



The Development of E-Leaflet Teaching Materials Using QR-Code in Human Excretory System Material

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Abstract

The Covid-19 pandemic was caused by the SARS CoV-2 virus which resulted in changes in almost all aspects of people's lives in the world. One of them occurred in the field of education. In the education sector, the learning process takes place online and requires a variety of additional technologies to support the learning process. During the online learning process, teaching materials are also needed that are appropriate to the conditions that occur. The purpose of this research was to develop appropriate teaching materials for use during the Covid-19 pandemic. The type of research used is research development or Research and Development (R&D).

The validation test results carried out by media experts were 94.53% and the material expert validation results were 90.43%. In small-scale product trials, the final test results showed that only 13.9% of students did not pass. In the practicality questionnaire responses, students showed that 19% of students considered this teaching material practical and 81% considered this teaching material very practical. Whereas in the large-scale trial conducted in 3 classes with a total of 108 students, the final test results showed that only 7.4% of students did not pass. In the response questionnaire given to the teacher, the percentage results were 96.35% which was included in the very valid category. In the student response questionnaire, 11% of students considered this teaching material practical and the remaining 89% of students considered this teaching material very practical.

Based on the results of the research that has been done, it can be concluded that e-leaflet teaching materials using qr-codes on human excretory system material are feasible and practical to use in the online learning process during the Covid-19 pandemic.

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INTRODUCTION

The Covid-19 pandemic is a pandemic caused by the SARS CoV-2 virus which has resulted in changes in almost all aspects of people's lives in the world. Based on data sources compiled by the Indonesian Ministry of Health until June 2021 it was stated that there were 176,892,195 positive confirmed cases with a total death rate of 3,859,461 in 222 infected countries and 149 countries of community transmission. Whereas in Indonesia there were reported 1,973,652 positive confirmed cases with a death rate of 53,476 people (Ministry of Health, 2021).

One of the changes caused by this pandemic is the existence of various changes in the field of education. The changes that have occurred in the education sector during the Covid-19 pandemic have resulted in the closure of schools around the world. This causes children all over the world to lose the opportunity to learn and socialize with friends directly (Unicef Indonesia, 2021). Based on this, the implementation of education during the Covid-19 pandemic took place online or online learning. Learning that takes place online certainly requires a variety of additional technologies to support the ongoing learning process. This sudden change resulted in teachers and students being asked to quickly adapt to the current conditions. One aspect of the changes that took place during the Covid-19 pandemic and which needs to be changed is the teaching materials. As long as the learning process takes place online, teaching materials are also needed according to the conditions that occur. Teaching materials that are usually used during offline learning are not suitable when applied to online learning.

Based on the results of Nurbaiti & Mariah's research (2020: 78) states that the young age group consisting of junior and senior high school students aged 15 to 20 years tends to have an interest in reading electronic books rather than printed books. Therefore, in the online learning process during the Covid-19 pandemic, electronic teaching materials are needed that are easy to use, so as to increase student motivation when learning takes place. One of the teaching materials that can be used as an alternative teaching material during the Covid-19 pandemic is leaflets. Usually leaflets are printed on a sheet of paper and used as teaching materials for offline learning. However, during the Covid-19 pandemic, leaflets can be an alternative to teaching materials in electronic form, which are called e-leaflets.

Leaflets are one example of learning teaching materials that can be used in the learning process. Leaflets are a collection of informative writings to support the learning process. In addition, leaflets can be interpreted as leaflets that contain various information to increase student understanding and skill abilities accompanied by various interesting pictures (Nasrudin et al., 2022: 34). Agustinarsih & Rosmaini (2018: 252) states that leaflet teaching materials are teaching materials that are able to attract students' interest because they contain various interesting images that can increase student interest during the learning process. Usually leaflets are printed on both sides in full color or using art paper or art cartoon, so that it looks more attractive. Meanwhile, E-Leaflets are leaflets in digital form and can be viewed using electronic devices such as gadgets or laptops.

Based on the results of interviews with the biology teacher at SMA Negeri 6 Semarang, the teaching materials that have been used so far in the online learning process are the same as the teaching materials used in the offline learning process. Even though in the online learning process there are many things that are not possible to do like during the offline learning process. In addition, the reduced learning time in the online learning process causes the material in offline teaching materials to not be fully conveyed to students. This causes the use of offline learning teaching materials during online learning to be less effective. Therefore it is necessary to have teaching materials that are practical and easy to use in accordance with online learning conditions.

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The material for the Human Excretory System is one of the biology materials in class XI IPA SMA. This material is listed in the basic competencies of the 2013 curriculum which contains KD 3.9 and KD 4.9 demands. KD 3.9 contains demands on students so that students are able to analyze the relationship between the tissue structure that makes up the organs of the excretory system and its relation to bioprocesses and their functional disturbances in the human excretory system. Whereas in KD 4.9. contains demands that students are able to present the results of an analysis of the influence of lifestyle on abnormalities in the structure of organ functions that cause disturbances in the excretory system and its relation to existing technology. Based on Wicaksono & Kuswanti (2022: 504) states that excretory system material contains abstract processes. So there is a need for innovation to overcome these problems. It was also stated that this problem can be overcome by presenting interesting material and equipped with multimedia to increase students' enthusiasm for learning in learning the important concepts in it.

Agustiningsih & Rosmaini (2018: 252) explained that the development of leaflets as learning teaching materials can provide significant benefits. The use of leaflets in the learning process is able to provide opportunities for students so that they can learn according to their abilities. In addition, learning using leaflets will be more interesting and not cause boredom. Similarly, according to Vebriyanti et al. (2021: 567) leaflet teaching materials equipped with a QR-Code are considered practical and able to help students complete their learning outcomes. In addition, the use of QR-Code in leaflet teaching materials is considered practical to make it easier for students to visualize the material being studied.

E-Leaflet is a digital leaflet teaching material that is packaged and developed with the addition of a QR-Code as a convenience provided to teachers and students in the process of using it. QR-Code can store all kinds of data like numeric, binary, aplanumeric, etc. In addition, QR-Code can have a smaller display compared to barcodes. This is because the QR-Code is able to accommodate data vertically and horizontally. Apart from that, the QR-Code is also resistant to damage (Agastya, 2021:77). Therefore even if the QR-Code is damaged or dirty, the data will still be readable. The website to be addressed is enrichment material from excretory system material in humans. So that the use of e-leaflets during a pandemic will greatly facilitate teachers and students because they can be used at any time. E-Leaflets equipped with QR-Code will be designed as attractive as possible to attract students so that they are able to understand the excretory system material more easily because it is equipped with interesting material visualization.

Based on this description, it is necessary to develop e-leaflet learning materials using QR-Code material for the human excretory system as learning teaching materials during the pandemic.

RESEARCH METHOD

The type of research used is development research. Development research is a type of research that is often referred to as Research and Development (RnD). RnD research is research that produces a product (Nuraeni & Habibi, 2021). This type of research is a type of research that has the aim of producing a product and testing the effectiveness of a product.

The research procedure used in research on the development of e-leaflet teaching materials on human excretory system material is guided by the R&D steps of (Sugiyono, 2016: 298).

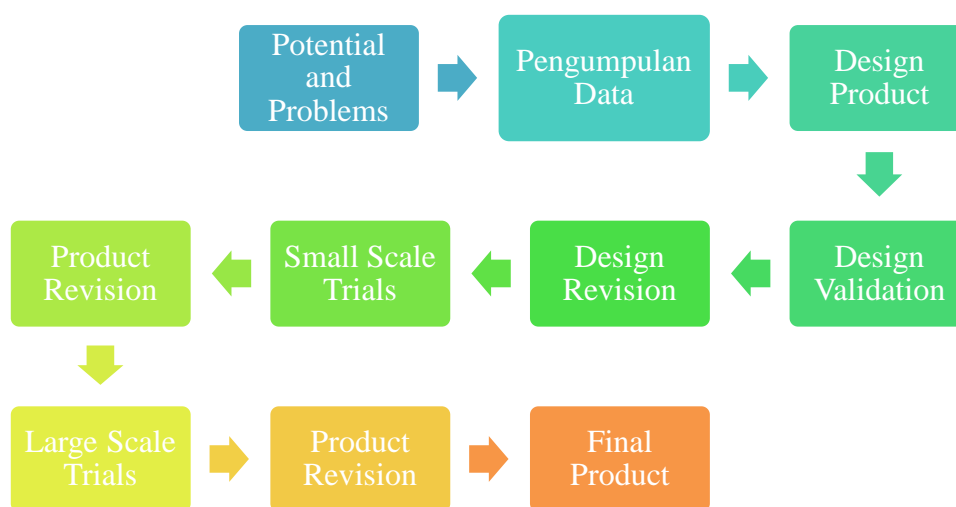


Figure 1. RnD Steps

Population and Sample

The research subjects used in the small-scale research were biology teachers and one class XI MIPA 4 consisting of 36 students. While the subjects of the large-scale research in this study were students in class XI MIPA 3, XI MIPA 5, and XI MIPA 6, each class consisting of 36 students. Determining the subject of this study used a simple purposive sampling technique, namely determining research subjects based on recommendations from biology teachers with the criteria that all students have gadgets or other electronic devices to support learning.

RESULT AND DISCUSSION

Feasibility of E-leaflet Teaching Materials Using QR-Code Human Excretory System Material

The feasibility assessment of e-leaflet teaching materials uses assessments obtained from validation by media experts and material experts. Media validation was carried out by Dr. Sigit Saptono, M.Pd., who is a lecturer at the Department of Biology, Semarang State University. Media validation in the

development of e-leaflet teaching materials consists of aspects of graphic feasibility and language feasibility. The media expert's assessment data can be seen in Table 1

Table 1. Media Validation Result

| No | Assesment Aspect | Percentage | Criteria |
|----|----------------------|------------|------------|
| 1 | Graphic Feasibility | 95,31% | Very Valid |
| 2 | Language Feasibility | 93,75% | Very Valid |
| | Average Score | 94,53% | Very Valid |

Based on the results of media validation carried out by the media validator, it can be concluded that e-leaflet teaching materials are suitable for use in the learning process. This can be seen based on the results of the validation which obtained a score of 94.53% which received a very valid assessment category.

Material Validation

Material validation was carried out by M. Zuhruhi Maulana, S.Pd., who is a biology teacher at SMA N 6 Semarang. Material validation consists of aspects of content eligibility, presentation eligibility aspects, language eligibility aspects, contextual assessment aspects. The data on the results of the material expert's assessment are presented in table 2

Table 2. Material expert validation results

| No | Assesment Aspect | Percentage | Criteria |
|----|--------------------------|------------|------------|
| 1 | Content Feasibility | 85% | Very Valid |
| 2 | Presentation Feasibility | 93,75% | Very Valid |
| 3 | Language Feasibility | 97,22% | Very Valid |
| 4 | Contextual Assesment | 85,71% | Very Valid |
| | Average Score | 90,42% | Very Valid |

Based on the results of the validation of the material obtained based on the assessment of material experts, a validity percentage of 90.42 was obtained. This means that the material contained in the leaflet teaching materials belongs to the very valid criteria. Each aspect of teaching material validation belongs to the very valid category.

Practicality of E-leaflet Teaching Materials Using QR-Code Material on the Human Excretory System

The practicality of teaching materials was obtained from practicality questionnaires filled in by students and teachers. The assessment is carried out after the learning process using e-leaflet teaching materials is carried out. The results of teacher responses regarding e-leaflet teaching materials are in table 3.

Table 3. Teacher Responses

| No | Assessment Aspect | Percentage | Criteria |
|----|----------------------|---------------|-----------------------|
| 1. | Content Feasibility | 100% | Very Practical |
| 2. | Language | 93,75% | Very Practical |
| 3. | Presentation | 91,67% | Practical |
| 4. | Appearance | 100% | Very Practical |
| | Average Score | 96,35% | Very Practical |

Based on the results of the teacher's response, the percentage of the total score was 96.53%. In this assessment, there are three aspects of the assessment that get very practical assessment criteria and one aspect of the assessment gets practical assessment criteria.

Table 4. Responses of Class XI Students

| (%) | Percentage | Criteria | Amount |
|-----|--------------|-----------|--------|
| | 81 < x < 100 | Very | 96 |
| | 61 < x < 80 | Practical | 12 |
| | 41 < x < 60 | Quite | - |
| | 21 < x < 40 | Practical | - |
| | 0 < x < 20 | Less | - |
| | | Invalid | - |

In the results of the responses of students in the trial class which totaled 108 students, the percentage was 84.78% with the lowest percentage being 75% and the highest percentage being 97.92%.

Based on the practicality questionnaire given to students and teachers, it can be concluded that e-leaflet teaching materials using qr-code material on the human excretory system are very practical to use in the online learning process. This is in line with what was conveyed by Munawar (2021: 61-62), the existence of the Covid-19 pandemic should not hinder the spread of information. At this time, taking advantage of technological developments can be an alternative when human activities are limited due to the Covid-19 pandemic. The use of technology should also be used in the education sector. This is done so that the learning process which was hampered during the Covid-19 pandemic can reduce its effects and learning materials can be delivered properly.

CONCLUSION

Based on the results of the research that has been done, it can be concluded that the development of e-leaflet teaching materials using qr-code material on the human excretory system is declared feasible as teaching material for high school students on the material on the human excretory system and the development of e-

leaflet teaching materials using qr-code material on the human excretory system is stated to be practical and able to help students achieve the minimum completeness criteria set by the school.

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