

Development of Interactive Health Promotion Application Media Based on the "Hygiene Sanitation Vs Covid-19" Quiz and News Up Date as a Form of Corona Virus Prevention in Malang City Adolescents

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ABSTRACT

COVID-19 is a new type of virus with high infectious rate. The prevalence rate of this virus in international scale in 2020 for Indonesia reaches 34th in the world and case fatality rate (CFR) for Indonesia is 3.96. Malang City has been included in the red zone since the pandemic beginning, considering that Malang is a tourism city and also a city with lots of migrants. Currently, the most effective way to prevent COVID-19 is the application of hygienic sanitation. The application of sanitary hygiene is not well conveyed, especially to adolescents who have high mobility and unstable emotion. The delivery of information about this has not been supported by an optimal product, so it is necessary to have a product that is suitable to the needs and limitations of the target. Products that can be developed are Android-based applications. The purpose of this development is as an educational effort to prevent corona virus in Malang City adolescents. This research and development modified the model of Sugiyono, which consists of: (1) potential problems; (2) situation analysis; (3) product design; (4) product design validation; (5) product design revisions; (6) small group trials; (7) product revision I; (8) large group trials; (9) product revision II; (10) final production. Validation by media experts obtained results 72,7%, validation by material experts obtained results 76%. The results of the small group trying 96,7% and large group get results 96,6%, so it can be concluded that this product is suitable as a healthy support to prevent COVID-19. Further research is to find out the effect of giving interactive application to health behavior and knowledge about hygiene sanitation. It is also hoped that the application can be developed into another application like iOS.

Keywords: android application, COVID-19, hygiene, sanitation

1. INTRODUCTION

2019-nCoV or which is often called Corona Virus Disease 2019 (COVID-19) is a respiratory infection disease that first appeared in Wuhan, Hubei Province, China [1]. On January 7, the CDC (Centers for Disease Control and Prevention) identified the findings of a new type of corona virus which was later named 2019-nCoV [2]. This virus is called a new type because of its composition which is a genetic recombination of the virus or a revolutionary form of the virus in the same family as the cause of MERS-CoV (Middle east respiratory syndrome coronavirus) and SARS-CoV (Severe acute respiratory syndrome coronavirus) [3].

The last data reported until April 1, 2020 at 2:55:50 pm, this virus has even spread to 203 countries and the total number of cases has reached 750,890 positive cases and 36,405 deaths, with a CFR (Case Fatality Rate) of 4.85% [3]. Meanwhile, the number of cases in Indonesia is in the 34th position in the world rankings and the third highest CFR in the world with a CFR of 9.36%. It means that the mortality rate is very large compared to other countries. There were 1,677 positive cases reported, 103 recovered and 157 died in 32 provinces [4]. Following up on this increasing number of cases, on March 31, 2020 President Jokowi announced a public health emergency status [5]. East Java Province with 103 positive cases is in the fourth rank after DKI Jakarta (808), West Java (220) and Banten (152) [4]. Malang

City has high risk in transmission of corona virus because Malang City is a city that has a promising orientation for migrants, whether for work, school or shopping [6]. In 2018 alone there were 3,795,229 domestic tourists and 124,267 foreign tourists who came to Malang City, this shows that Malang is a city with a lot of migrants so that the possibility of disease spreading is also high [7]. In addition, Malang City is at an altitude of 440-667 masl with an average temperature of 21.6°C-24.7°C or classified as cool with high rainfall, this is certainly beneficial for viruses to survive longer [8].

Common symptoms of this virus at baseline were fever (40 [98%] of 41 patients), cough (31 [76%]), and myalgia or fatigue (18 [44%]); Less common symptoms are sputum production (11 [28%] of 39), headache (three [8%] of 38), hemoptysis (two [5%] of 39), and diarrhea (one [3%] of 38).), then at a later stage it can cause acute respiratory syndrome to heart injury to death [9]. In general, all age groups are susceptible to infection. Moreover, the adolescents group is important to be noted, eventough they have good immune system, but they have high mobility that's mean they have higher risk in spreading covid-19, and when they don't realize it, they can pass it on to their parents and also other vulnerable people [10][11].

The transmission of this virus also depends on the effectiveness of control measures and the extent of affected areas in adopting hygiene and healthy living habits that can reduce the risk of contracting the disease [9]. Prevention efforts that can be carried out by the community include washing hands with soap for at least 20 seconds, avoiding touching the eyes, nose and mouth using unwashed hands, covering the nose when sneezing, cleaning surfaces with disinfectants and much more [11], [12]. This means that hygiene and sanitation are effective preventive measures that need to be practiced by the community.

Control measures that can be taken by the government are through health promotion, financial assistance, and policies. Health promotion is carried out by the government in order to improve a clean and healthy lifestyle in the community. In this digital native generation, the pattern of information search and promotion carried out tends to depend on communication technology using an internet connection [13]. Education is also a form of promotion that can be applied. The existence of this 4.0 technological advancement allows the development of android-based model applications in the health sector [14]. Based on research it shows that the use of mobile and internet application-based technology

has proven to be effective in increasing knowledge and also awareness of community behavior [15].

The news about COVID that is dynamic become a challenge in delivering health information on COVID-19. Print media certainly cannot be a solution to this because it is permanent. The android application is a platform that allows news to be loaded up to date which functions to facilitate the delivery of information. Apart from being in the form of news, health promotion is also carried out using quizzes. As Wardani stated, the method of delivering information using quizzes can encourage interest or target initiative because of its interactive form, besides that it also directs application users in a series of exercises to increase insight without being overwhelmed [16]. Quizzes also can be used as a reflection of the material that has been provided in the application in the form of a booklet, thus helping users to conduct self-assessment of the information they understand. Quizzes also function in enriching knowledge through the questions displayed and also the facts that appear after answers.

In this study, the research targets are adolescents, considering that attention to this age group is still minimal. Adolescents are also a group that is still in the stage of searching for identity, where the unstable nature is still found so that a valid source of information is needed to strengthen their knowledge. Teens who live in Malang City become the researchers' aim of seeing the urgency of Malang City in this pandemic emergency. Researchers also distributed applications with data sources that had been validated so that they could be updated automatically. Based on the background, the researchers conducted research on "Development of Interactive Health Promotion Application Media Based on Quiz 'Sanitation Hygiene Vs Covid-19' and News Up-Date as a Form of Corona Virus Prevention in Malang City Adolescents".

2. METHOD

2.1. Types of Research

This study is research and development type. Research and development is also the stage of creating a new product or product innovation so that it can be justified [17]. The purpose of research and development is not to test a theory but to develop an effective product so that it can be useful for a particular institution [18].

2.2. Model of Research and Development

The model of this research was developed by Sugiyono. This model is a procedural model, which is descriptive with certain steps to produce a product (17). Sugiyono method was chosen because this model contains validation and revision so the result of the product can be tested. This method consists of 10 steps, namely: (1) potential problems; (2) situation analysis; (3) product design; (4) product design validation; (5) revision of product design; (6) small group trials; (7) product revision I; (8) large group trials; (9) product revision II; (10) final production [19].

2.3. Procedural of Research and Development

The method used in this research and development refers to Sugiono according to the needs of the researcher [19], namely:

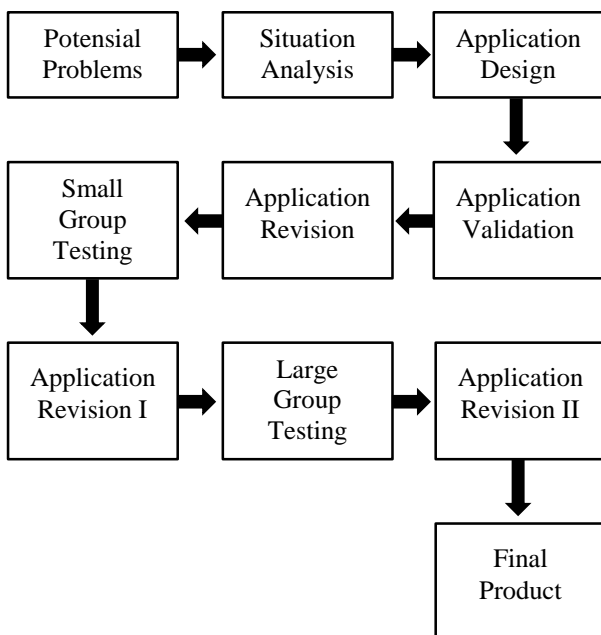


Figure 1. Procedural Research and Development by Sugiyono

2.3.1. Potensial Problems

At this stage the researcher explores potential problems based on literature studies. Literature study is a finding or previous research related to the thing being researched. The literature study carried out includes the topic of COVID-19 health. The last data reported until April 1, 2020 at 2:55:50 PM in China as the center of distribution is 82,308 (18). This virus has even spread to 203 countries including Indonesia with the third highest

CFR in the world with a CFR of 9.36%. This virus certainly has the potential to cause higher mortality over time if it is not handled more responsibly.

2.3.2. Situation Analysis

The existence of this pandemic has made the developer conduct a situation analysis through secondary data because field observations are not possible. Data from Malang City Government in October 11, 2020, there were 1870 positive cases or were included in the orange zone. This is lower when compared to Malang Regency which is in the yellow zone. Currently the government of Malang city is also targeting Malang City to enter the Yellow zone. So that more efforts are needed in health promotion. The form of electronic media is currently being intensively developed by the government, as evidenced by the fact that on October 8, 2020, Malang City received an award from the Indonesian award 2020 for the category of based economic recovery E-commerce. So that electronic-based health promotion media also can be applied as an up to date and interesting media.

2.3.3. Application Design

Application design is carried out after knowing the potential problems and also analyzing the situation. The application design will be designed depend on the table follows:

Table 1. Product Design

Product Design	Product Design
General Design	
Background	There is no up to date health promotion media which is important role in the spreading of the COVID-19 hoax in Malang.
Theme	The hygiene sanitation Vs COVID-19
Respondents (target)	Small group trial: 6 Malang City teenagers by random sampling; Large group trial: 50 Malang City teenagers
Purpose	To convey information related to COVID-19 and prevent hoaxes spreading.
Title	<i>Jagoan Covid</i>
Supporting products	Application design through software, developers and servers
Application Components	
Loading page	Waiting screen before going to display
Main menu	a. Distribution data b. E-booklet c. Quiz

Product Design	Product Design
	d. Hoax buster e. Web link f. News <i>update</i>
Exit page	Contains a statement whether it is true to close the application
Accessibility	
Admin	Management of COVID-19 distribution data, partner links, hoax buster data and quizzes
User	View data on the distribution of COVID-19, access partner links, play quizzes and search in hoax buster
Tools	
Distribution	Data Contains confirmation data, death and recovery COVID-19
News	Contains the following materials: a. Cover b. Foreword c. Table of contents d. Definition of COVID-19 e. Transmission, signs and symptoms f. Diagnosis g. Prevention h. Management i. Disinfection guide j. Environmental Health and food during a pandemic k. Bibliograph
News	Contains news updates about COVID-19
Quiz	quiz and the truth
Hoax buster	Hoax article and the truth
Link web	links Regional, provincial and national COVID-19 links
About the application	Usage and development

2.3.4. Application Validation

Application validation is one of the way in assessing the feasibility of a product, validation is carried out by experts who are competent and master in their fields. This product validation process involves material experts and media experts with the right qualifications so that their suggestion can be used as product improvement. The assessment scale used check list on the validator sheet with Likert scale type, which is an assessment of five categories ranging from very good with a score of 5 and very poor with a score of 1.

2.3.5. Application Revision

The results of expert validation used as input to improve the application. Improvements can be seen from

the suggestions and criticism column and application eligibility figures. The aim of this phase is the product can be corrected before testing in small groups.

2.3.6. Small group trials

Small group trials were carried out by researcher in group of adolescents who were taken by purposive sampling depend on the criteria that similar to the main target group, some of the criterias are their residence in Malang City, their age are between 12-24 and they want to install the application. Researchers conducted small group trials on 6 teenagers in Malang City. The determination of this amount refers to Setyosari's research, namely the range of respondents between 6-8 people selected according to the criteria of the researcher. Before the trial was carried out, the researcher explained the purpose of the study then provided a file containing the application and also a google form related to assessment and also criticism and suggestions. The result of this phase can be seen reseracher email.

2.3.7. Revision I

Application Criticism suggestions based on small group trials are used in product improvement (Applications). If the test results show the product is good, there is no need for revision. However, if there are still some shortcomings, researchers need to revise them.

2.3.8. Large Group Trial

The trial subjects were taken by quota sampling with the inclusion criteria of adolescents aged 12-24 years who live in Malang, both male and female, willing to fill out a questionnaire and install an application. The selection of a sample quota of 50 people is based on Uma now in his book Reserch Methods for Business states that if the sample size should be between 30-500 elements.

2.3.9. Revision II

After conducting trials in large groups, the feasibility results obtained from the media. If the results show that it is good, there is no need for revision. However, if there are still insufficient values and input, it is necessary to revise the application.

2.3.10. Final Production

After the second stage of the revision, the final production is the final output of this research and

development. Because it is a .apk consistency file, the final production is marked by uploading the application to the google aps store for its usefulness

2.4. Data Analysis Techniques

The data obtained based on revisions by experts is qualitative data from the criticism and suggestions column, this data is used as input in the revision. Meanwhile, quantitative data were obtained from an assessment questionnaire by experts, small groups and large groups. Then the data is processed to obtain a product eligibility level. The results of the product assessment are recapitulated then the average value is sought, then the value is compared with the expected value or the highest value then multiplied by 100% to get the percentage of product eligibility. This percentage figure is compared with the interpretation of product eligibility. The following is the calculation formula used.

$$Hah = \frac{Tse}{Tsh} \times 100\%$$

Description:

- Hah = The final result of the trial percentage of
- Tse = Total score achieved
- Tsh = Total score expected

The final result of the trial percentage will be feasible if it is more than 61%. The standard used in the interpretation of product is Sugiyono's research [19]:

Table 2. Quality of Feasibility and Level of Achievement

Qualification	Achievement Level	Information
81%-100%	Very good	Very feasible, without revision
61%-80%	Good	Eligible, without revision
41%-60%	Fairly good	Not feasible, without revision
21%-40%	Not good	Not feasible, needs revision
< 20%	Not very good	Not very feasible, needs revision

3. RESULTS AND DISCUSSION

3.1. Product Feasibility

3.1.1. Media Expert Validation

Application validation by media experts is carried out to determine the feasibility of the product from the side of the media developed for the delivery of material related to adolescents, COVID-19 and its prevention. This media expert validator is Pondok Pesantren Sabilurrahyad information system development team and the IT team Rosana Travel alumni of Universitas Islam Negeri (UIN) Maulana Malik Ibrahim Malang. The results of validation by media experts can be seen in the appendix and for Quantitative data from the results of application validation by media experts are interpreted in Table 3:

Table 3. Results of Validation Application By Expert Media

No.	Elements Rating	Value					Tse	Tsh	%
		1	2	3	4	5			
1.	<i>Responsibility</i>	-	-	-	✓	-	4	5	80%
2.	Compatibility of assets with the theme	-	-	-	✓	-	4	5	80%
3.	Completeness of <i>tolls</i>	-	-	✓	-	-	3	5	60%
4.	Main menu design	-	-	-	✓	-	4	5	80%
5.	Design <i>splash screen</i>	-	-	-	✓	-	4	5	80%
6.	Design <i>Exit page</i>	-	✓	-	-	-	2	5	40%
7.	Layout consistency	-	-	-	✓	-	4	5	80%
8.	Use of size <i>font</i>	-	-	✓	-	-	3	5	60%
9.	Use of font types	-	-	-	✓	-	4	5	80%
10.	Color suitability	-	-	-	✓	-	4	5	80%
11.	Suitability <i>Background</i>	-	-	-	✓	-	4	5	80%
	Total						40	55	
	Average	$\frac{Tse}{Tsh} \times 100$					$\frac{40}{45} \times 100$		72,7%

Table 3 shows the average percentage result of validation performed by media experts of 72.7%.

Referring to the eligibility quality table and the level of achievement described in Chapter III of table 3.3, the

results of the validation by media experts on the application are declared "feasible and good" to be used. The lowest percentage in the assessment above is 40% on the exit page indicator, so that notes related to revisions for the next stage are included.

After obtaining quantitative data from the validation results, there are qualitative results. The following is the qualitative data interpreted in table 4:

Table 4. Expert Criticism and Suggestions for Media

Validators	Criticism and Suggestions for Improvement
The Media Experts	The color of the button <i>action</i> less contrasted.
	Android icon on the exit notification is the same as the application
	Icon The list icon on the <i>e-booklet</i> is the same as the initial icon
	Back button on details of news and hoaxes made parallel to the search button
	Image on news is displayed according to source

3.1.2. The Validation of Material Expert

Next validation was carried out by a material expert, who is the lecture of specialization in Health Promotion and Behavioral Sciences (PKIP), majoring in Public Health, State University of Malang. The material expert validator is tasked with conducting an assessment for the feasibility of the product and the suitability of the material presented. Furthermore, the results of validation by material experts and quantitative data from the results of application validation by material experts are interpreted in table 5.

Table 5 shows that the average percentage of validation by material experts is 76%. This result is associated with the quality of the feasibility and the level of achievement that can be said "decent and good" as a support in the delivery of material on the product being developed. The results are also included with notes related to improvements or revisions. The lowest value is 40% on the material clarity indicator so that it is necessary to fix this. Furthermore, the data obtained is in the form of qualitative data.

Table 5. Results of Application Validation by Material Experts

No.	Element of Assessment	Value					Tse	Tsh	%
		1	2	3	4	5			
1.	Completeness of material	-	-	-	✓	-	4	5	80%
2.	Depth of material	-	-	-	✓	-	4	5	80%
3.	Material sequences	-	-	-	✓	-	4	5	80%
4.	Clarity of material	-	✓	-	-	-	2	5	60%
5.	Clarity of terms	-	-	✓	-	-	3	5	20%
6.	Suitability of material with objectives	-	-	-	✓	-	4	5	80%
7.	Suitability of games with material	-	-	-	✓	-	4	5	80%
8.	Suitability of images with material	-	-	-	✓	-	4	5	80%
9.	Suitability of language with material	-	-	✓	-	-	3	5	60%
10.	Balance of content in the media	-	-	-	✓	-	4	5	80%
Total							38	50	
Average		$\frac{Tse}{Tsh} \times 100\%$					$\frac{38}{50} \times 100\%$		76%

The following is the interpreted qualitative data in table 6 regarding criticism and suggestions from media experts.

Table 6. Expert Criticism and Suggestions for Material

Validator	Criticism and Suggestions for Improvement
Expert Material	Improvement at PUEBI
	On the use of scuba masks, the sign is clarified

Validator	Criticism and Suggestions for Improvement
	It is necessary to add <i>footnotes</i> to difficult terms
	If it is possible to add photos to the quiz
	Writing citation is not only at the end but there are <i>in-text citation</i>
	Improvements in The e-booklet includes writing errors for the word "contact:" "isolation vs quarantine" and writing in the form of a point that is not appropriate if using the middle

3.1.3. Small Grup Trial

After validating the experts and making improvements according to the results and the suggestion, then a small group trial is carried out. Small group trials were carried out within 1 day. The respondent of small group trials and large group trials are different, but the characteristics are the same. This trial was carried out on adolescents who live in Malang City. Based on the criteria set by the researcher, 6 students became respondents in this trial with the inclusion criteria, namely 14-24 years old and residing in Malang City. The research was conducted online using watsapp group and sheet using g-form. The assessment sheet on the small group trial can be seen in the attachment and

then in table 7 the results of the interpretation of the student assessment results data in the small group trial are explained as follows.

Table 7 shows the average percentage results of the assessment by 6 respondents in the small group trial is 96.7%. So it can be said that the quality of the feasibility and the level of achievement of the book is Pop Up interactive said to be "very feasible and very good" for further development. The lowest percentage lies in the assessment aspects in point 3 and point 4, so that this can be a correction for further improvement. In addition, in table 3.6, other criticisms and suggestions have been explained in accordance with the results of the small group trial submitted by respondents in the forum.

Table 7. Small Group Trial Results

No.	Aspects of Assessment	Value		Tse	Tsh	%
		Yes	No			
1.	The application is easy to use	6	0	6	6	100%
2.	The language used is easy to understand	6	0	6	6	100%
3.	The images used are attractive	5	1	5	6	83,3%
4.	The colors used are attractive	5	1	5	6	83,3%
5.	The material in the application is interesting	6	0	6	6	100%
6.	The letters used are easy to read	6	0	6	6	100%
7.	Quiz presented is interesting for me to play	6	0	6	6	100%
8.	News updates in the application help me	6	0	6	6	100%
9.	The material in the e-booklet is coherent	6	0	6	6	100%
10.	I excited to maintain sanitary hygiene after reading the e-booklet in the application	6	0	6	6	100%
	Total			58	60	
	Average	$\frac{Tse}{Tsh} \times 100\%$ $\frac{58}{60} \times 100\%$				96,7%

After interpreting the quantitative data, then interpreting the qualitative data obtained from the respondents' criticism and suggestions. The following is the qualitative data that is interpreted in table 8

Table 8. Criticism and Suggestions for Small Group Trials

Assessors	Criticism and Suggestions for Improvement
6 respondents in trials small group	There is a writing error in the quiz
	Application can only be used on Android

3.1.4. Large Group Trials

After small group trials were carried out, the trials were carried out on a broad range of respondents. This trial was carried out for 2 days. Based on the criteria set by the researcher, 50 respondents who live in Malang City are obtained. The assessment sheet for large group trials can be seen in the appendix. The following are the results of student assessments in large group trials which are interpreted in table 9 below.

Table 9. Large Group Trial Results

No.	Aspects of Assessment	Value		Tse	Tsh	%
		Yes	No			
1.	Easy to use application	49	1	49	50	98%
2.	The language used is easy to understand	50	0	50	50	100%
3.	The image used is attractive	47	3	47	50	94%
4.	The colors used are attractive	43	7	43	50	86%
5.	The material in the application is interesting	50	0	50	50	100%
6.	The letters used are easy to read	49	1	49	50	100%
7.	The quizzes are interesting for me to play	47	3	47	50	94%
8.	News updates in the application help me	49	1	49	50	98%
9.	The material in the e-booklet is coherent	50	0	50	50	100%
10.	I am passionate about maintaining hygiene sanitation after reading the e-booklet in the application	49	1	49	50	98%
Total				483	500	
Average		$\frac{Tse}{Tsh} \times 100\%$ $\frac{483}{500} \times 100\%$				96.6%

Table 9 shows the average percentage rating of 50 respondents in the large group trial that is 96.6%, so it can be said that the quality of the feasibility and the level of achievement of the book is Pop Up interactive "very feasible and very good" for further development. In addition, it can be seen that the lowest percentage lies in the assessment aspects in points 7 and 3, which are 94%. In addition, in table 3.8 other criticisms and suggestions have been explained in accordance with the results of large group trials.

After obtaining quantitative data from the results of student assessments, then qualitative data is obtained from the criticisms and suggestions presented in the forum. The following is the qualitative data that is interpreted in table 10.

Table 10. Criticism and Suggestion from Large Group Trial

Assessors	Criticism and Suggestions for Improvement
50 respondents in large group trial	4 respondent give suggestion that is the application must be in playstore so the application can be installed easily Link of the referrence can't be access

3.2. Product Revision

Revision in research and development is a form of improvement for the development of the final product, so that future product improvements can be made. Product revisions are obtained from the results of the assessment of the application by experts and respondents in group trials that come from aspects of the assessment sheet, as well as criticism and suggestions from experts and group trial respondents.

4. CONCLUSION

Based on the results of expert validation as well as the results of the assessment in group trials, the average feasibility level of the application product is categorized into the level "very feasible and very good". This is based on the percentage of the media expert's assessment was 72.7% (feasible and good), the material expert's assessment was 76% (feasible and good), the assessment in the small group trial was 96.7% (very feasible and very good), and the assessment in the large group trial was 96.6% (very feasible and very good). The advantage of this application itself is that it can foster interest in learning, so that the delivery of material or information won't be boring because the application is modified to be more colorful and more interactive and contains many

functions. The android application presents information on the device and the target is given the opportunity to interact so that it is more attractive to its users. It is hoped that in the future the application can be modified in the form of iOS and its effects can be examined at the level of knowledge and attitude.

AUTHORS' CONTRIBUTIONS

DKN: concept and design the study, methodology, analysis, writing; DK & MA: validation, writing review, supervision

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