PROMOTING AN INTEGRATED SCIENCE AND ENGLISH POP-UP BOOK FOR PRIMARY SCHOOL STUDENTS

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Abstract

After doing an observation and interview with teachers, the researchers found that English and science were taught in a conventional method and were not thoroughly learnt. Hence, the teaching was not effectively conducted, and learning often ended up in boredom, which resulted in ineffective teaching and learning atmosphere. The objectives of this research were to create a combined English language and science pop-up book learning media for animal and human movement organs and to acknowledge its feasibility. The 4D development steps developed by S. Thiagarajan et al. were used in the research design, consisting of four stages: define, design, develop, and disseminate. The participants included in this research were the 5th-grade students of SD N 26 Belinyu, consisting of 35 students. Out of 35, 20 were female, and 15 were male. Two senior female teachers in the same school were also included in the interview. Data were collected by documentation, expert validation sheets, feasibility test sheets and user response questionnaires. Expert validation was conducted by two expert judgments, while language validation was justified by two language experts in Bahasa Indonesia and English. The results showed that the benefits students gain from using pop-up book media include seeing, opening, and shutting images on the pop-up book, which helps strengthen children's motor development.

Keywords: Pop-up book, English for elementary students,Science in primary school

INTRODUCTION

Science and linguistic provision must be fostered as early as possible. Teachers owe it to their students to encourage the development of science and language skills. Science, or in Bahasa Indonesia stated as *IPA,* should begin in elementary school in order to instill and develop the character of students who are interested in science (Fatimah, S. & Kartika, 2013). The urge to provide a high-quality, intellectually stimulating curriculum prompted educators to adopt science literacy as a means of improving curriculum (Kim & Kim, 2021). On the one hand, English should be taught at a basic level to expand participants' language repertoires and introduce the science of foreign language communication. In the new, more global, technologically advanced, and post-industrial economies, there is a perceived need for a

workforce that is more entrepreneurial, adaptable, and capable of lifelong learning, which is as the effect of global processes on TEYL policy and practice in school curriculum and teaching and learning methodologies (Chang, 2012). Whilst, a good understanding of integrated learning of science and language can advance the critical and creative thinking, problem-solving, communication and environmental awareness to the young learners. Other than that, teachers at primary schools who teach science should comprehend two scientific components; science as a process and as a product (Barlia, 2008).

To support those aspects explained previously, teachers should create effective teaching materials to improve students' learning experiences and comprehension of the materials as they facilitate the learning process (Miftah, 2013; Rizal & Maryam, 2020). Pop – up book development as a teaching medium is becoming prevalent among educators as a way to convey information to students. The appealing visuals of the Pop-up Book serve as a reference for the teacher in the development of more clearly and easily understood material. The use of pop-up book media is very feasible for elementary school students because it helps children's understanding in social interaction and translating material in accordance with the theme of thematic books and its attractive shape of pictures will make students more interested in reading (Dewanti et al., 2018; Oktaviana, 2021; Safitri & Sudarsono, 2019; Sari & Suryana, 2019). Several academics believe that the use of a pop-up book to teach elementary students optimizes the learning process (Amalia & Setiyawati, 2020; Baiduri et al., 2019; Junita & Munzir, 2020; Zaeni et al., 2018). Furthermore, the use of pop – up book proved to be effective to be used in enhancing the outcomes of lower level students in one of elementary schools in Semarang as well as could improve their learning autonomy (Ahmadi et al., 2018; Elmunsyah et al., 2019).

In Bangka Belitung province, the pop up development has never been implemented. Other than that, teaching in rural areas differs from teaching in cities where teachers are supposed to come up with more teaching ideas, especially during the pandemic. For teachers who are in urban areas, the pandemic did not deflate the spirit of teaching which can be done easily through You Tube or Zoom applications. For example, a teacher at one of outstanding elementary schools in *Pangkalpinang* (Radar Bangka, 2017) created his own You Tube account to teach science and English simultaneously. Hence, the students receive better experiences in learning. On the one hand, that's not the case for teachers in rural areas, who have fewer resources to develop the courseware. For instance, a teacher at *SDN 26 Belinyu* had to travel to remote areas in the forest to complete her science materials about animals and human's body that could not be explained virtually. Consequently, many students are not

familiar with English vocabulary especially words related to types of human and animal body movement, which is contradictive with students who have better school facilities in the city.

Drawing on these facts, a needs analysis to the students was conducted to determine whether an English integrated IPA Pop-up book should be created. The findings indicated that students were eager to learn more about science and English. They also stated that an integrated science and English book, particularly a pop-up book, should be created right away. Along with the needs analysis, the authors interviewed the primary teachers to find out the kinds of media used in teaching IPA. To enrich the data, two research questions were formulated thoroughly; 1) how is the development of English integrated IPA pop-up book media at primary schools? 2) how is the feasibility of this English integrated IPA pop-up book media at primary schools? The aims of this research were to acknowledge how is English integrated IPA pop-up book media developed and its feasibility when it is used to the students.

METHOD

The design of this study was research and development (R&D) that was employed Thiagarajan's(Thiagarajan, Semmel, and 1974) 4D development procedure. The stages of the 4D procedure are as follows: (1) define, which included observation, material preparation, needs analysis, and research setting (2) design,the researchers developed specifications for learning media to be developed,(3) develop, the activities included reviewing material content, testing, and result analysis,and (4) disseminate, the product development of this learning media for animals and human's body movement that had been prepared for the dissemination. The participants included in this research were the 5th grade students of SD N 26 Belinyu, consisting of 35 students. Out of 35, 20 students were female and 15 students were male. Two senior female teachers in the same school were also included to answer the questionnaire.

Data collection techniques applied were documentation, expert validation sheets, feasibility test sheets and user response questionnaires. Expert validation was conducted on aspects of format, material and language. Meanwhile, the product trials on a limited and large scale were disseminated by applying learning media to elementary school students. Product response questionnaires were given to elementary school students and teachers in limited-scale and large-scale product trial activities. The research statistical analyses were performed using both qualitative and quantitative methods. The qualitative approach was used to analyze data in the form of suggestions and criticisms from experts/experts and students. The quantitative descriptive approach was used to process feasibility data with 'extremely valid', 'valid', 'fairly valid', 'invalid', and 'extremely invalid' criteria in validation phase, together

with 'very good', 'good', 'fairly good', 'poor', and 'very poor' criteria in trustworthiness stage. In implementing the small and large scales and teacher responses to learning media from material content, media and language used, the criteria of media attentiveness were 'captivating', 'interesting', 'fairly interesting', and 'uninteresting'. The criteria for the validity and feasibility of the media used are presented respectively in Table 1 and Table 2(Freddy Widya Ariesta, 2018)

$$P = \frac{\sum x}{\sum x_i} \times 100\%$$

Tabel 1.Media Validity Criteria

Persentage (%)	Category	Description
81-100	Extremely valid	Valid (no revision)
61-80	Valid	Valid and needs a revision
41-60	Fairly Valid	Valid for use but needs revision in some aspects
21-40	Invalid	Huge revision

FINDINGS AND DISCUSSION

The development of pop – up book

The first stage in this research is the definition stage. In this stage, several activities were implemented, including conducting other curriculum analysis which includes an analysis of the suitability of core competencies, primary competencies, and indicators of competency achievement. While the material analysis and sources of teaching materials were carried out through interviews with the teachers, as well as analysis of the suitability of the selected material to be developed. The curriculum analysis was conducted on the curriculum that applies in schools, namely the 2013 Curriculum. Along with its abstract nature, the content for moving organs of animals and humans is extremely ideal for use as a pop-up book, according to the findings of the investigation of the curriculum analysis. The next step was to decide on the media design (design). This media place for a reason well with the *KI* and *KD* scientific classes on animal and human movement organs. At this point, the writers decided on the materials to be utilized, such as the media presentation, the media idea, and the size of the pop-up book media that would be created. The dimensions of the medium were determined during the design stage to be 60x40 cm. This size would be convenient to pack and use during the learning process. Figure 1 depicts the sequence of design actions, whereas Figure 2 depicts the final media outcomes.

Figure 1. Design Phase

Figure 2. Final Results

Later, the development stage was completed, and the pop-up book media were finalized. Figure 2 depicts the end outcome of this step. In this phase, the material expert, media expert, and language expert validated the media based on their expertise. The specialists in Elementary School Science handled the content and media performance, while a language expert handled the language judgment. Several indicators were included in the suggested validation questionnaire, including the relevance of teaching materials, the relevance of KI, KD with indicators, material compatibility, content components, systematics of learning content, the breadth of material, and so forth.

The feasibility of each validation

The validation findings indicate that the produced medium meets the criterion of being extremely valid and very practical. The expert's assessment was 92.5 per cent, indicating that the product meets exceptionally valid requirements and is appropriate for usage without alteration. Table 2 shows the findings of the material's validity and the explanation on each criterion.

Tabel 2.Validity and Trustworthiness of the Material

Aspects	Criteria	%	Validity	Trustworthiness
Material	Teaching material relevance level to the curriculum	100	Extremely valid	Very good
	The completeness of the material describes facts, concepts, and theories that are in accordance with the subject matter of KI and KD	75	Valid	Good
	The suitability of the material presented with the development of learning media	100	Extremely valid	Very good
	The media content component is sufficient	100	Extremely valid	Very good
	The description of learning content and activities in learning media is systematic	75	Valid	Very good
	The scope of the material presented in the learning media is in accordance with the students' thinking level	75	Valid	Very good
	The depth of the material is in accordance with the cognitive, affective and psychomotor domains	75	Valid	Very good
	The accuracy of the material is not misconceptions and multiple interpretations and according to the students' experiences.	100	Extremely valid	Very good
	The material is presented according to the latest scientific developments	100	Extremely valid	Very good
	The material in the media is implicated by science and technology	100	Extremely valid	Very good
	Average	**90**	**Extremely valid**	**Very good**

In media validation step, which included only one media expert, yielded an average feasibility rating of 94.4 percent (with extremely valid criteria and suitable for use without revision). At this point, the validator has made no comments or modifications for improvement. The media is seen to be quite valid and testable at this early level. Table 3 displays the findings of the media's validity and feasibility on each criterion.

Tabel 3.Validity and Trustworthiness of the Media

Aspects	Criteria	%	Validity	Trustworthiness
Media	Media developed according to the material	100	Valid	Good
	Media developed according to purpose	100	Valid	Good
	Media developed according to KD	100	Valid	Good
	The media contains appropriate illustrations	75	Valid	Good
	Media makes it easier for students to imagine the material	100	Valid	Good
	Attractive media display	100	Valid	Good
	Media is not easily damaged	75	Valid	Good
	The use of media can reduce dependence on teachers	100	Extremely valid	Very good
	The use of media can minimize misconceptions	100	Extremely valid	Very good

Average		94,4	**Extremely valid**	**Very good**

Two experts were engaged in language validation: *Bahasa Indonesia* and English. The validation of the *Bahasa Indonesia* generated 95% findings, whereas English yielded 95% percent. Both of these outcomes have requirements that are both extremely valid and feasible. Tables 4 and 5 provide the findings of the examination of the language's validity and feasibility on each criterion.

Tabel 4. Validity and Trustworthiness of *Bahasa Indonesia*

Aspects	Criteria	%	Validity	Trustworthiness
Bahasa	The language uses Indonesian according to PUEBI	100	Extremely valid	Very good
	Language according to the level of understanding of students	100	Extremely valid	Very good
	Easy to understand language	100	Extremely valid	Very good
	Language according to the goals to be achieved	100	Extremely valid	Very good
	The language used is free from idioms, does not have double meanings, *etc.*	75	Valid	Good
	Average	**95**	**Extremely valid**	**Very good**

Tabel 5. Validity and Trustworthiness of *Bahasa Inggris*

Aspects	Criteria	%	Validity	Trustworthiness
Bahasa	The language uses Indonesian according to PUEBI	100	Extremely valid	Very good
	Language according to the level of understanding of students	100	Extremely valid	Very good
	Easy to understand language	100	Extremely valid	Very good
	Language according to the goals to be achieved	100	Extremely valid	Very good
	The language used is free from idioms, does not have double meanings, etc	75	Valid	Good
	Average	**95**	**Extremely valid**	**Very good**

To seek the evaluation of learning media, small and big scales were used. The final result of the Pop-up book media had been adjusted based on the student feedback used to collect data and used as a material for product enhancement to make it perfect. The animal and human movement organs Pop-up book media might well be classified as appropriate for use in integrated IPA learning in English for youngsters based on the findings of the validation and use trials. Researchers encountered difficulties in collecting data. For example,

in the current trial, the researcher could only test the product with 20 students, including 15 students for small-scale trials due to the current pandemic conditions, which prohibited crowds, finding it challenging to gather up the students. However, based on observations from the pop-up book test activity, it is concluded that the usage of pop-up books could provide pupils with an experience similar to being in the world of mystery about what is beyond the folds. Learning was accomplished in many ways by bringing a pop-up book to bear since there are variations in tasks, such as reading the text while gazing at images and employing folds. The benefits that students gain from the use of pop-up book media include the activity of seeing, opening, and shutting images on the pop-up book, which helps strengthen children's motor development.

Pop-up book media has the advantages of having a simple shape, being cost-efficient, easily available materials, being able to articulate a summary, being able to overcome the limitations of space and time, requiring little additional information, and being able to compare a change that can be varied between multiple media from one medium to another. The statement items in the students' response surveys provided actual proof of the effective deployment of the pop-up book medium. According to the questionnaire statement questions, the findings of the student answer questionnaire analysis suggested that students thought this medium was fascinating and effective to utilize. The students stated in the first statement that they were pleased to learn through pop-up book medium. Students agreed in the second statement on language that the language used was straightforward to grasp. The third point is that utilizing this medium can make scientific classes less dull, and students say yes since this media incorporates images and text. The fourth statement of the pop-up book media makes it easier for students to understand the learning material clearly, and students answer yes. The fifth question is whether students can gain understanding and knowledge when using pop-up book media and students answer yes because students find it easier to understand the material presented. The sixth question was that students were interested in learning science when using pop-up book media, and students answered yes because the application of pop-up book media made students not easily bored in the learning process in class.

The seventh question is that the display of the pop-up book media is interesting and can increase students' creativity, and students answer yes because the media can make students curious by the presence of folds. Judging from the results of the student response questionnaire where the number of results of the assessment of student responses to this media, if presented, is included in the very effective and valid criteria with a percentage of 100% after being tested. Pop-up learning media for integrated science textbooks in English,

material for animal and human movement organs resulting from research, can be used in science learning to assist and facilitate teachers in delivering material during the learning process in class while increasing students' knowledge of English vocabulary in Englishscience lessons.

CONCLUSION

To sum up, the pop – up book of English and science was stated feasible resulted by the questionnaire response. In relation to this, more pop – up development should be supported by the stakeholders. As mentioned earlier in the background, students admitted that the teaching method was monotonous and traditional due to the unavailability of appropriate media to support and boost their learning motivation. Hence, based on the results, the pop – up book development was feasible to be used by the students.

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