Research Article

Validity of guided inquiry-based modules on digestive system to improve argumentation skill

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ABSTRACT

Students tend to be passive in learning activities if the media is less supportive. Module development as a learning medium can overcome the passivity of students. The purpose of this research was to determine the validity and feasibility of the guided inquiry-based module on Human Digestive System materials to improve students' argumentation skill. This research is Research and Development. The research was conducted at class VIII of State Junior High School 3 of Surakarta. The module comprised of into three parts, namely the introduction, content, and closing. The contents section consisted of three sub-materials, namely: 1) food substances; 2) food digestion organs and processes; and 3) food digestive system disorders. The module feasibility was tested through the assessments of media, subject matter, learning experts and linguists. The results of experts' evaluation toward the module showed that the module was feasible with the percentages were 88.28% (media design), 90.125% (material), 91.15% (learning aspect), and 94.8% (language). Therefore, the module is feasible to be used as a learning medium to improve students' argumentation skill.

INTRODUCTION

The success of learning can be achieved through the establishment of effective communication between components of learning. One way to form effective communication is the use of a learning medium. Learning media is a important of its existence besides the existence of teachers and students (Utariyanti, Wahyuni, & Zaenab, 2015). The progress of science and technology, especially information technology is very influential on the preparation and implementation of strategies and learning methods. These advances impact on the many alternatives that teachers can use to use varied media in classroom learning. Students tend to be passive in learning activities if the learning infrastructure is less supportive. To overcome this, the use of educational media appropriately and varied can overcome the passivity of students (Arif, 2011). Learning medium has a role as information-carrying technology that can be used for the learning process. Through a learning medium, teaching materials will be conveyed to students more effectively. However, the use of

learning medium, especially science, is still rarely conducted in practice. Students also still have difficulty in understanding Natural Science materials, especially the argumentation skill.

According to the master e-learning theory, learning carried out in class has a weakness, namely the limited time in conducting learning activities. By using media modules, students can learn flexibly. The module is one of the learning materials systematically compiled and designed to help students achieve a specific learning objective. Sejpal (2013) explained that a module is a unit of work in a course of instruction that is virtually self-contained and a method of teaching that is based on the building up skills and knowledge in discrete units. The virtue of the module is expressed by Padmapriy (2015), which says that modules help to develop the self-learning capacity among the learner. The use of modules as a medium can help students understand Natural Science materials in an easier and more enjoyable way. Books on school are now in the form of textbooks, although there are already variations in the addition of illustrations but have not had enough influence on increasing students' reading interest. Low reading interest causes activity and learning outcomes to be low. The complexity of the teaching material delivered further makes students less interested in reading textbooks including biology books. Students tend to be interested in reading picture books (such as comics) compared to textbooks, because comics have a coherent and regular storyline that makes it easy to remember again. This is the reason for the idea of combining the appeal of comics, including attractive appearance, coherent and easy to understand flow, with textbooks that tend to be textbooks (Daulay, Ananda, Anwar, & Fatimah, 2019; Putri, Gloria, & Mulyani, 2018; Saito & Nakamura, 2019). Based on research Tatalovic (2009), comics are a potential and effective medium for science learning, because it can help students understand science material in an easier and more enjoyable way.

The module supplied with comics is a medium that supports the implementation of the 2013 curriculum where one form of management and implementation of education aims to build the potential of students to become independent human beings. The use of guided inquiry-based module as a medium supplied with comics is also still rarely used and is a new thing for the students of state junior high school 3 Surakarta. The facts of the initial observations on the process of learning science in class VIII of Surakarta Middle Schools show that there are still few students who can argue. During the learning process, the teacher tends to dominate the class by asking many questions, answering questions, directing and giving explanations of the material, the questions raised by the teacher are only questions that require short answers or repetitive questions, so that students do not accommodate the thinking skills and arguments. In addition, the used module does not train students to argue. Results obtained with field observations indicate that students are less able to argue. This is evidenced by the average test of students' argumentation ability of 32.04%, according to Zohar and Nemet (2002). The number of students who express statements (claim) is 42.9%. Students who use evidence amount to 20.32%. The ability to provide reasons (reasoning) amounts to 32.9%. The results of the argumentation ability test are relatively low, because most students have not been able to provide reasons and evidence. Arguments that only contain claims or statements without evidence and reasoning are simple arguments (Crowell & Kuhn, 2014; Okumus & Unal, 2012; Venville & Dawson, 2010). The development of modules supplied with comics as a learning medium will attract the attention of students to focus more on learning. In addition, the development of modules supplied with comics as a learning medium is in line with the principles of Education Implementation in Republic of Indonesia Law Number 20 of 2003 Article 4, where education is held by developing a culture of reading, writing and counting for all citizens.

The 2013 curriculum develops science no longer as a discipline, but integrative science which emphasizes the development of various abilities of students, one of which is the argumentation skill. However, students' argumentation skill is still not maximal, judging from the difficulty of students understanding the concept of Natural Science and the score of Natural Science obtained by students that is not satisfactory. The use of modules as a medium supplied with comics in conveying the concept of Natural Science effectively leads students to develop their argumentative abilities indirectly.

The argumentation skill of students is important to develop so that students are trained to solve problems in real life and in the world of work later (Hendarto, Rinanto, & Ramli, 2016; Karpudewan, Roth, & Sinniah, 2016). Reading activities of various sources are able to improve critical thinking and student learning outcomes (Muhlisin, Susilo, Amin, & Rohman, 2018). The argumentation skill contains 3 aspects, namely: claim, reasoning and evidence (Acar, Patton, & White, 2015; Hsu, Dyke, Chen, & Smith, 2015). It should be emphasized that the argumentation skill is very well developed for junior high school students. This is related to the psychological development of students. Based on Piaget's development theory, junior high school students (11-14 years) are included in the formal operational stage, which allows students to have problem solving behavior and test hypotheses.

The argumentation skill of students can also be developed by implementing Guided Inquiry. Guided inquiry is inquiry that facilitates students to develop skills through the use of various sources of information (Hendarto, Rinanto, & Ramli, 2016; Mistry, Fitzpatrick, & Gorman, 2016; Sedwick, Leal, Turner, & Kanu, 2018; Toh, Cheng, Ho, Jiang, & Lim, 2017). Students will be faced with various contextual problems that require the ability to think and solve problems through practicum to prove the hypothesis that has been made (Hendarto et al., 2016). The guided-inquiry stage in detail according to includes 7 stages, namely: the stage of problem formulation (initiation), making a hypothesis (selection), designing an experiment (exploration), carrying out an experiment (formulation), making a conclusion (collection), communicating the results of the experiment (presentation), and the assessment stage (Fakayode, Mayes, Kanipes, Johnson, & Cuthbertson, 2017; Kuhltau, Maniotes, & Caspari, 2007; Ural, 2016). The development of guided inquiry-based modules supplied with comics will be applied to the subject matter of human digestive system. The consideration is that the human digestive system contains the concept of science that occurs a lot in student life and is abstract. In addition, the use of learning medium in learning the human digestive system is still rare and not optimal. Therefore, to assist students in developing their argumentation skill, the development of guided inquiry-based modules supplied with comics as learning medium on the subject matter of human digestive system for Junior High School Students was taken as an appropriate alternative solution to overcome various problems that had been expressed.

The purpose of this research was to find out the validity and feasibility results of the guided inquiry-based modules as a medium supplied with comics to improve students' argumentation skill. The medium development of guided inquiry-based modules supplied with comics is expected to be an alternative medium for teachers on the subject matter of the subject matter of human digestive system. In addition, this research is useful for students so that students obtain learning medium which is interesting and easy to learn as well as which trains the argumentation skill in the process of learning Natural Science, because Comics can help students develop language skills, art activities, and creative statements in storytelling, dramatization, reading, writing, painting and drawing, as well as helping them interpret and remember the contents of reading material.

METHOD

The used research model is Research and Development (R&D). The steps of research and development in this research were adapted from Borg and Gall (1983) which consisted of: Preliminary Research and Collection of Information, Planning, Early Product Development, Expert Validation, First Revision, Early Trial, Second Revision, Field Test, Final Product Revision, Dissemination (Figure 1). In this study, the development stage was only up to second product revision. Before the field test was carried out.
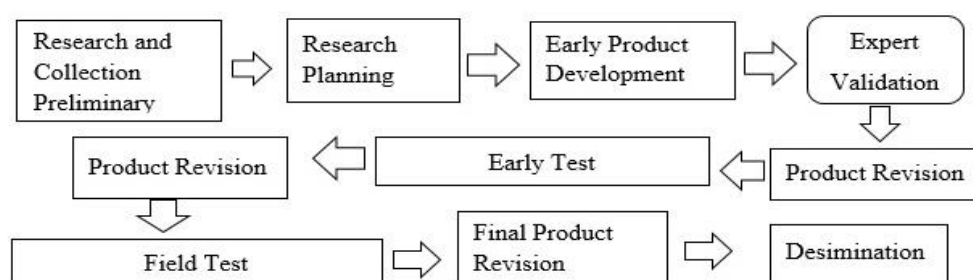

Figure 1. Research and Development (R&D) Model by Borg and Gall

The research location of the development of guided inquiry-based modules supplied with comics on the subject matter of the human digestive system was at state junior high school 3 Surakarta. The subject of this research was eight-grade students. The research sample was determined by means of intact group after it was made sure that the eight-grade students of state junior high school 3 Surakarta were homogeneous and normally distributed. There were 2 classes as research samples, namely classes 8.3 and 8.4.

Further analysis at the information collection stage is done to get an overview of the characteristics of the students that surround: (1) the initial profile of the argumentation skill; (2) students' experience in using teaching materials; and (3) the initial profile of students' reading interest. Information collection in this study also includes the analysis of national education standards, analysis of national examination results, analysis of learning resources, and task analysis. National education standards analysis aims to determine the amount

and type of teaching material. The analysis of the results of the national examination aims to determine the material that is difficult for students to understand so that they are able to become the basis for the selection of material in product development; learning resource analysis aims to collect and identify which sources support the preparation of teaching materials. Analysis of task characteristics aims to optimize the training of argumentation skills of students with high and low reading motivations.

The planning phase includes activities related to the preparation of the draft guided inquiry module supplied comics and preparation of the activity format coloring the guided inquiry module with comics. Activities carried out at the draft planning stage of the module include: (1) determining comic media; (2) determine the subject matter of digestive system material based on national examination analysis; (3) determine the format and visualization of module contents that are tailored to the characteristics of the module which includes independent instructions (self instruction), self contained, stand alone, adaptive, and user friendly; (4) determine the learning format including learning devices; (5) determine the procedures carried out during the research starting from product development procedures, test validation, trials to data analysis; (6) creating an activity matrix that represents all the step criteria of the guided inquiry learning model to ensure that each syntax in the guided inquiry model is represented by appropriate activities so that it can accommodate students' argumentation skills.

Initial product development is carried out by referring to the module characteristics and paying attention to the guided inquiry syntax through activities in the module equipped with comics that allow students to use their argumentation skills. The initial product development phase includes the identification of subject matter developed, the development of module activities equipped supplied comics, the development of evaluation questions, collecting supporting materials such as materials and images equipped with learning tools including syllabus, learning implementation plans, and assessment instruments.

The stages of expert validation are used to obtain an initial qualitative evaluation of the draft products that have been made. Validity test is done by expert evaluation test consisting of material experts, learning device experts, design experts and linguists. Material expert validation aims to obtain data in the form of assessments, opinions and suggestions on the accuracy and suitability of the material in the module developed. The validation of the learning device expert aims to obtain data in the form of assessments, criticisms, and suggestions on module preparation related to the fulfillment of the correct module characteristics and the assessment of the basis of the guided inquiry model supplied comics in the module. In addition, it aims to obtain data in the form of assessments, opinions, and suggestions on the accuracy and suitability of questions with indicators and dimensions of cognitive processes. Validation of design experts aims to obtain data in the form of assessments, opinions, and suggestions on the design and readability of the contents of the module supplied comics. Validation of linguists aims to assess the accuracy of language use. The results of expert validation tests were analyzed descriptively, namely descriptive qualitative data for opinions and suggestions as well as quantitative descriptive (percentage) for the analysis of assessment scores from each expert.

Product revisions are made to improve the initial product module. In this study, first revisions were made after getting advice from expert validators, both material expert validators, module presentation design validators, linguist validators, and expert device learning validators. Then proceed to the initial trial stage. Limited field testing is carried out by the validation of individual education practitioners (science teachers) and small group tests (students) as materials to improve the product in the next revision. Validation of practitioners is 2 science teachers at state junior high school 3 Surakarta. While students, assessment by 8 students of grade 8.4 who have obtained the material and 8 students of class 8.3 who have not obtained material.

There are two types of data used in research and development, namely: 1) Qualitative data obtained from criticism, responses and suggestions from counselors, expert validators, practitioners and students on the appearance quality and material on the comics produced in the comment column on the test questionnaire validity of experts and student response questionnaires. 2) Quantitative data obtained from the results of expert validator, practitioner and student assessment through expert validation questionnaires and student test questionnaires containing numbers obtained from scores.

The instrument used in the research development module learning media based on guided inquiry in the digestive system material supplied this comic in the form of a questionnaire. This questionnaire is given to the validator to obtain data in the form of assessment sheets and response sheets for the learning media developed. In the questionnaire a multilevel scale is used where in each question, the validator gives a score for the questioned aspect of the learning media. The chosen category for validation questionnaires is the likert

scale (Arikunto, 2006). In addition, a questionnaire in the form of a comment sheet and suggestions for learning media were also provided.

Data analysis techniques were carried out by questionnaire and interview techniques. Questionnaire techniques are used to obtain data in the form of responses or assessments in experts on the products developed, while interviews to obtain information in the form of explanations of the answers to the questionnaire.

Data analysis techniques that are suitable for analyzing questionnaire results are descriptive analysis techniques with an average scoring answer to determine the answer for each item answer validator by giving a score of one to five. The formulas used, namely percentage score (Formula 1).

$$P = \frac{\Sigma \text{ overall answer to the questionnaire}}{n \ x \ highest \ score \ x \ number \ of \ respondents} \ x100\% \tag{1}$$

P = Percentage score
n = number of questionnaire items

The results of the calculation of the percentage of the overall components are then adjusted to the revised decision making in Table 1.

Table 1. Revised decision making

Achievement level	Qualification	Information
81-100	Very feasible	No need to be revised
61-80	feasible	No need to be revised
41-60	Enough	Revised
21-40	Less feasible	Revised
0-20	Not feasible	Revised

RESULTS AND DISCUSSION

The making of guided inquiry-based modules supplied with comics on the subject matter of human digestive system refers to core competencies, basic competencies, and the 2013 curriculum learning objectives. The selection of digestive system material is based on the results of the national examination in Surakarta Middle School. The human digestive system is one of the lowest value materials. Besides that, the digestive system material can accommodate guided inquiry learning and student argumentation. Module medium is developed with guided inquiry-based supplied with comics. The implemented guided inquiry can be seen from the contents of the module medium and the stages of learning implementation. The description of the subject matter in the module is packaged in comic form to make it more interesting. The contents of comic stories are taken from events that are common in life and are known by students.

In the development stage of the conducted initial product form (developed preliminary form of product) is to make the guided inquiry-based modules supplied with comics on the subject matter of human digestive system. The development of the initial module is carried out by referring to planning objectives, sub-topics, guided inquiry learning models, formatting and visualization of module contents, learning media formats and procedures related to module development with the following designs: front cover page (Figure 2a); module identity sheet; foreword; table of contents; basic competencies, core competencies, indication and objectives; instructions for using the module; concept maps; module content section; subject matter summary, science info; glossary; and bibliography.

The content section consists of guided inquiry syntax stages which were developed using seven steps of learning according to covering 7 stages, namely: the stage of problem formulation (initiation), making a hypothesis (selection), designing an experiment (exploration), carrying out an experiment (formulation), making a conclusion (collection), communicating the results of the experiment (presentation), and the assessment stage (Lazonder & Harmsen, 2016; Putra, Widodo, & Jatmiko, 2016; Yohana, Sudarmin, Wardani, & Mohyaddin, 2018). The module contents section is packed with student activities as follows. The page section "let's observe". Students are asked to observe the images presented in the module which will later lead to the next stage. The observed page display can be seen in Figure 2b.

The next part is the page "let's ask". This page contains a questionnaire listing form and problem formulation from the members of the learning team that has been predetermined by the teacher. Students formulate problems for what they have observed. The page view let's ask can be seen in Figure 3a. The next page is the page "let's hypothesize". On this page, students are asked to write hypotheses or temporary

guesses on the formulation of the problem they are making. The hypothesis page display can be seen in Figure 3b.

The next page is the page "let's experiment". After students write their hypotheses, students plan experiments and conduct experiments to prove the hypotheses they have made. The page view of conducting an experiment can be seen in Figure 4a. Next page is about "let's discuss". On this page, students discuss to fill out the experimental data and relate it to the existing concepts. Students collect information from various sources. Students exchange ideas by arguing. Express claims, reasoning and evidence. The page views of the concept map can be seen in Figure 4b.

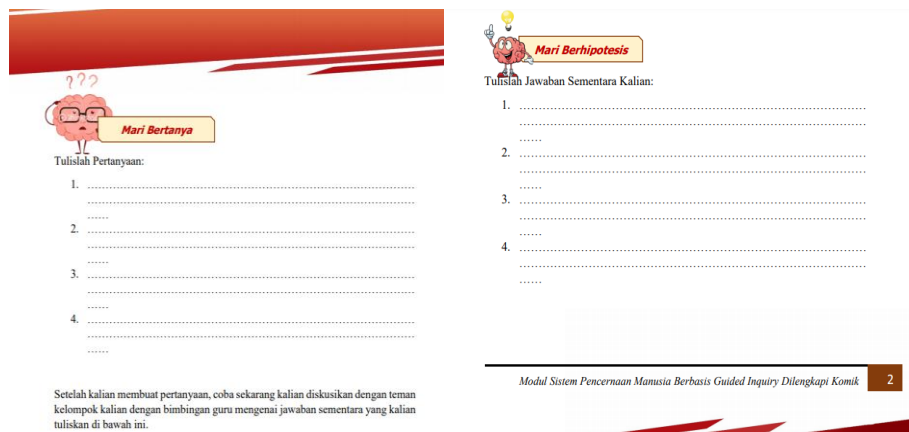**Figure 2**. Cover module (a) and the display "let's observe" (b).

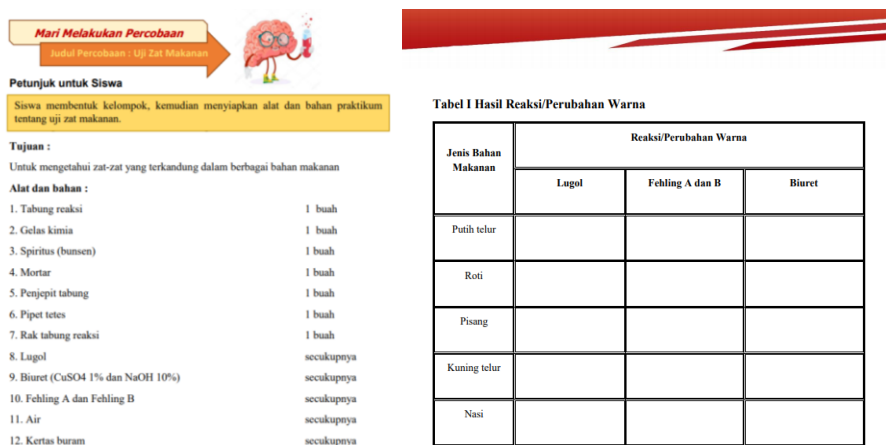**Figure 3.** Display of student problem formulation (a) and Display of student hypotheses (b)

Figure 4. The display sheet "let's do an experiment" (a) and the Display sheet "let's discuss" (b).

The next page is about Class Presentation. This section aims to monitor the acquisition of student concepts, strengthen concepts or correct wrong concepts. Students present the results of the discussion after experimenting with the right argument. Student presentations must contain aspects of claim arguments, reasoning and evidence. Presentation or sharing activities can improve learning outcomes because students are able to evaluate what has been learned (Muhlisin et al., 2018; Soltis, Verlinden, Kruger, Carroll, & Trumbo, 2015). The page views of the concept map can be seen in Figure 5.
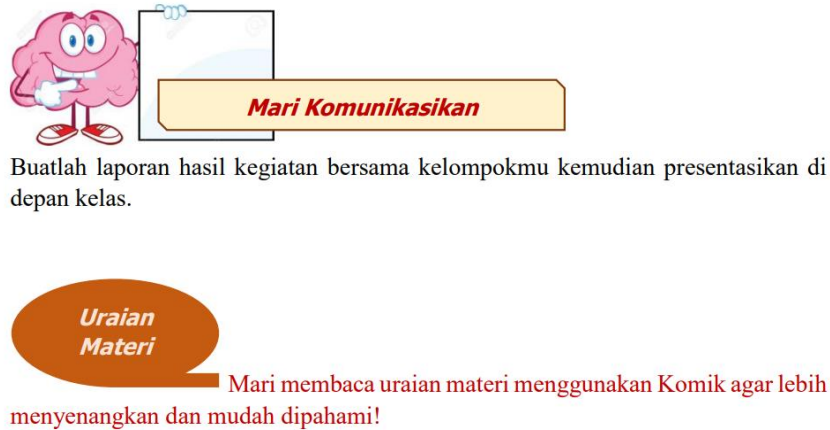
Figure 5. Display of "let's communicate" sheet.

The next page is a description of the subject matter in the form of comics. Comics as a solution to students' reading interest are placed in the material description. The description on the subject matter of the digestive system is presented in comic form so that it is more interesting and students' interest in reading becomes high without reducing the substance of the subject matter from the standard. The display of comic pages can be seen in Figure 6.

Figure 6. Display of the comic subject matter description in the module.

The next page is an assessment in the form of a test of argumentation skill. This section is an individual responsibility so that no one can help each other when working on it. Assessment at the end of the learning activity trains students in working on the problem of argumentation by arguing that is good and right. The page display about the argumentation skill can be seen in Figure 7.

Figure 7. Display of the argumentation test evaluation question sheet on arguing

In the content section, there are several additions such as the science info section, subject matter summary and competency test. The results of the initial product development of the guided inquiry-based module supplied with comics on the subject matter of human digestive system are supplied with teacher modules with the same contents as the student modules but there are several supplements on: introduction to the teacher; recommendations for learning scenarios; syllabus; and judgment.

The preliminary trials carried out are in the form of expert validation. In the expert validation stage, the results of the initial qualitative evaluation of the draft products have been obtained. Student module validation and teacher module validation can be described as follows.

Validation results of the module product for students

The first validation of module product for students is carried out by four experts including validation of learning instruments and aspects in the module (subject matter, presentation, readability, and learning media).

Product validation by subject matter experts

Assessment of modules by subject matter experts was analyzed in the lowest value range of 1 and the highest one of 4. Before conducting the validation, the subject matter validator first gives input to improve the module. These inputs include: (1) Selection of images and the right amount to explain dental subject matter, (2) Addition of subject matter in certain parts, (3) Some medical terms that are still written incorrectly. After getting input from the subject matter validation experts, the developed products were improved so that they became products that were ready for validation. The results of the subject matter validation are fully visualized in Table 2.

Table 2. Subject matter aspect validation by experts

No	Aspect	Percentage (%)	Qualification
1	Subject matter accuracy	90	Very feasible
2	Subject matter update	88	Very feasible
3	Subject matter develops thinking skills and abilities	92	Very feasible
4	Subject matter follows scientific systematics	86	Very feasible
5	The basic concept of the subject matter	88	Very feasible
6	The concept of the subject matter	85	Very feasible
7	Image concept	90	Very feasible
8	Systematic delivery of the subject matter	92	Very feasible
9	Subject matter that can improve the ability to argue	94	Very feasible
10	Subject matter that can increase students' reading interest	92	Very feasible
11	Relevant to everyday life	90	Very feasible
	Average	**89.72**	**Very feasible**

Based on the results of the validation, it is obtained that the average of all aspects of material assessment by experts shows very feasible qualifications, meaning that the subject matter in the student module has met the criteria and is feasible to continue in the initial field trial.

Product validation by presentation expert

The results of the module assessment by validation experts are visualized in Table 3.

Table 3. Design aspect validation by experts

No	Aspect	Percentage (%)	Qualification
1	Module cover design	92	Very feasible
2	Display of module contents	80	Feasible
3	Layout of module contents	94	Very feasible
4	Image color clarity	88	Very feasible
5	Writing color clarity	88	Very feasible
6	Display of attractive and colorful modules	92	Very feasible
7	Presentation of module contents	86	Very feasible
	Average	**88.57**	**Very feasible**

Based on the results of the validation, it is obtained that the average of all aspects of the module presentation design by experts shows very feasible qualifications, meaning that the presentation of student module products has met the criteria and is feasible to continue in the initial field trials.

Product validation by linguist

Data from module validation on aspects of language are presented in Table 4.

Table 4. Language validation aspects by experts

No	Aspect	Percentage (%)	Qualification
1	Good and right Indonesian language	96	Very feasible
2	Terminology	96	Very feasible
3	Language clarity	98	Very feasible
4	Language compatibility	92	Very feasible
5	Attention to the code of ethics and copyright	94	Very feasible
	Average	**95.2**	**Very feasible**

Based on the results of the validation, it is obtained that the average of all aspects of language by experts shows very feasible qualifications, meaning that the student module has met the criteria of good and feasible readability to continue in the initial field trial.

Product validation by learning media experts

Evaluation of learning instruments includes syllabus, lesson plans, assessment, and evaluation questions. A summary of the validation of learning media aspect is presented in Table 5.

Table 5. Validation of learning media aspect by experts

No	Aspect	Percentage (%)	Qualification
1	Teaching material	90	Very feasible
2	Learning process	92	Very feasible
3	Syntax of the guided-inquiry model in learning	94	Very feasible
4	Assessment	96	Very feasible
5	Activities that support learning	88	Very feasible
6	Subject matter that can improve the ability to argue	86	Very feasible
7	Aspect of argumentation skill	88	Very feasible
	Average	**90.57**	**Very feasible**

Based on the results of the validation, it is obtained that the average of all aspects of the assessment of learning media by experts shows very feasible qualifications. The results of expert validation indicate that student module products have met the criteria and are eligible to continue in the initial limited field trials.

Validation results of the module product for teachers
Product Validation by Subject Matter Experts

Assessment of modules by subject matter experts was in the lowest value range of 1 and the highest one of 4. The results of the subject matter validation are fully visualized in Table 6.

Table 6. Subject matter aspect validation by experts

No	Aspect	Percentage (%)	Qualification
1	Subject matter accuracy	90	Very feasible
2	Subject matter update	88	Very feasible
3	Subject matter develops thinking skills and abilities	94	Very feasible
4	Subject matter follows scientific systematics	86	Very feasible
5	The basic concept of the subject matter	90	Very feasible

No	Aspect	Percentage (%)	Qualification
6	The concept of the subject matter	90	Very feasible
7	Image concept	92	Very feasible
8	Systematic delivery of the subject matter	90	Very feasible
9	Subject matter that can improve the ability to argue	94	Very feasible
10	Subject matter that can increase students' reading interest	88	Very feasible
11	Relevant to everyday life	96	Very feasible
12	The accuracy of the activity confirmation section	92	Very feasible
13	The accuracy of the evaluation section	86	Very feasible
	Average	**90.46**	**Very feasible**

Based on the results of the validation, it is obtained that the average of all aspects of material assessment by experts shows very feasible qualifications, meaning that the subject matter in the teacher module has met the criteria and is feasible to continue in the initial field trial.

Product validation by design presentation expert

The results of the module assessment by validation experts are visualized in Table 7.

Table 7. Design presentation aspect validation by experts

No	Aspect	Percentage (%)	Qualification
1	Module cover design	84	Very feasible
2	Display of module contents	80	Feasible
3	Layout of module contents	88	Very feasible
4	Image color clarity	90	Very feasible
5	Writing color clarity	94	Very feasible
6	Display of attractive and colorful modules	90	Very feasible
7	Presentation of module contents	90	Very feasible
	Average	**88**	**Very feasible**

Based on the results of the validation, it is obtained that the average of all aspects of the module presentation by experts shows very feasible qualifications, meaning that the presentation of teacher module has met the criteria and is feasible to continue in the initial field trials.

Product validation by linguist

Data from module validation on aspects of language are presented in Table 8.

Table 8. Readability validation aspects by experts

No	Aspect	Percentage (%)	Qualification
1	Good and right Indonesian language	94	Very feasible
2	Terminology	96	Very feasible
3	Language clarity	96	Very feasible
4	Language compatibility	94	Very feasible
5	Attention to the code of ethics and copyright	92	Very feasible
	Average	**94.4**	**Very feasible**

Based on the results of the validation, it is obtained that the average of all aspects of readability by experts shows very feasible qualifications, meaning that the teacher module has met the criteria of good and feasible readability to continue in the initial field trial.

Product validation by learning media experts

Evaluation of learning instruments includes syllabus, lesson plans, assessment, and evaluation questions. A summary of the validation of learning media aspect is presented in Table 9.

Table 9. Validation of learning media aspect by experts

No	Aspect	Percentage (%)	Qualification
1	Teaching material	92	Very feasible
2	Learning process	94	Very feasible
3	Syntax of the guided-inquiry model in learning	88	Very feasible
4	Assessment	90	Very feasible
5	Activities that support learning	92	Very feasible
6	Subject matter that can improve the ability to argue	94	Very feasible
7	Aspect of argumentation skill	90	Very feasible
	Average	**91.42**	**Very feasible**

Based on the results of the validation, it is obtained that the average of all aspects of learning media by experts shows very feasible qualifications, meaning that the learning media presented in the module have met the criteria and are feasible to continue the initial field trials.

Product validation by evaluation expert

The validation summary of the evaluation aspect is presented in Table 10.

Table 10. Validation of learning evaluation aspect by experts

No	Aspect	Percentage (%)	Qualification
1	Question material	90	Very feasible
2	Presentation of questions	90	Very feasible
3	Scoring	88	Very feasible
4	Dimension of knowledge process	94	Very feasible
5	Aspect of argumentation skill	96	Very feasible
	Average	**91.6**	**Very feasible**

Based on the results of the validation, it is obtained that the average of all aspects of learning evaluation by experts shows very feasible qualifications, meaning that the learning media in the teacher module has met the criteria and is feasible to continue in the initial field trial. Assessment of the results of expert validation shows that the validity of the subject matter, module characteristics, readability, learning media, contains aspects of argumentation and evaluation of argumentation skill in the guided inquiry-based module supplied with comics on the subject matter of human digestive system as targeted because the results of the fourth validation are highly feasible. The results of expert validation indicate that the module product is feasible to continue in the initial field trial, but still requires some improvements according to expert validation.

Product revisions were made to improve the initial product guided inquiry-based module with comics based on suggestions from subject matter expert as validator, module presentation design expert as validator, linguist as validator, learning media expert as validator, and practitioners, in addition to being based on findings in the field. Table 11 containing results of suggestions and revisions from validators as experts.

Table 11. Suggestions and revised results from expert validators

No.	Validator	Suggestion	Revision
1	Subject Matter Expert	• There is a part of the concept map that isn't right • Pictures of the shape and number of teeth in the description of comic give rise to misconceptions • The writing system still has typos • In the description of comic material, there are concepts that can lead to misconceptions	• Addition and changes of words on concept maps • Image changes and number of teeth in the description of comic material • Writing rules justification • The addition of carbohydrate sources for noodles so that there is no misconception
2	Module Presentation Design	• Basic colors are distinguished • Mentioning of the name of the institution • Title inside and front cover • In the module identity, the name of the author does not need a title degree • Each Study Group must have subtitles	• Changing the basic colors • The mention of the name of institution was replaced by the study program • Addition of title inside and front cover • Elimination of titles in the name of the author • Giving subtitles to each Study Group
3	Language	• Use of command sentences in student learning activities • There is still a lack of punctuation • Bibliography writing	• Replacement of command sentences is an invitation sentence on Study Group • Addition of punctuation is still insufficient • Improvement of bibliography writing
4	Learning Media	• Lack of concrete examples of one food source • Decreasing indicators of Core Competence	• Addition of concrete samples of food source • Improved of Core Competence indicators

Suggestions from validators as experts aiming to improve the initial product so that it can proceed to the initial field-testing phase conducted by involving users in the school. The guided inquiry-based modules supplied with comics that had been developed were then piloted in the initial field trial limited (small scale test). The aim of the initial field trial is to gather information that can be used as material to improve the product in the next revision. The initial trial involved 2 practitioners, 8 students in class 8.4 and 15 students in class 8.3. The initial field trial was by giving a questionnaire for responses to the guided inquiry-based modules supplied with comics on the material of Human Digestive System. The results of the initial field trials of 2 Natural Science teachers of State Junior High School 3 of Surakarta are presented in Table 12.

Table 12. Recapitulation of preliminary trial results by practitioners

No	Aspect	Score Percentage (%)			Qualification
		Practitioner 1	Practitioner 2	Average	
1	Module content	100	100	100	Excellent
2	Subject matter	93.75	93.75	93.75	Excellent
3	Evaluation	100	100	100	Excellent
4	Presentation	100	96.87	98.43	Excellent
5	Language	100	100	100	Excellent
6	Module display	100	100	100	Excellent
	Average			**98.69**	**Excellent**

Table 12 is the data from the results of the initial field trials based on teacher assessments through questionnaires. The average score of the two teachers is 98.69% with very good qualifications. An assessment by 8 students of grade 8.4 who had obtained the subject matter and 8 students of class 8.3 who had not obtained the subject matter are presented in Table 13.

Table 13. Module assessment by students

No	Aspect	Score Percentage (%)			Qualification
		Class 8.3	Class 8.4	Average	
1	Module content	84.33	78.75	81.54	Excellent
2	Presentation	88.33	83.50	85.91	Excellent
3	Language	88.89	81.82	85.35	Excellent
	Average			**84.27**	**Excellent**

The assessment of the guided inquiry-based learning modules supplied with comics on the subject matter of human digestive system by the teacher in Table 12 and by students in Table 13 shows that content, material, evaluation, presentation, language/readability and display of modules are very well qualified according to the teacher and the average of all students, so that they can proceed to the operational field test/effectiveness after correcting the module deficiencies based on the obtained suggestions. The teacher explains that the module is good and requires a little improvement related to writing the wrong word, while students explain that the module is good and interesting because it has been supplied with comics, pictures and colors that are not boring so it is interesting to read, but there are some prints that are still blurred so that they need to be fixed.

In addition to giving an assessment, the teacher also provides comments and suggestions. Suggestions given by the teacher are used in the next implementation trial. Suggestions from teachers regarding the modules that have been developed are presented in Table 14.

Table 14. Results of suggestions and revisions from education practitioners

No	Practioners	Suggestion	Revision
1	Practitioner 1	The addition of glossary section will be better	Adding the glossary
2	Practitioner 2	Table proportions	Correction of table proportions
		Addition of illustrations	Addition of illustrations in science info, subject matter summaries, and each student activity in the module.

Suggestions from practitioners were not carried out based on time considerations and the subject matter felt was enough for the designed indicators. In the initial test, students also shared learning modules as well as the teacher explained, and students pay attention to the module sheet by sheet. The activity is ended by distributing the module assessment questionnaire to be filled out by students. The results of suggestions and revisions from students can be seen in Table 15.

Table 15. Results of suggestions and revisions from students

No	Suggestion	Revision
1.	There are some missing spaces	Re-checking and fixing missing spaces
2.	Addition of glossary	Adding more words or terms to the glossary
3.	Addition of images as in the competency test to make it more interesting	Addition of illustration images to science info, and each stage of student activity.

Stated that after the product design process is carried out the next step, expert validation is the stage of assessment by experts on the product developed, then the design revision stage is to improve the existing weaknesses in the product through expert suggestions. Validation is the first test conducted in research and

development by presenting experts namely media experts, material experts, language and learning device experts to assess the products produced (Sengupta-Irving & Enyedy, 2015; Soltis et al., 2015).

From the results of the validity that has been conducted by the subject matter expert as validator, learning media expert, reading expert, design expert, practitioner and student, it can be stated that the guided inquiry-based modules supplied with comics on the subject matter of human digestive system are suitable to be used to improve students' argumentation skills. Because beside that specifically comics can help students develop language skills, art activities, and creative statements in storytelling, dramatization, reading, writing, painting and drawing, as well as helping them interpret and remember the contents of reading material.

CONCLUSION

Module design was divided into three parts, namely the beginning, contents, and closing. The contents section consists of three sub-material, namely: 1) food substances; 2) food digestion organs and processes; and 3) food digestive system disorders. Based on the results of the research, it can be concluded that the guided inquiry-based modules supplied with comics fulfill the criteria that are very feasible as a learning medium with a value of 88.28% in terms of medium, 94.8% in terms of language, 91.15% in terms of learning media and 90.125% in terms of subject matter, which is obtained from the average results of each aspect of the validation assessment of each expert in both the teacher module and student module. With validation and feasibility tests carried out to experts, teachers and students, it can be expressed that the guided inquiry-based modules supplied with comics on the subject matter of human digestive system are feasible and able to improve students' argumentation skill.

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