The development of a who wants to be a great biology games as a computer learning media based on human respiratory systems

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Abstract. This study aims to determine the quality and feasibility of learning media games who want to be a great computer-based biology. This research refers to the Research and development (R&D) procedure ADDIE development model is carried out through five stages, namely Analysis, Design, Development, Implementation and Evaluation. The instrument used in assessing the media was a questionnaire sheet that used a Likert measurement scale with descriptive analysis techniques. The results of research into the development of media games who want to be a great biology material on the human respiratory system obtain an average overall evaluation criteria of 60% of media experts, 87% of material experts, very good quality, 93% natural science teachers, very good quality, in class trials small based on an average rating of 74%, large class trials 84% with very good quality. Based on the results of the assessment and questionnaire responses of these students, the media games who want to be a great biology material of the human respiratory system can be categorized as very appropriate to be used as teaching media in schools. The results of the quality and feasibility of learning media are very good.

1. Introduction
Education is one of the programs that is highly considered in every country in the world, including in Indonesia. Education based on Law Number 20 Year 2013 concerning National Education System (SISDIKNAS). In the era of globalization there needs to be an urgent need to improve the quality of human resources (HR) through education and better access to science. The influence of technology in education and learning development, most learning resources are available to students. One of the results of technology that has been utilized in the world of education is the media or learning tools and resources. Along with the development of information technology in various fields, both in terms of software and hardware, especially in the multimedia computer sector. Increasing human needs, technology is also developing for learning and entertainment purposes. One form is in the world of computer-based quiz games [1],[2],[3].
Biology is one branch of natural science that studies about living things with various events related to living things themselves, all types of living things both macroscopic and microscopic are studied in biological sciences so that media is often needed to assist in learning biology, especially in terms of complex things that cannot be observed with the naked eye. IPA biology has a characteristic concept in every material taught, one of which is in the material of the human respiratory system [4],[5],[6]. Material of the human respiratory system has many characteristics that highlight physiological processes and concepts that are quite complex difficult to observe directly by students such as breathing mechanisms where there is a process of gas exchange between the atmosphere (environment) through the nasal cavity to the lungs which is certainly quite difficult to explain without the media concrete learning.

Who wants to be a great biology game is important to learn because this media is a combination of audio, visual, video and audio visual. Seeing from several experiences and educational problems researchers offer learning media as an alternative that can be used by students to study independently which can be used inside or outside the classroom. The game is the result of an adaptation of the game who wants to be a millionaire that has been modified by researchers so that the dish displayed is different [7],[8].

Games who wants to be a great biology on the material of the human respiratory system is an alternative educational game for science biology subjects that can be used by students of class VIII as a means to test how extensive students' knowledge about the material. The appearance of the game who wants to be a great biology on the material of the human respiratory system is made as attractive as possible so that it can be positively influenced by students when operating it.

2. Methods
This research is included in the type of research Research and development (R&D). R&D is a research method used to produce certain products, and test the effectiveness of these products [9]. Based on the sequence of steps and the ADDIE model development scheme, it can be arranged as follows: Analysis, Design, Development, Implementation and Evaluation. The product produced in this research is a computer-based learning media called who wants to be a great biology in the material of the human respiratory system. Data that has been obtained in the study, analyzed using descriptive data. The data is a quantitative data that is changed from the score assessment to quality data to determine the quality of the product produced.

3. Results and discussion
This research is an R & D (research and development) research by adopting ADDIE method and developing media in the form of games who want to be a great biology. This research goes through several stages of analysis, namely conducting needs analysis, material analysis, student analysis and also the analysis of techniques in making these media. After the analysis is carried out, the design phase begins with the preparation of instruments to assess learning media and to make media designs and conduct initial production.

After the analysis phase is finished and the design is finished, it is continued with the development stage, which is product evaluation which is carried out several stages and testing. The initial product design that has been made is assessed by media experts, material experts. Next the product research results were reviewed by the design teacher of science. After that proceed with the small class test (10 students) and large classes (1 class). Each stage of product research and testing is evaluated based on input and suggestions from previous research and testing results until the final product is obtained. Product evaluation uses a questionnaire that has been validated by expert judgment. The measurement scale used to test the learning media created is using a Likert scale.
3.1. Development Procedure

Media games who want to be a great biology in its development using the ADDIE method, the stages of the ADDIE model include five steps, namely the analysis phase, the design stage, the development stage and the evaluation stage [10]. The stages are explained as follows:

3.1.1 Analysis phase. The analysis phase begins by collecting data in the early stages of media development.

3.1.1.1 Requirements Analysis. Need analysis in the form of learning media analysis used and material analysis.

3.1.1.2 Analysis of the learning media used. The selection of learning media developed was the result of an interview with one of the science teachers at Muhammadiyah 6 Yogyakarta Middle School on Thursday 10th August 2017 said that students of class VIII when studying respiratory system materials tended to be passive and mostly used lecture methods and rarely used available media to help the learning process.

The availability of facilities and infrastructure that is quite complete including ICT facilities such as LCD projectors, computer laboratories and hotspot areas. With these various facilities teachers often rely solely on power point media, so learning in the classroom becomes less varied and also teachers become less innovative in developing learning media. Therefore media games who want to be a great biology can be an alternative learning media. In addition to making more varied use of sound, animation and video can make learning more interactive and this media can also be used in computer laboratories or brought to their homes.

3.1.1.3 Material Analysis
3.1.1.3.1 Analysis of SK and KD. The learning material used in this study is the material of the human respiratory system. The material is difficult because the material is quite a lot with limited time to study it in detail. So that this material will be easier for students to understand if it is published in more interactive media and students can do independent learning.

Material of the human respiratory system contained in the media in accordance with SK (Competency Standards) are an determined specification of performance that sets out the skills, knowledge and attitudes required to operate effectively in employment. It is the aim of learning process in general and KD (Basic Competence) is about what the Standard Competence spells out in the KTSP syllabus Curriculum, namely:

SK: 1. Understand various systems in human life:
KD: 1.5 Describes the respiratory system in humans and its relationship to health.

3.1.1.3.2 Analysis of Literature Study. Literature study conducted aims to collect learning material from various sources of learning textbooks to create media.

3.1.1.3.2.1 Human Respiratory System
3.1.1.3.2.1.1 Material of the human respiratory system. The material of the human respiratory system consists of respiratory constituent organs in humans, respiratory mechanism and air volume and lung capacity.
3.1.1.3.2.1.2 Image. The picture used on the material of the human respiratory system is the best picture so that students are easy to understand with good picture visualization.

3.1.1.4 Student analysis. Students who will use learning media who want to be a great biology are students of class VIII of junior high school. This research was conducted by small class trials and large class trials. Trials for small classes are randomly selected by 10 people while for large class trials are conducted on one class of students (25 students).
The selection of instructional media is adjusted to the development of students because students of class VIII are included in the fourth stage or included in the formal operational period (11-Adult) where at the age of adolescents and beyond someone is able to think abstractly and hypothesis [11]. At this stage one can predict what might happen. He can draw conclusions from a statement. So the need for more interesting innovative and creative media to construct abstract material so that it is more easily understood.

3.2. Planning phase (design)
Product design has stages:

3.2.1 Compile an outline of the contents of the media who wants to be a great biology. The outline of the contents of the media is to contain an initial plan about what will be displayed into the media that are adjusted to the SK and KD, the media to be developed in this study consists of learning activities in the following order.

3.2.2 Cover page. Contains the title of the learning media, the University logo, the name of the researcher, the contact person of the researcher and the main menu of the media.

3.2.3 Description of the material. Describe material about the human respiratory system, human respiratory organs, human respiratory mechanisms, air volume and lung capacity

3.2.4 Video. The video presented on the media who wants to be a great rainy biology to clarify the learning material. The video contains the material of the human respiratory system in full and the mechanism of breathing.

3.2.5 Games or quizzes who wants to be a great biology. On the front page of the quiz there are instructions for using the quiz as well as instructions for using help to answer

3.2.6 Design content in media who wants to be a great biology. The material presented in the developed media is first an introduction to the human respiratory system through video. After that, students learn a deeper description of the material, then students play or work on questions from the quiz who wants to be a great biology.

3.2.7 Develop research instruments. Arranging instruments for media experts, material experts, science teachers as reviewers and student response questionnaires in the form of Likert scale questionnaires. The questionnaire consisted of three answer choices namely Strongly Agree (3), Agree (2), Disagree (1) [8]. After the instrument is finished, it is then consulted with the supervisor to be further validated by the media and material experts. The validation of the media expert assessment instrument was carried out by Yahya Hanafi, M.Sc. Much was validated by the material expert assessment instrument, for natural science teachers, and students' responses to the media were done by Much. Fuad Saifuddin, M.Pd. After validation, there are some items that are invalid. The instrument points are then revised according to the validator's suggestion, so that a valid evaluation instrument can be obtained that can be used to assess the developed media.

3.3. Development stage
This stage consists of several components, namely:

3.3.1 Tools and Materials. Tools and materials used to make this learning media include laptops, mice, cellphones, flashdisk. As for the editing process and computer coding and editing using Macromedia Flash 8.0 software.

3.3.2 Production. Production goes through several stages, namely:

3.3.2.1 Putting together a storyboard. Formulation of media ideas and concepts who wants to be a great biology.

3.3.2.2 Pictures and videos. Looking for pictures and videos that are suitable with the learning material and inserting pictures and videos that have been provided into flash media.

3.3.2.3 Background. Background used in this media to adjust to junior high school students.

3.3.2.4 Audio. Incorporate sound that has been prepared in accordance with the character games for junior high school students by using a cheerful backsounds.
3.3.2.5 Incorporate all components. Incorporate all components that have been prepared into the Macromedia Flash 8.0 application to operate.

3.3.2.6 Arrange the media. Arrange media who want to be a biology based on storyboards that have been prepared from components with various techniques for making computer-based media.

3.4. Product Revision

3.4.1 Revision stage I. Revision of the initial stage after the assessment of experts

3.4.1.1 Revision of Media Expert. The revision of this stage is done after the media experts give an assessment of the media developed. Based on the results of the assessment and some suggestions from media experts, the following improvements were made:
The cover which was initially shaped as a quiz who wants to be a millionaire has been changed to adjust to the material that is the human respiratory system can be seen as Figure 1.

3.4.1.1.1 Instruments which previously could not be used to assess improved media that did not need to be asked of testers were removed

3.4.1.1.2 The quiz part that was originally presented exactly the same as the original game replaced is not the same as the original match with students

3.4.1.1.3 Variations on the previous questions were less random after correcting the questions made randomly according to the number of questions so that the questions that appeared varied

3.4.1.1.4 Previous questions and material are not available

3.4.1.1.5 Pictures, videos, animations and audio have been improved by adding videos, pictures to the material and audio to the problems

3.4.1.1.6 The appearance of the previous material is still less attractive, replaced with a more interactive one

![Figure 1. Examples of views before (left) and after (right) revision.](image)

3.4.1.2 Expert Material Revision. This revision was made after the material expert gave an assessment of the developed media. Based on the results of the assessment and some suggestions from the material experts, the following improvements will be made:

3.4.1.2.1 Previous writing is still a lot that is not in accordance with the way of writing after revised writing that is still less suitable to be adjusted

3.4.1.2.2 Previous material is still in doubt with the learning objectives suggested to ask back to the science teacher in junior high. After asking the teacher the previously questionable material is adjusted to the learning objectives to be achieved and eliminates inappropriate ones

3.4.1.2.3 Previous references obtained were still doubtful after the revision was changed and added material from different reference sources

3.4.1.2.4 Before being revised there were still questions that did not originate from material included in the media after the revision replaced the adjusted questions from the material contained in the learning media made
3.4.1.2.5 Many of the cognitive levels in the previous questions were wrong after the revised cognitive level of the questions was improved according to the material and abilities of students.

3.4.1.2.6 Previously there were no learning videos in the media as a motivational generator for students after the revision was added interesting learning videos and the material was presented more interactively.

3.4.1.2.7 Have not included the bibliography in the previous media, after the revised bibliography has been included in the learning media.

3.4.1.2.8 The previous picture on the material is still unclear after the revision is replaced with a clearer and easier to understand picture like the image below.

3.4.2 Revision stage II. The second revision after the assessment of the science teacher. This revision was made after the science teacher gave an assessment of the learning media who wanted to be a great biology that had been developed. Based on the results of the assessment and some suggestions from the natural science teacher, there is no significant suggestion from the natural science teacher, only comments for the media are considered good enough to develop again. This revision is an improvement from the previous media that will be tested on the product to small class students (10 students) and becomes the basis for the next revision.

3.4.3 Revision stage III. The third phase of the revision was carried out after a small class student trial. This revision was made after the small class students responded to the product that had been developed. Based on the results of input and some suggestions from students, namely the picture is very good and very easy to learn, rarely play games like this, in my opinion the game who wants to be a great biology is very good and easy to operate comments from a student named Klara Atika Putri. Based on these suggestions and input, so there is no deeper improvement to the product at this stage III.

3.4.4 Revision stage IV. Phase IV revisions were made to the development products that had been tested on large-scale trials. In large class trials students provide input that is learning to use media who wants to be a great biology, is very interesting, gets additional information and can learn human respiratory system material easily understood, not boring. But there are also students who give input, that is, their voice is hardened and developed more to make it more interesting. Based on these suggestions and input, so that there is no deeper improvement on the revision of this last stage both in terms of the media and material in the media who wants to be a biology.

3.5. Final Product Review

Media Who wants to be a great biology has been developed. The assessment phase is carried out to determine the quality of the product through the assessment of media experts, material experts, science teachers and student responses to small class trials and large class trials. This media assessment on who wants to be a great biology has all aspects of both good and very good categories. That is good media / teaching materials can enhance the learning process, which is concerned with the benefits of media / teaching materials [12]. This is related to the presentation and appearance of teaching media who want to be a great biology shows that this instructional media attracts the attention of students so that it arouses enthusiasm to understand the material being studied.

Pictures and videos can present something that can be seen so as to provide a concrete learning experience to students [13]. The students will feel and see directly the relationship between theory and practice so as to increase student attention to focus on the material presented. This means that the pictures and videos presented in the media who want to be a great biology are very helpful for explaining the material of the human respiratory system.

The components of the presentation of learning are arranged according to the curriculum used by the school. The material is arranged according to the SBC by loading Competency Standards (SK) and Basic Competencies (KD) which are analyzed in such a way, that one of the functions of learning media is as a learning aid that also influences the situation, conditions and learning environment in order to achieve the learning goals that have been created and designed by the teacher [14]. This means that the preparation of learning material objectives must be in accordance with Competency Standards. So the depth of the material can be seen from existing indicators. The media used are required in a structured
and organized presentation. This consideration is expected to meet the needs in achieving the goals set. This means that the contents included in the learning / material in the developed media helps students to understand the lesson in accordance with the specified goals. So the material in this learning media is worth studying.

Based on the overall assessment in terms of the quality of media and material assessed by media experts, material experts, science teachers and student responses it can be concluded that this media who wants to be a great biology has very good qualities to be used as a medium for learning biology in schools. Good and effective learning media requires good planning. This shows that the media developed in this study are in accordance with the plan in the research and development phase carried out.

Based on the overall assessment in terms of the quality of the media and learning assessed by media experts, material experts, science teachers and student responses, are in the good and very good categories, meaning that who wants to be a great biology is very feasible to be used as a biological science teaching media especially on the material of the human respiratory system for VIII grade junior high school students.

The advantages and disadvantages of media who want to be a great biology is that the main advantages of this media are more interactive because it is able to display images, animations, audio, and video. Production costs are cheaper because to multiply products can be done by copying files between users, it is more practical to carry them anywhere because they are in the form of soft files that can be included on a CD, flash or memory card as a data storage medium. Delivery or transfer of distribution can be done by using e-mail. While the drawback is that it requires the use of resources in the form of electricity, computers or notebooks to operate it. In making or developing it requires creativity and skills in the field of ICT [15].

4. Conclusion
Based on the research and development of games who want to be a great biology as a computer-based learning media material on the human respiratory system in the eighth grade junior high school students, it can be concluded that.

The quality of games who wants to be a great biology as a computer-based learning material of human respiratory system material in eighth grade junior high school students obtained an average percentage of all aspects of media experts namely aspects of software engineering, presentation aspects, aspects of visual communication, and aspects of language worthiness by 60% with good quality, from material experts namely aspects of learning design, aspects of material, aspects of problems, aspects of presentation, and aspects of the implementation of contextual learning by 87% with very good quality, from science teachers namely aspects of software engineering, aspects of visual communication, aspects of language feasibility, aspects of learning design, aspects of material, aspects of questions, aspects of presentation, and aspects of the implementation of contextual learning by 93% with very good quality, as little as 74% of the small class test and 84% of the large class test with the quality of each very good from various aspects, namely aspects of presentation, linguistic aspects, aspects of visual communication and aspects of usefulness.

Based on the overall assessment in terms of the quality of the media, and the material assessed by media experts, material experts, science teachers, and media student responses who want to be a great biology are in the category of good and very good quality, meaning that the media is already worthy of being used as alternative learning media material for the human respiratory system in eight grade junior high school students.

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