Developing Socioculture-based Reflective Picture Storybook Media for Math Lesson

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Abstract. This research aims to: 1) create a reflective picture storybook media developed based on sociocultural considerations, and 2) determine the eligibility score of the socioculture-based reflective picture storybook media in improving social skill and creativeness of grade IV elementary pupils. This research follows ADDIE research and development method. Subjects for field testing came from Class IV State Elementary School (SDN) 2 Jonggrangan Kulon Progo, Yogyakarta, Indonesia and numbered 17 pupils. Data were obtained from observation, questionnaire, and documentation. The result from the research indicates that: 1) The reflective picture storybook is successfully developed based on sociocultural considerations; 2) Eligibility of the media according to evaluation by media expert in percentage reaches 85.81%, according to material expert reaches 86.02%, and according to students’ response reaches 86.00%.

1. Introduction
Media in learning process play a very important role, and even reaches similar position that learning method occupies [1]. This is due the fact that any method applied in any learning requires that the media being used is suitably adjusted to the need at hand. Learning media thus acts as a bridge that connect teachers in their attempt to transfer and build comprehension in their students’ mind. At present with the help from advancement in our era various technologies are available for teachers to create media that best suit their needs.

Learning media come in different shapes and types, one of them is reflective picture storybook. Reflective picture storybook media is a graphical storybook that carries messages through illustrations and texts [2]. Storybook with graphical illustration is a very effective mean to attract students’ curiosity and to ease them to attain conceptual understanding, which is in line with Sayer’s opinion that at elementary level pupils tend to favour reading materials equipped with graphics [3]. Storybook made with a lot of attractive colours will win children’s curiosity to engage in reading. Through interesting characters, illustrations and colouring, average thickness, simple plot and lesson, students can take example from characters in the story. Teachers can exploit graphical storybooks to improve pupils’ creativity and their social skill as well. However they are not readily available at school. The picture storybook developed in this research differs from what commonly found in school, and according to interview with teachers, some admitted to be unfamiliar with such thing.
Prior study by Maulida reveals that learning using picture storybook with emphasis on creativity result in students capable of fulfilling learning completion threshold. [4]. From here it can be confirmed that reflective picture storybook is a suitable media to nourish students’ creative side. Pre-research focused on analysing the need at school indicates that there is demand for socioculture-based reflective picture storybook media. Pre-research also points to the fact that available books are less than ideal in diversity, meanwhile to ensure the success of School Literacy Movement books with sufficient diversity are indispensable, and this is especially true for sociocultural-based books that are very lacking in number. Insofar books used for learning are limited to thematic type produced by government as such new publication of interesting story books are deemed necessary. Teachers expect books that ease learning and are easy to understand as well as interesting. Therefore, the authors feel compleed to t ace this issue and engage in developing reflective picture storybook media which purports to tain and improve students’ social skill and creativity at grade IV elementary class.

2. Method
This study is a research and development effort that purports to construct a reflective picture storybook based on socioculture. Research steps are modelled after ADDIE (Analysis, Design, Development, Implementation, and Evaluation) as proposed by Branch [5]. This research finished at development activities and concluded with producing media and assesses the eligibility of reflective picture storybook which has been developed based on sociocultural aspects for use in improving social skill and creativeness among 4th graders. As such, the fifth stage is excluded.

Subjects involved in the development stages of this reflective picture storybook media were media expert, material expert and grade IV elementary students. Research instruments are observation leaves, media validation questionnaire, expert’s validation pages, and students’ response questionnaires. Observation leaves was qualitatively analysed, validation pages both for media expert and material expert were qualitatively and quantitatively analysed, using Likert scale (5,4,3,2,1), while students’ response questionnaires were analysed quantitatively based on Guttman scoring system (1 and 0). From the questionnaires calculation of percentage of eligibility is obtained according to Likert scale as previously adapted by Riduwan [6].

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Percentage = \frac{\text{total scores}}{\text{maximum score}} \times 100\%
\]

| Percentage | Criteria                  |
|------------|---------------------------|
| 0% < x ≤ 20% | Very ineligible / Very bad |
| 20% < x ≤ 40% | Ineligible/ Inadequate |
| 40% < x ≤ 60% | Moderately eligible / Adequate |
| 60% < x ≤ 80% | Eligible / Good |
| 80% < x ≤ 100% | Very eligible / Very Good |

3. Result and Discussion
The research was fulfilled with several steps according to ADDIE (Analysis, Design, Development, Implementation, and Evaluation) model. The research was pursued until satisfactory media that can meet the purpose of improving 4th graders’ social skill and creativeness can be successfully produced and this require several phases as enumerated below:

3.1 Analytical Phase

3.1.1 Needs Analysis. Researchers’ own observation during math lesson in State Elementary School (SDN) 2 Jonggrangan, revealed that teachers already used books made available by the government such
official bundled lesson books, activity leaves and references but they were not adequately diversified. Pupils already relied on the books and students’ activity leaves, but had yet to show a decent amount of social skill and creativeness. Researcher did not witness both teachers and students made use of any socio-culture based reflective picture storybook as their primary learning media regardless students’ inclination to engage with book containing animated pictures.

3.1.2 Curriculum Analysis, Result from curriculum analysis points to polygon topic in math lesson. Basic competence contained in the reflective picture storybook are (3.8) ability to analyze regular polygons and irregular polygons and (4.8) to identify regular and irregular polygons. One of the goal is to ensure the students can grasp the concept of regular and irregular polygons. Ss such, suitable media for that purpose is needed.

3.1.3 Students’ Characteristics Analysis. Characteristic analysis indicates that it will be easier for the students to comprehend lesson if visual or graphical aids are provided. The ongoing learning did not allow enough facility that support students’ learning progress and bring their social skill and creativeness to the surface. Therefore, further learning using reflective picture storybook media developed based on socioculture is expected to permit bigger space for growth for students’ social skill and creativeness.

3.2 Design Phase
At design phase, researchers finalized the product design of the intended socioculture-based reflective picture storybook developed with Polygon lesson in mind. The product is developed and designed using certain software i.e. Microsoft Word 2010 and Corel Draw X7. Texts for illustration and pictures were compiled in Microsoft Word 2010, and then transformed in to real pictures using Corel Draw X7. Concept, content, story and plot in the reflective picture storybook media are developed based on sociocultural aspect by the researchers, while its graphics originated from collaborative effort between research team and illustrator.

Preliminary design for the socioculture-based reflective picture storybook media was developed through various stages as follows:

- Story is developed by taking account the purpose of intended product, learning goal, intrinsic elements of story, material considered in accord with basic competence, content that motivates students to improve their social skill and creativeness, reflective questions and reflection evaluation relevant to students’ social skill and creativeness.
- Illustrations were created in collaboration with illustrator from Yogyakarta and adjusted to concept previously prepared by researchers.
- Front cover page is filled with illustration picturing the characters of the story.
- Preface page is behind cover page, complete with usage instruction and basic competence mapping.
- Content pages consist of story that narrates polygons, regular polygons, and irregular polygons as found in daily object at home and at market. In the middle of the story students are presented with games in which they are tasked to find several object and classify them into polygon group or else.
- At the end of the story there is information box page containing summary of what students have learned before.
- Instruments design included observation leaf, validation page for media expert, validation page for material expert and questionnaires for students.

3.3 Development
Development stages covered instrument development, media development, validation and module revision, which can be defined as follows:
3.3.1 **Instrument development stage.** In this stage printing of the planned instrument was completed, followed by validation by two validators to measure the eligibility of the instrument to gather data.

3.3.2 **Media development stage.** At this stage all design of the media was converted into file with .pdf extension and went to printing station.

3.3.3 **Media validation stage.** At this stage socioculture-based reflective picture storybook media as a product of development underwent assessment process by validators. Validation of the media was conducted by media expert and material expert. After validators declared the validity of the media then prepared module can be used for small-scale field testing. Meanwhile advice and suggestion from validators were used as a source for further improvement. Below are the analysis results for the media as validated by validators.

**Table 2** Analysis result for Reflective picture storybook media validated by material expert

| Aspect            | Validator’s Score | Percentage (%) | Criteria       |
|-------------------|-------------------|----------------|----------------|
| Content eligibility | 40                | 80,00          | Eligible       |
| Presentation      | 31                | 88,57          | Very Eligible  |
| Language          | 12                | 80,00          | Eligible       |
| Illustration      | 7                 | 70,00          | Eligible       |
| Completeness      | 9                 | 90,00          | Very Eligible  |
| Physical appearance | 9              | 90,00          | Very Eligible  |
| Executability     | 15                | 100,00         | Very Eligible  |
| Average           |                   | 85,81          | Very Eligible  |

Results from validation by material expert with regard to content eligibility, presentation, language, illustration, completeness, physical appearance, and media executability reach an average 85.81%. This percentage according to Riduwan falls into very eligible criteria, this indicates that the reflective picture storybook is a suitable media for improving social skill and creativeness of 4th graders at elementary school.

**Table 3.** Analysis result for Reflective picture storybook media validated by media expert

| Aspect            | Validator’s Score | Percentage (%) | Criteria       |
|-------------------|-------------------|----------------|----------------|
| Content Eligibility | 41               | 82,00          | Very Eligible  |
| Presentation      | 34                | 97,14          | Very Eligible  |
| Language          | 11                | 73,00          | Eligible       |
| Illustration      | 8                 | 80,00          | Eligible       |
| Completeness      | 8                 | 80,00          | Eligible       |
| Physical Appearance | 9              | 90,00          | Very Eligible  |
| Executability     | 15                | 100,00         | Very Eligible  |
| Average           |                   | 86,02          | Very Eligible  |

Results from validation by media expert with regard to content eligibility, presentation, language, illustration, completeness, physical appearance, and media executability reach average score 86.02%. According to Riduwan, such amount of percentage can fall within very eligible criteria, meaning reflective picture storybook can be considered as a suitable media or improving 4th graders’ social skill and creativeness in elementary school.
3.3.4 *Revising Media.* Below are several advises from media expert and material expert on which revision of reflective picture storybook media was based.

| Table 4. Suggestions from media expert and material expert |
|-----------------------------------------------------------|
| Suggestions                                                                 |
| Media Expert                                                                 |
| 1. Background cover should not only show characters, but also setting of the story |
| 2. Before going into the main story, direction page should be provided |
| 3. Pictures should be adjusted to material and real life situations |
| Material Expert                                                                 |
| 1. Targeted basic competence should be clearly defined |
| 2. In page 16 mathematical point that reveal polygon lesson was not really evident, additional story relevant to material is recommended |

Based on suggestions from validators abovementioned regarding to media revision, the authors made several improvements in accordance with validators’ advice, such as: (1) cover background was modified with market picture because the story takes place in a market; (2) direction and basic competence mapping was attached after cover page; (3) in page 15 there was revision for a stone picture, because the one with hexagonal shape is the lining for the stone, and according to source stepping stone is usually shaped oval; (4) in page 16 there was a dialog revision because it was not adequately matching for closing the last dialog; additional dialog was necessary to strengthen concluding discussion of the story.

3.4 *Implementation*

There were several actions at implemental stages i.e. testing the media under development using students’ response questionnaire. Field testing at limited scale was conducted for 3 4th graders at State Junior School (SDN) 2 Jonggrangan. Students gave score to content eligibility, presentation, language, illustration, completeness, physical appearance, and media’s executability on the questionnaire. From the questionnaire several data can be presented as follows:

| Table 5. Analysis Result for Students’ Response Score Questionnaire in Limited Field Testing |
|-----------------------------------------------|------------------|-----------------|-----------------|
| Aspect                                        | Average Questionnaire Score | Percentage (%) | Criteria         |
| Content Eligibility                           | 44                | 88.00           | Very Eligible    |
| Content Presentation                          | 31                | 88.57           | Very Eligible    |
| Language                                      | 12                | 80.00           | Eligible         |
| Illustration                                 | 10                | 82.22           | Very Eligible    |
| Completeness                                 | 8,67              | 86.67           | Very Eligible    |
| Physical Appearance                          | 8                 | 80.00           | Eligible         |
| Executability                                | 14,67             | 97.78           | Very Eligible    |
| Average                                       | 86,17             |                 | Very Eligible    |

Result from students’ response questionnaire in limited field testing in percentage reaches 86,17%. Such result according to Riduwan can fall within very eligible criteria, meaning reflective picture storybook media is suitable for improving students’ social skill and creativeness at Grade IV level.
All results from validation by experts and from limited field testing can be summarized as follows:

| No.  | Assessment Result                  | Percentage | Description   |
|------|------------------------------------|------------|---------------|
| 1    | Media Expert                       | 85.81      | Very Eligible |
| 2    | Material Expert                    | 86.02      | Very Eligible |
| 3    | Limited Field Testing              | 86.17      | Very Eligible |
|      | Sum Total                          | 258.00     |               |
|      | Average Percentage (%)             | 86.00      | Very Eligible |

According to the table above, as much as 85.81% from media expert and 86.02% from material expert serves as indication that reflective picture storybook media is eligible for use in math lesson Polygon. Students’ response toward the media in percentage reaches 86.17% which is very good. Average percentage from all validation effort and limited field testing is 86.00%, therefore it can be concluded that culture-based reflective picture storybook media lesson Polyhedron is very eligible for improving students’ social skill and creativity at grade IV.

4. Conclusion
According to results from the research and development of culture-based reflective picture storybook media above, several conclusions can be inferred as follows:

- The creation of reflective picture storybook media based on socio-culture refers to ADDIE development model.
- The eligibility of culture-based reflective picture storybook media according to media expert’s assessment in percentage reaches 85.81% and falls into very eligible category, based on evaluation by material expert reaches 86.02% and falls into very eligible category, and from limited field testing reaches 86.17% and falls into very eligible category. Total average percentage based on all experts’ validations and limited field testing is 86.00%, therefore it is conclusive that the culture-based reflective picture storybook media about Polygon lesson is definitely eligible for use in improving social skill and creativeness of grade IV elementary students.

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