this case, based on the results of expert validation, the overall results of the expert team's validation showed that the aspects that received an average score of 96.30%. The result of validation by material expert is 98.12%. The results of the validation by media experts were 96.20% and, while the validation by design experts was 94.60. The results of expert validation are properly and validly used. The results of the validation of students majoring in Biology who took the Aquatic Ecology course showed an average result of 97.50% and therefore, it can be stated that the Android-based marine ecology practicum guide is valid and can be used.

References

[1] Clement, J. Number of available applications in the google play store from December 2009 to June 2020. www.statiska.com (2020)

[2] Sholihah, N., Wilujeng, I., & Purwanti, S. Development of android-based learning media on light reflection material to improve the critical thinking skill of high school students. Journal of Physics: Conference Series, 1440, 012034 (2020)

[3] Safitri, I., Pasaribu, R., Simamora, S. S., & Lubis, K. The effectiveness of android application as a student aid tool in understanding physics project assignments. Jurnal Pendidikan IPA Indonesia, Vol.8(4), pp. 512–520. (2019)

[4] Sari, W. P., & Ma'rifah, D. R. Development LKPD of android based mobile learning worksheets with pbl to improve critical thinking on environmental material. Jurnal Pendidikan Biologi, Vol. 11(2), p. 49 (2020)

[5] Surata, I. K., Sudiana, I. M., & Sudirgayasa, I. G. Meta-analisis media pembelajaran padapembelajaran biologi. Journal of Education Technology, Vol. 4(1), p. 22 (2020).

[6] Thiagarajan, S., Sammel, D. D., & Sammel, M. I. Instructional development for training teachers of exceptional children. Indiana University (1974)

[7] Ali, S. M., & Ahmad, M. T. Scope and impact of android application in education sector. Chronicle of the Neville Wadia Institute of Management Studies & Research, pp. 284–290 (2014).

[8] Mukti, I. N. C., & Nurcahyo, H. Development of computer aided biology learning media to improve student learning outcome. Jurnal Inovasi Pendidikan IPA, Vol. 3(2), p.137 (2017)

[9] Trisyagil, T., Ahmadi, F., & Kustiono, K. The development of flash-based media in project based learning for English subject to increase students' motivation and achievement at senior high school. Innovative Journal of Curriculum and Educational Technology, Vol. 9(2), pp. 48–56 (2019)