Project Base Learning Media in the Dynamic of Hydrosphere

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Abstract. The aims of this study were: 1) to identify the need of using teaching-learning media
digital catalog based on Problem Base Learning (PBL) to subject study the dynamic
of hydrosphere and its impact on life. 2) to identify the development stages of teaching-learning
media digital catalog based on PBL. 3) to identify the feasibility of teaching-learning media
digital catalog based on PBL to subject study the dynamic of hydrosphere and its impact on life.
The type of this study was Research and Development with Brog and Gall’s development model.
The conclusion of this study were: 1) The need for teaching-learning media digital catalog based
on PBL was obtained into the category of need. 2) the development of teaching-learning media
digital catalog based on PBL has been adjusted and integrated with curriculum 2013. 3) the
teaching-learning media digital catalog based on PBL had feasibility value 85.7%, and was
feasible to be used in class.

1. Introduction

Education is not something static but it is something dynamic that demands a continuous improvement;
and education has goal which should be achieved in the teaching-learning process [1].

The teacher transforms into facilitator who leaves the lecture method and presents teaching-learning
media that stimulates the students to discuss or do fun interactive activities but it is still challenging the
student’s potential. In this case, students work with the facilitator to generate and refine hypotheses
related to the problem's potential solution. the facilitator’s role is to model hypothesis-driven reasoning
skill [2].

Teaching-learning media occupies an important position as one component of the teaching-learning
system. Media is a tool that used to deliver messages from sender to recipient, thus it can stimulate the
thought, feeling, attention and interest of the recipient [3]. The teaching-learning media is one of the
external factors that affect the success of learning activities [4].

The teaching-learning media digital catalog based Problem Based Learning is a teaching tool that
consists of materials limitations, and evaluation guided which is systematically and attractively designed
to achieve the expected competence.

Catalog is a list of items or objects that are arranged for a particular purpose [5]. Problem-based
learning (PBL) is considered as a student-centered teaching approach in which students are inspired to
apply critical thinking through problem simulation to learn some both complex issues and simple issues
that may or may not have a standard solution [6].

The application of teaching-learning media digital catalog based on Problem Based Learning can
provide better planned learning activities, independent, with transparently output results.
2. Research methodology
This study was conducted at SMA MTA Surakarta, District in Academic Year 2016/2017. SMA MTA Surakarta is addressed at Kyai Mojo Semanggi Street Kliwon Market with geographical location at 7°35'11.72 "S and 110°50'10.62" E. The Location of school can be show at figure 1.

![Image of Research Location](image)

**Figure 1.** Image of Research Location

The type of the study was research development. The definition of the study and development according to Arifin is suitable with Borg and Gall’s statement, “research and development is a powerful strategy for improving practice. It is a process used to develop and validate educational products”. The definition of study and development in Arifin which suitable with the statement is research methodology has three main components, those are: (a) development model, (b) development procedure, and (c) product trial [7].

The product that would be produced in this development was in the form of teaching-learning media digital catalog based on PBL which contained about the dynamic of hydrosphere and its impact on life.

3. Research finding

3.1. The need of teaching-learning media digital catalog based on PBL
Based on the questionnaires data that have been given to the students of class X, it was found that innovative teaching-learning media was needed by the students.

The questionnaires that were given to the students were in the form of checklist questions. The students were asked to give checklist mark on the columns that have provided. The scale used in the questionnaires was Likert scale with score criteria 5(indispensable), 4(needed), 3(not sure), 2(not needed) and 1(not indispensable). Based on the result of questionnaire needs which have been given to the students of class X with amount of 33 students, it was obtained percentage value 76.4% with the category of need.

3.2. The development of teaching-learning media digital catalog based on PBL
The development of media in this study used Brog and Gall” development model, then adjusted to development requirement and media which is being developed. Here were the steps of media development:

3.2.1. Research and information collecting. Looking for potential and existing problems about the existing of teaching-learning media in the school.

3.2.2. Planning. Planning in the teaching-learning media design that would be created, including analysis, and the goal.
3.2.3. **Develop preliminary form of product.** The product of teaching-learning media was given to the media expert and material expert for being evaluated.

3.2.4. **Preliminary field testing.** The researcher did teaching-learning process by using media that have been created and developed.

3.2.5. **Main product revision.** Reviewing each deficiency and evaluating the result of limited product trial.

3.2.6. **Main field testing.** The researcher did large-scale trials and involved the students in answering questionnaires about teaching-learning media that have been developed.

3.2.7. **Operational product revision.** The improvement and revision of the product was based on the result of large-scale product.

3.2.8. **Operational field testing.** The implementation of posttest and product trial was done after several evaluations of the limited-scale and large-scale trial stage.

The final results of product after evaluation, validation and trial, were showed on figure 2, figure 3, figure 4, figure 5 below:

![Figure 2](image2.jpg) **Figure 2.** The Front Page Display of Digital Catalog

Front page was created by using adobe Photoshop software cs4 for windows 10, then converted into flipbook maker pro 4.3.3.

![Figure 3](image3.jpg) **Figure 3.** Hydrological Cycle Material

The hydrological cycle material was as beginning material in learning hydrosphere.
The groundwater material covered type, potential, distribution and its utilization.

Watershed conservation and soilwater material aimed to show the students about the ways to preserve the watershed and soilwater from the damaged.

3.3. The feasibility of teaching-learning media digital catalog based on PBL
The media feasibility evaluation in this study used questionnaires. The evaluation aspects included several indicators; those were the attractiveness of page, the appearance, consistency, image clarity, color selection, the use and the preparation, the innovation and representative.

Based on those aspects, the evaluation criteria were created and resulted the percentage of value were showed on table 1.

Table 1. The expert validation to teaching-learning media digital catalog based on PBL

| no | validator          | score (%) | category       |
|----|--------------------|-----------|----------------|
| 1  | media expert       | 87.5%     | very feasible  |
| 2  | material expert    | 84%       | very feasible  |
|    | average            | 85.7%     | very feasible  |

Source: Research Primer Data 2017

Based on the data in the table 1 above, obtained the average value of the expert team of 85.7% so that it can be said that the teaching-learning media digital catalog based on PBL is very feasible to be used in classroom learning.
4. Results and discussion
Teaching-learning media digital catalog was needed by the students to understand the hydrosphere material.

The use of teaching-learning media digital catalog based on PBL was considered to be effective as a mediator of hydrosphere material for students in class X.

The development of teaching-learning media used Borg and Gall's development model with the subject study the dynamic of hydrosphere and its impact on life. Teaching-learning media digital catalog based on PBL covered Core Competence, Basic Competence, Picture and Video related to the hydrosphere material.

The teaching-learning media digital catalog based on PBL then was evaluated for the feasibility by the team experts, both media expert and material expert. The percentage of value gained from media expert validation by 87.5% and 84% from the material expert, thus it can be concluded that the teaching-learning media digital catalog based on PBL was included in the category of feasibility.

5. Conclusion
Based on the results of teaching-learning media development digital catalog based on PBL, it could be conclude that: (1) the need for teaching-learning media digital catalog based on PBL was obtained the percentage results 76.4% and included into the category of need. (2) the teaching-learning media digital catalog based on PBL used Brog and Gall’s model which the stages was adjusted with the media that will be developed. (3) the feasibility of teaching-learning media digital catalog based on PBL had validation result 87.5% from media expert and 84% from material expert, thus it can be concluded to be very feasible.

The suggestion for further study is it is better to use sans serif font with the size 11. Sources can be placed under picture and video or can be created in one page and placed it in last page.

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