Validity of science student books with the theme of energy in life based integrated local materials using integrated models for 21st century learning

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Abstract. Science student's book should be in accordance with 21st century learning with assessments that are relevant to the characteristics of the learning. Where in the 21st century learning that is demanded are critical thinking skills and problem solving, creative and innovative skills, communication skills and collaborative skills. Where the four skills will aim to develop the potential in developing character, talent, competency, interest and literacy. To make use of this science student's book, then need to be validated. The purpose of the validation is to know the validation science student's books with the theme of energy in life based integrated local materials using integrated models for 21st century learning to use Aiken's V with 5 validator is three experts and two practitioners composed. The questionnaire used the data of collection method. The result by 3 experts composed of content validation, construct validation, validation and then the graphical language with a valid validation category. While practitioners composed from same 2 with 3 experts composed is content validation, construct validation, validation and then the graphical language with a valid validation category. Conclusion, overall the science student's books with the theme of energy in life based integrated local materials using integrated models for 21st century learning Be avowed valid and it can to be use in school.

1. Introduction

Education is very important to be taught to participants to shape the behavior and personality of students, optimize the development and growth of mindset to be better from time to time and be ready later in facing global challenges.

Learning will lay the foundation and competencies, measuring competencies in the order of having thinking skills from simple to high-level thinking processes. The learning process will start from an easy thing to a difficult thing. With a simple thinking evaluation will be a ladder for students to improve competence towards someone who has a critical mindset. A person who has the ability to think critically, creatively, collaboratively and be able to communicate well will also increase his character, so that the knowledge and competencies he masters will make him have an attitude / character that is responsible, hardworking, honest in his life [1].

Student book is a book that contains a description of the subject matter or the particular field of study, systematically arranged and have been selected based on specific objectives, learning orientation, and development of learners to be assimilated. Student book is used as a learning tool in learning activities at school.

Students used books will be eligible to be used if it is valid and practical use. Before validation on students' books to be used, carried out prior validation of the instrument instrument instrument
validation and practicalities of that instrument that is used later in mevalidasi instrument validation and practicalities instrument fit for use

The material in the student book is material that has been adapted and applied by the current curriculum in Indonesia [2]. Learning material in student books must contain content and learning processes about local content and uniqueness to shape students' understanding of local content in the area where students live. In the classroom learning process through integrated learning that is appropriate, relevant and meaningful for students so that learning will be more inherent and quickly understood by students [4] and students' understanding becomes more complete [5]. Learning materials taught in junior high schools for natural science subjects are arranged based on a theme that connects and summarizes several subjects namely physics, biology and chemical concepts as a whole [6].

Integrated science teaching materials will be able to answer the challenge. Learning materials connected with the facts and phenomena that occur in everyday life or learning that is factual based local content where the students make the learning process, to help understand and enhance the learning material of the 21st century skills that are taught in an integrated thematic will increase student interest in learning, helping students connect their understanding, widen the assessment strategy, keeping students connected with learning, curriculum simplifies and saves teachers time because it combines several subjects and connecting material with the real world and life experiences of students.

21st Century learning is learning that incorporates and integrates all skills ranging from critical thinking and problem solving skills, creative and innovative skills, communication skills and collaborative skills by putting measurements of students' abilities from low thinking to higher level thinking. With the aim of being able to improve the competency abilities of students. One of the subjects that is able to help improve the skills of the 21st century is the Natural Sciences subject which is expected to be able to answer global challenges and be ready to compete in the international arena [7].

In reality, many learning materials do not provide local content in the learning material. The book published by the Indonesian Ministry of service and culture (revised 2017) is also not yet integrated into a theme and is still separate between each discipline. Therefore, natural science student books can be integrated using a theme in connecting relevant subject matter.

Analysis of the media in the learning process in the assessment of the quality of the content is much lower. It can be seen that the quality of content in the media used in learning media at school still looks very low and even still not in line with expectations to face global challenges. Therefore, integrated science and student books based on local material are needed to improve student competency and teacher professionalism in classroom learning so that they can meet the demands and development of skills or skills demanded in 21st century learning [8]. While the integration of 21st century learning in integrated natural science student's text book Also are not yet developed, this is evidenced by the results of the data analysis of integrating 21st century learning [9]. Reviews These characteristics are in accordance with 21st century learning characteristics.

Therefore, integrated science teaching in schools need to integrate scientific paradigm with the perspective of learners about the terms in science and physical phenomena that occur in natural surroundings. Background activity and local content in the environment of the learners also become one of the important factors that could affect the success of the learning process. Conceptual knowledge learners have been formed from everyday experience and through knowledge passed down for generations. Therefore, the socio-cultural environment needs to be considered in developing integrated science teaching in schools.

Local content is the charge to develop the region's potential as an effort to improve the quality of education one secondary school (SMP). Sijunjung area has a lot of local content that can be used and integrated into learning, one Integrated science teaching in schools. Some of the local content in the region in terms of cultural activity Sijunjung namely Selaju Sampan, almost every year is carried by Sijunjung society. In terms of food and fruits such as godok obuih, Durian Kalumpang, Lansek Sijunjung and many more local contents that can be incorporated into the Integrated science teaching in schools, so that education of students into thematic learning and meaningful.
Components - components student books in general must have (1) Directive learning (Hint learners / teachers), (2) Competence to be achieved, (3) Content or content of learning materials, (4) supporting information, (5) exercise, (6) work instructions, can be Worksheet (LK), (7) evaluation, (8) The response or feedback on the evaluation results. The book must contain color images, images, tables, graphs that can be easily understood [11].

Good and high-quality student books are books that are feasible in terms of presentation, language, graphics and content of books that will later help improve students' abilities. In addition, textbooks also contain components relevant to educational goals or curriculum. Book packaging patterns are also carried out in accordance with the characteristics of teaching materials, starting in terms of presentation, content, presentation, and linguistics [12]. The structure of the book consists of namely the title, five elements, basic competence or subject matter, training and assessment and information support [3]. student book contains a chapter title and information about the basic competencies that match the topics in each chapter. Each chapter comes with a concept map, introduction, sheet activities of learners, non-experimental and both experimental or program discussion, summaries, practice questions, assignments, and evaluations for students [13]. Every discussion in the student book includes three domains of competence: knowledge, attitudes and skills, as well as each theme that contains one / more projects to be carried out and conveyed to students [14]. load given to the student activities are an integral part of students' books listed at the end of the chapter. The final part of the student book consists of information about the issuer, glossary, bibliography, index, and appendix [5].

A good student book or a high quality is decent book in terms of content, language, presentation and graphics. In addition, the textbook also contains components relevant to the purposes of education or curriculum. Packaging pattern books are also carried out in accordance with the characteristics of good teaching materials, both in terms of content, presentation, and linguistics [12].

Student books that have been developed need to be evaluated. The evaluation was conducted to determine whether the student book has been well used or whether there are still things that need to be repaired. Components include the evaluation of a book: the feasibility of the content, language, grain, and kegrafikan. After the evaluation of the students' books, the next step is to revise the student book. If the evaluations and revisions have been done then obtained a valid student books, practical and effective.

Evaluations were conducted on the development of the resulting product consists of three criteria. Those criteria are: validity, practicality, and effectiveness. This is in line with. To determine the quality of the model development and learning tools necessary three criteria of validity, practicality and effectiveness [15].

In knowing the product is valid or not, the product must be tested for validity. The quality of a product in this case is a student book is determined by validity. This means that the instrument used can measure what should be measured [16]. A validation test is carried out by experts (lecturers) and users (teachers) [17]. Validation on the product can be done by experts (lecturers) who are experienced to assess the weaknesses and strengths of the products produced.

Validity refers to the design of interventions based kebaharuan science (content validity), and the various components of interventions related to one another (construct validity) [18].

Validity tested in the development of students' books are content validity and construct validity. Content validity with respect to the content and format of the book the students developed, while the construct validity with respect to the structure and characteristics of the students' books were developed. In addition to content validity and construct validity, it is also necessary to test the validation language to see the use of the language used in the book students in accordance with the correct spelling.

Logical validity consisted of content validity and construct validity, the empirical validity consisting of validity of the present and future. Empirical validity is used to test or test instrument for measuring instrument based on experience. Measure the validity of a product used to measure the content validity of the contents of the suitability of the curriculum, construct validity demonstrates consistency and linkage between the components of the product, in addition to the validity of a product also in terms of aspects of language and aspects of the display.

Sheets validation Integrated Science Student Book is used to determine the validity of Integrated Science Student Book developed. This validation sheet using a questionnaire in the form of a list of
questions. This validation questionnaire filled out by teachers and lecturers with predefined criteria developed lattice validation and validation by expert media and languages.

Books Students have valid criteria when they describe the curriculum expectations, ie the components of Books Students demonstrated content validity and construct validity. In determining the validity of the content there are some questions that should be raised. The following product validation indicators that will be used in the development of student book-type integrated with the energy theme in the lives of local content based Sijunju area to improve the skills of the 21st century.

Indicators conducted on a teaching material must arouse the will, interest and attention of students, easily understood and understood by students, encourage students to think critically and learn, and based on authentic assessment [10]. The following indicators in the validation of the student book is the product of; a) the feasibility of the content includes: compliance with core competence and basic competence, suitability to the needs of learners, suitability to the needs of teaching materials, the truth of the material substance, the benefit to the addition of the insight, and conformity with the 21st century skills b) linguistic include: readability, clarity of information, compliance with the rules of Indonesian, and use language effectively and efficiently. c) The presentation includes; the order of presentation, motivation, interactivity (stimulus and respond), and completeness of the information. d) display student book covers; the use of the font (type and size), layout, layout, illustration, graphics, images, photographs, design views, and conformity with the values, morality, social.

Validity analysis based validation sheet, with the steps: Providing a score for each item with answers strongly agree (4), agree (3), disagree (2) and strongly disagree (1). Each validator total score for all indicators.

2. Research methods
This research is a descriptive study. Aims to describe a phenomenon or event [19]. Data taken in the form of numbers is then interpreted in the form of description. The book design is given to expert validators to be validated. Validation is the process of assessing whether a design on a product is feasible or not to be used and applied. Expert validators are considered to have expertise in construction, content suitability, graphics and linguistics. This research also involved a practitioner validator. The steps taken to validate student books are: a. making a validation sheet grid; b. Prepare validation sheets; c. Perform validation from the validation sheet to the expert validator; d. Correct the validation sheet according to the expert validator's suggestion; e. Validate the Integrated Science student book to the validator experts and practitioners to identify the strengths and weaknesses of the student book; f. Analyze the results of the validation sheet filled out by the validator; and g. Make revisions in accordance with the suggestions or input from the validator to be repaired until the product is deemed appropriate and meets the recommendations of the validator.

Validation instrument science textbooks used in the form of a questionnaire. Instrument validation prepared using a Likert's scale of 1-4 with 1 = disagree term (0% -25%), 2 = disagree (26% -50%), 3 = agree (51% -75%), and 4 = strongly agree (76% -100%). Rate validator to each statement is analyzed by using the formula Aiken's V, which at the end of the processing is obtained:

$$V = \frac{\sum s}{n(c - 1)}$$

Information:
\(s = r - lo\)
\(lo = \) lowest figure validity assessment (in this case = 1)
\(c = \) highest figure validity assessment (in this case = 4)
\(r = \) The figures given by the validator

Students developed a book considered valid if it has reached the interval in the category ≥0,61 valid [20].

The questionnaire was rated first by the expert validator according to predetermined criteria that the results are shown in Table 1. Validation instruments have valid criteria as shown in Table 1. The
reference in assessing is using instrument to the Integrated Science student book-type integrated with the theme of energy in life Sijunjung area-based local content to improve the skills of the 21st century.

**Table 1.** This Table Explain about results of the validation instrument ratings

| Aspect                              | V  | Criteria |
|-------------------------------------|----|----------|
| Clear sentences                     | 0.89| valid   |
| based on indicators                 | 0.89| valid   |
| based on the objective              | 0.89| valid   |
| Does not contain a double meaning   | 0.89| valid   |
| Simple and easy to understand       | 0.89| valid   |
| In accordance with Indonesian Spelling is good and right | 0.89| valid   |
| **Average**                         | 0.89| valid   |

3. **Results and Discussion**

This product validation has been done based on the theory of the feasibility of student books. In addition, validation also refers to the component of the feasibility of student books in accordance with the National Board of Education Standards in Indonesia which includes the appropriateness of content, construction, linguistics, and graphics. Student book developed from the theme of energy in local charge-based life by involving three expert validators and two practitioner validators. Expert validators consist of lecturers who teach and have educational backgrounds in the field of science education, and Indonesian language majors. The cover of the book contains the subject title, theme, level of education in Junior High School, learning model and local content based, the name of the author, publisher, and symbol of the curriculum being applied. The cover of the book is designed in blue and combined with white to attract students' learning interest. On the title page, list of contents, introduction to the book, list of illustrations, and list of symbols. Then, the contents of the book based on local content based books in Sijunjung consist of introductions and sub-themes. The introduction in this book presents a concept map that is made as interesting as possible so that students easily understand the reciprocal relationship between the title and the sub-theme. The final section contains the conclusions in each chapter, the competency test, the glossary, the project assignments at the end of each sub-topic, the literature, the author's biodata, and the back cover of the book cover. A snapshot of the cover design and material based on local content of the Sijunjung area can be seen in Figure 1.
Figure 1. (a) Integrated Science Student Book Cover, (b) Regional Local Content-Based Materials Sijunjung
Rate the validity of the book students performed using a validated assessment instrument before. Validation of the student book includes four components include components of the feasibility assessment content, presentation, linguistic components, and components graphical. Assessment is done by 3 people This expert validator produce valid criteria for the four components as shown in Table 2.

| Component                | value Validation | Criteria  |
|--------------------------|------------------|-----------|
| Feasibility Of Contents  | 0.82             | valid     |
| Presentation             | 0.85             | valid     |
| Linguistic               | 0.85             | valid     |
| Graphical                | 0.87             | valid     |
| **Average**              | **0.85**         | **valid** |

Based on Table 2 can be seen that the students developed the book is valid in terms of the feasibility of the components of content, presentation, linguistic, or graphical. Then assessment of practitioners that teachers implement instructional learning in Junior High School 1 Sijunjung also get a valid criteria for the four components as shown in Table 3.

| Component                | value Validation | Criteria  |
|--------------------------|------------------|-----------|
| Feasibility Of Contents  | 0.89             | valid     |
| Presentation             | 0.90             | valid     |
| Linguistic               | 0.86             | valid     |
| Graphical                | 0.90             | valid     |
| **Average**              | **0.89**         | **valid** |

According to the table it can be seen that all four components have been included in the valid criteria. On average ratings validity student books can be seen on Table 4,

| validator    | Average Value Validation | Criteria |
|--------------|--------------------------|----------|
| Expert       | 0.85                     | valid    |
| Practitioners| 0.89                     | valid    |
| **Average**  | **0.87**                 | **valid**|

Based on Table 4 above can be seen as a whole that the validity of the books included in the criteria valid student. Nonetheless, some input was also provided by the validator for the improvement of the development of Integrated Science Student Book SMP mode with Energy Integrated in the Regional Local Content-Based Life Sijunjung for 21st Century Skills are performed.

Integrated Science student book integrated type is assessment using a Likert scale with a category 1 = Disagree, 2 = disagree, 3 = agree, and 4 = strongly agree. Then, the formula Aiken's V is the results of this assessment. Figure 2 below shows the results validator validator assessment experts and practitioners from the four aspects of the assessment:
Figure 2. Validation Assessment Student Book by Validator and Validator Expert Practitioners

Based on the graph above shows that the differences in the assessment of expert validators and the results of practitioners are not so striking, the four aspects (content suitability, construction, linguistic and graphic) almost look the same. The average value of Aiken’s V by the practitioner validator in the graph is higher than the expert validator. This difference is because expert validators better understand aspects of content and practitioner validators better understand the conditions of needs in the field. Expert validator assessment considers Integrated type students’ integrated science books in accordance with scientific rules, while practitioners’ validator assessments are based more on the teacher's knowledge and experience in the field. The validator gave some suggestions for researchers to slightly revise the integrated science student book integrated type in the form of improving the learning objectives to further detail the conditions section, clarifying the description of the images provided, and clarifying excerpts from the instructions for using the book and adjusting the Indonesian spelling correctly and correctly.

4. Conclusion
Based on the explanation above, the validation that has been done on the products made has met the pattern of preparation of teaching materials that are in accordance with the characteristics of a good and correct teaching material. In other words, the students’ books have been validated to have fulfilled the validity component which includes the feasibility of the content, the feasibility of the construction, the feasibility of language and the feasibility of graphics. Thus, the integrated Type-based local Science student book based on local content in Sijunjun can be tested in learning.

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