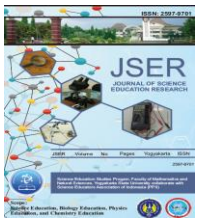
JSER 2019, 3(1), 52 - 62

JSER

Journal of Science Education Research

Journal homepage: www.journal.uny.ac.id/jser



The Development of the Character-Based Science Comics Learning Media to Improve Self-Reliance Learning the Students of SMP

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Keywords:
Development of science comics learning media, character, self-reliance learning

ABSTRACT

The purposes of this research were: 1) to produce, 2) to know the quality, and 3) to know the effect character-based science comic learning media in improving the self-reliance learning of the students on Junior High School and the improvement of the character building. This particular research was Research and Development (R&D) referring to 10 steps developed by Borg & Gall, but this research was conducted only for 1-9 steps. The subjects of the research were 36 students; 10 students participated in the preliminary field test and 26 students in the main field test. Data collection techniques were interviews, questionnaires, and observations. The result of the research showed that: 1) the developed character-based science comic learning media developed using steps proposed by Borg and Gall, 2) the quality of the Science comic learning media is good, and 3) learning using the science comic learning media improve the students' self-reliance learning and character building.

INTRODUCTION

Education is a basic tool in increasing the ability of a nation to adapt to rapid changes and technological advances. Education is a systematic, gradual and continuous development process as an effort to improve the quality of its implementation. Improving the quality of education carried out through developing the methods of delivering learning materials, developing the quality of teacher with knowledge of curriculum development, and developing various types of learning media. Today, the field of learning is generally influenced by developments and discoveries in the fields of science and technology. The effect of this development is seen in efforts to reform the education and learning system. The effort touched not only physical facilities or educational facilities, but also non-physical facilities such as the ability and skills to use available facilities, innovative ways, and positive attitudes towards the educational tasks. An integral part of the effort is the learning media. Therefore, learning media should be mastered by every professional educator.

Research on the use of media in the learning process end to the conclusion, that the process and students learning outcomes showed significant differences between learning without learning media and using media (Sudjana & Rivai, 2005: 3). The growing awareness of the importance of developing learning media in the future must be realized in practice. Educators can develop skills to create attractive, inexpensive and efficient media, by accepting the possibility of using the modern device in line with the demands of the development of science and technology. Learning media are not only textbooks, but also use newspapers, magazine, comics, and electronic media that are now popular in the community.

According to Nana Sudjana & Ahmad Rivai (2010: 6-7), learning media have the components of the teaching method as an effort to enhance the learning environment of students. Therefore, learning media has a function as a teaching aid, which supports the teaching methods used by educators. According to Heinich et al. (1996: 8), media is a link to delivers information between sources and recipients. Supporting by Latuheru (1988: 9), the notion of media leads to something

that delivers or transmits information or messages between the source (the giver of the message) and the recipient of the message.

Moreover, Latuheru (1988: 13) limits the media as all forms of link used by humans to convey or disseminate ideas, assumption or opinions aiming those arrive at recipient. A thing included in learning / educational media when the media is used to channel/convey messages of education and learning. AETC (Associational of Education and Communication Technology) defines the media as all forms and channels to be used in the process of delivering messages or information. With the term of the mediator, the media shows the function and role, which is to organize effective relationships between two main parties in the learning process of students and the content of the lesson. In addition, mediators can also reflect the understanding that every learning system conducts mediation, from educators to the most sophisticated equipment, called media.

Based on the opinions of the experts, concluded that learning media are all forms of mediator that can enhance the interaction process between educators-learners and learners-learning environment, used to convey or deliver learning messages and facilitate the students in the learning process.

Classification of media, Heinich et al. (1996: 8) divided into seven types; 1) non-projected media, 2) projected media, 3) audio, 4) video and film, 5) computer-based media, 6) multimedia, and 7) radio and television. Meanwhile, Azhar Arsyad (2011: 29) stated, learning media grouped into four groups based on technological developments; 1) media of printed technology, 2) media of audio-visual technology, 3) technology media based on computers, and 4) media combined of printed technology and computers. Educators are required to choose and adapt the learning media into the learning process. The use of media in the learning process can facilitate the interaction between educators and students so that learning activities will be more effective and efficient.

Comics might use as an attractive medium for students in junior high schools because comics illustrated stories that are easily understood by students through visualization of written information. Comics might use as an alternative source of learning for students and replace the position of educators in learning activities both in class and outside the class. Comics can be used in the learning process, teaching aids by educators, and self-reliance learning media for students. Comic books and images facilitate students to improve self-reliance learning because students have the opportunity to self-reliance learning, reading material descriptions, and answer questions.

Several things as an attempted to improve the students' learning motivation are the selection of learning materials including meaningful learning media, creating discovery learning, and translate material according to the developmental level of students. Comics are one of the unique learning media, media for delivering ideas, thought, and freedom of thought.

According to McCloud (Indiria, 2011: 3) defining comics are images and other symbols that are adjacent or contiguous in a certain sequence aiming to provide information or to achieve an aesthetic response from readers.

Comics combine text and images in a creative form. Comics are media that can attract attention due to easy to understand. Although new media continues to emerge, reading comic still is a popular activity for children and adults. Recently, there has been an increasing explosion in the creation of educational comic books, including science (Jee, 2012: 196). Simple words added everyday language make comics readable by everyone.

The particular research conducted on students of junior high school who are on a transition to adolescence age. So, they need interesting media to increase self-reliance learning. Law No. 20 of 2003, national education is aimed at developing learners' potentials so that they become persons imbued with human values who are faithful and pious to one and only God; who possess morals and noble character; who are healthy, knowledgeable, competent, creative, independent; and as citizens, are democratic and responsible. The message of the National Education System Act is intended to prioritize the development of intelligence and self-reliance learning of the student. The self-reliance learning of students is needed in the context of learning and study in the classroom because an educator is possible to continuously assist students in learning. Here, when students are not accompanied by educators, students can perform self-reliance learning (Ekowati, 2004: 3). Self-reliance means able or can meet their needs. Self-regulated learning according to Kadhiravan (2012: 213) refers to thoughts, feelings, and actions of learners that are systematically oriented towards achieving goals. Good (Slameto, 2003: 176) defines self-reliance learning is learning with little or without outside aid. In this opinion, self-reliance learning of students is responsible for decision-makers related to the learning process and has the ability to carry out the decisions. Zimmerman (2008: 166) defines the self-reliance learning is the active process of students used to obtain academic skills.

Self-reliance learning of students does not mean self-study, on the contrary, the situation is fostered for group learning and each student

becomes a partner in a group. And, it needs to grow the sense of togetherness, awareness to cooperate and cooperation, mutual assistance and correction without offense, and respecting opinions and the establishment of others. It means directing the students to be a smart and democratic member of community and conducting self-reliance learning (Aristo, 2008: 1).

Based on preliminary research, interviews conducted with educators (attached in appendix 1), self-reliance learning of students, especially in SMP Muhamadiyah 2 Yogyakarta, is poor. Students may tend to follow the instructions of educators and less able to bring up their motivation in learning. And, through comic media is expected, can increase self-reliance learning of students.

There are a lot of changes in science education, both in curriculum and learning. Permendiknas (regulation of ministry of national education) No.22 of 2006, the scope of the science field is grouped into one science subject. Then, integrated science learning developed, which is a science learning approach that connects or integrates various fields of science into one language unit. Integrated science learning includes dimensions of attitude, process, products, applications, and creativity. With integrated science learning, hope, students have a holistic knowledge of science to solve the daily life problems contextually. The meaningful learning experiences may achieve through integrated learning that links conceptual elements with the field of science studies. Integrated learning may also present with themes or topics discussed from various perspectives or scientific disciplines that are easily understood and known by students. Thus, through integrated learning, some relevant concepts of the themes do not need re-discussed in different fields of study. So, the use of time for the discussion is more efficient and achieving the learning objectives is more effective.

According to Fogarty (1991: 3-5), several models of integrated learning have the potential to be developed into science learning, such as connected, webbed, and shared. Integrated learning of webbed model is integrated learning using a thematic approach. This approach begins by determining a particular theme. The advantages of this model are the selection of themes according to the interests and motivation of students, easier for educators who have no experience, and motivate students. Educators may use an interesting theme linked to issues that develop in the community and combined with technology and presenting the impact on the environment and society, as well as how to solve the problem in positive actions in the learning process. In this case, students will require thinking actively and creatively. One of the impacts of the environmental problem on humans and the surrounding environment is global warming, which is an increase in the earth's temperature due to the increase in greenhouse gas levels in the air.

Regulation on national education of 2003 is not only aimed at developing learners' potentials but also become persons imbued with human values that possess morals and noble character; so, with those characters, will create a citizen with the nation and religious character. The aim of national education is the formulation of the quality of Indonesian people that must be developed by each education unit. The national education goals are the basis of cultural and character education to produce character, intelligent, and independent human resources.

Education is a conscious effort carried out by a person or student to grow, develop, mature other people or learners, and built the personality. For this reason, education is a very appropriate tool to instill and develop character. Character education is a system of educating character values to the student which includes the components of knowledge, awareness or willingness, and actions to implement these values (Dirjendikdasmen, 2010: 8-9). Some of the problems related to the low character of students presented by Wanda Crisiana (2007: 5), who found three low characters in students of Industrial Engineering of UK Petra Surabaya; they are caring, respect, and citizenship. Building national character through education is necessary and can not be postponed; starting from the home environment, school, and community by imitating the figures. In the school environment, teachers, principals, and educational personnel are communities, indirectly, be role models for students. Then, a strong character must be owned by the community first, especially educators.

Lickona (1991: 53) states, "Component good character consists of moral knowing, moral feeling, and moral action." Moral knowing consist of moral awareness, knowing moral values, perspective-taking, moral reasoning, decision making, and self-knowledge. The moral feeling is a feeling of morality, strengthening the emotional aspects of students to be human with character. This reinforcement relates to the attitude, such as awareness of conscience, self-esteem, empathy, loving the good, self-control, and humility. While moral action is a moral action as the result of two other character components.

Battistich (2008: 82) states that character education is an intentional effort to use all dimensions of school life to encourage in achieving optimal character development. Character education can be manifested by involving all components in the school such as the content of curriculum, learning process, the quality of relationships, subject of learning, the implementation of co-curricular

activities, and the ethos of the entire school environment.

Character education is an effort that leads to the strengthening and reinforcing the knowledge, awareness, and behavior of children as a whole on a certain value, in order, can implement these values well into the environment. The purpose of character education is to create good children. Once grown in good character, children will grow up with the capacity and commitment to do the best things, do the right, and tend to have life goals.

Character education in schools might turn into real by involving all the components in the school. These components are students, educators, employees, principals, committees, surrounding of school's environment, and the components of education, such as curriculum, learning process, assessment, quality of relations, management of subjects, and extracurricular activities.

The issue of culture and character of the nation is currently the highlight of the community. This issue concerns various aspects of life, which published in printed media, interviews, dialogue, and speech in electronic media. Not only highlighted by mass media, but community leaders, experts, and educational and social observers, also talk about the issue of the future national culture and character in various forums, among local, national and international levels. The issues that arise in the community such as corruption, violence, sexual crimes, vandalism, mass fighting, consumptive economic life, unproductive political life, and so on, become a hot discussion in the mass media, seminars and on various occasions.

Many alternatives or opinions have been put forward to overcome or, at least reduce, the problem of the fading the culture and national character is through education. Education is considered as a preventive alternative because education can be established better generation. The results of education would not have an impact shortly but have a strong impact on society. Education is the most responsible process in creating Indonesian citizens with strong character as capital in developing high and superior civilizations. The nation's character is the basic capital of building a high level of civilization, a society that is honest, independent, cooperating, obedient to rules, trustworthy, strong and a high work ethic; those will produce a regular and good social life system.

In principle, the development of national culture and character is not included as a subject but integrated into subjects, self-development, and school culture (Ministry of Education, 2010: 11). Character education is integrated into various fields of study, including science, aiming, to provide a meaningful experience for students because the students can understand and integrate it through the learning process. Thus, these values can be absorbed naturally through daily activities. The importance of science for character development has become the concern of developers in several countries. Science is believed as having an important role in the development of the character of society and the state due to the rapid progress of science products, the efficacy of science processes transferred to various fields, and the thickness of the values, attitudes, and morals in science.

Based on observations and interviews with educators and students at SMP Muhamadiyah 2 Yogyakarta, found out that science learning has not implemented in an integrated way; science learning is still divided into physics, biology, and chemistry. Integrated science learning is quite difficult from the teacher's perspective due they are not from science but the fields of physics, biology, and chemistry. Moreover, the low level of self-reliance learning of students in science can be seen from; most of the students do not do the exercises, students do not pay attention or note the material during the lesson, and even some students do not carry books. Here, science learning comics containing the most advanced material can be used by students as independent reading material. Learning science with the material of global warming has not been fully developed, including the development of values of character education which has not integrated into science subjects. Educators at SMP Muhammadiyah 2 Yogyakarta, in the process of learning science, also only use available learning media.

This study attempted to contribute to education, especially in the science learning process, which are the development of character-based science learning media comics containing integrated material, namely by taking the theme of the "Panasnya Bumiku" which might use by students to increase self-reliance learning in science subjects.

METHOD

The research type was research and development (R & D), which is a research-oriented to develop, and test the effectiveness the products used in research (Borg & Gall, 1983: 772). Borg & Gall (1883: 775) proposed ten major steps in Research and Development, but this research was conducted only for 1-9 steps (preliminary studies, planning, implementation, preliminary field test, product revisions I, small group trials, product revisions II, field test, and final product revision).

Developmental Procedures

Preliminary Study and Collecting Information

This step is the first step or preparation of a literature study, which is collecting information related to literature materials that can support the

product of development research. Field studies conducted to determine the needs of educators and students about difficulties in science teaching and learning, and find out whether comic media is considered appropriate to overcome these difficulties. The field study was conducted by distributing questionnaires of the needs analysis to students, while interview conducted to educators.

Planning

In the planning step, task analysis is carried out, which are the collection of procedures to determine the contents of the lesson unit. The activities of this step were; determine the competency standard (SK) and basic competencies (KD) as themes, determine indicators of success, analyze the main concepts, analyze learning objectives and develop assessment instruments.

Implementation

The implementation step is the preparation of the preliminary product of the comic science learning media, which is written on sketch paper. The activities were: (1) creating storyboards, (2) preparing supporting material, (3) creating a synopsis on the achievement of learning indicators, (4) making comics with computer media, and (5) coloring comics.

Preliminary Field Test

The step is a feasibility assessment by experts and practitioners to obtain an assessment and inputs. The assessment activities consisted of three stages: (1) feasibility assessment by material experts and instructional media experts, (2) assessment of comic learning media by practitioners; science teachers for junior high school, and (3) peer.

Product Revision I

This step is a product revision based on the results of the feasibility assessment by material and instructional media experts. Moreover, the revision is also based on input from teachers and peers.

Small Group Trial

The small group trial was carried out by using character-based science comic learning media that had assessed for feasibility and after product revisions. The small group trial test used questionnaires on students' responses to the product. Characteristics of various data and input obtained in small group trial are used as material for revision and improvement.

Product Revision II

This step was a product revision based on the results of small group trial. In this step, it will produce a revised the product of science comic learning media.

Field Test

The field trial test was carried out using the revised product in Product Revision II. The test aimed to determine the effectiveness of the product in improving self-reliance learning and achievement of character building of caring, creative, curiosity, and communicative. Various data and input were used as material for revisions and improvements.

Final Product Revision

The final product revision is carried out based on the results from the field trial. After the revision and improvement, it produced a character-based science comic learning media that used to improve the self-reliance learning of junior high school students.

Analysis

In this step, analyze the results of the research instrument that will use as report material or thesis.

Product Trial

Preliminary Field Test

Before the product tested on students, the product must be validated by at least 1 material expert and 1 media expert. The expert validation was important to validate the preliminary product that the product was feasible to test to subjects (students). At this validation step, material experts will provide assessments, comments, and suggestions on products from aspects of material feasibility. Media experts will provide assessments, comments and suggestions on products from the feasibility aspects of storyline, language, and images. Furthermore, the researcher also conducted validation to practitioners, namely science teachers who have experience teaching science. Then, the product is valid and feasible to further test.

Small-Group Evaluation

The small-group evaluation aimed to obtain data or information, used to improve the product in the next revision.

Field Trial

The field trial aimed to determine the results of the implementation of character-based science comics to the build characters and self-reliance learning of students. The questionnaire used to find out the effectiveness of characters building and increasing self-reliance learning.

Subject of Trial Test

After the products were validated and feasible by media and material experts, then the learning media tested to the subject of the trial test (students). There are two stages of product test in this study, namely:

10 students joined in Small-group evaluation with criteria of achieved the Minimum Completion Criteria (KKM) for basic competencies in the previous material.

32 students joined in Field trials with criteria of achieved the Minimum Completion Criteria (KKM) for Basic Competence in the previous material.

Data Collecting Instruments

The instrument in this study was questionnaires of the variable quality of character-based science comics (appendices 5, 6 and 7), questionnaire sheets of the character and self-reliance learning, and observation sheets of students' character and self-reliance learning (appendices 3 and 4).

a. Questionnaire of Science comic quality.
b. Questionnaire of Character and self-reliance learning.
c. Observational Sheets of Character and self-reliance learning.

Data Analysis Technique

Data analysis for variable of science comic quality

According to Sugiyono (2012: 414), product validity might conduct by presenting experts or experienced experts to assess new products to determine the weaknesses and strengths. To complete the validity data, an assessment was also carried out by education practitioners. The data analysis for the variable of science comic quality was descriptive. Then, the score is converted into the level of product quality on qualitatively scale 5 (1 to 5) with ideal conversion guidelines (Sukardjo, 2006: 55).

Table 1. Conversion score of scale 5

No.	Interval of Score Mean	Category of Quality
1.	$\overline{X} > 4{,}206$	Excellent (SB)
2.	$3{,}402 < \overline{X} \leq 4{,}206$	Good (B)
3.	$2{,}598 < \overline{X} \leq 3{,}402$	Pretty Good (CB)
4.	$1{,}794 < \overline{X} \leq 2{,}598$	Poor (KB)
5.	$\overline{X} \leq 1{,}794$	Worst (SKB)

Data analysis for variable of self-reliance learning and character

One of the requirements to produce accurate estimates in analyzing the results of research data is through a different test. Aiming to test the differences of the increasing score on self-reliance and character, a statistical test with paired t-test performed, but must perform normality test before it. A paired t-test is a method of hypothesis test where the data used is in pairs.

Normality test used to find out whether the data is normally distributed or not. In this study, the calculation of the normality test was performed using the Shapiro-Wilk test statistic in SPSS 16.0. Data is normally distributed at a significance level of 5% when the price of the probability is higher than 0.05.

The criteria for accepting or rejecting H_0 at the 5% significance level were:

1) H_0 Rejected, if the significant score < significance level 0.05.
2) H_0 Accepted, if the significant score > significance level 0.05.

The hypotheses in this study were:

H_0 : There are no significant differences in the results of the self-reliance learning of students who attended before and after learning using the science comic learning media.

H_1 **:** There are significant differences in the results of the self-reliance learning of students who attended before and after learning using the science comic learning media**.**

RESULT

Result of Developmental Step

Step of Product Design

The developed product was a character-based science comic learning media containing integrated material with a specific theme and in line with the psychological development of students. The preliminary product of the printed comic learning media was validated by experts and practitioners to determine the feasibility before it continued to small-group evaluation and field trials. Based on the procedures for the development, the steps were.

Establish the Material Integrated into the Theme

This particular research begins by conducting literature studies, observations, and interviews on science learning in junior high school. According to teachers at SMP N Muhamadiyah 2 Yogyakarta, science learning has not implemented in an integrated manner. Science learning is given separately, such as Biology, Physics, and Chemistry, due to the educational background of the teacher. Also, the integration of character education has not been fully carried out on science subjects. The interviews with educators stated that they agree with the developing science comics learning media containing integrated and character material. According to teachers, there is no science comic learning media in the school. Researcher study the science material to be integrated to obtain an integrated science theme. The field of study that will be integrated is material and nature (chemistry), energy and changes (physics), living things and life processes (biology), and the earth and the universe (earth and space science). The researcher chose the theme "Panasnya Bumiku" as a topic in the material of global warming. This theme was chosen based on the subject material of population density, chemicals, temperature, and layers of the atmosphere.

Formulate the Indicators of Integrated Science Learning

Indicators of integrated science learning are made based on integrated basic competencies. The basic competency and integrated science learning indicators are: Basic Competencies:

1) Explain the relationship between population density and chemicals with environmental problems.
2) Explain the process of global warming related to increasing the environmental temperatures.
3) Apply the role of humans in environmental management to overcome global warming.

Indicators:

1) Explain the gas composition of the atmosphere component and the layer of the Earth's atmosphere.
2) Explain the effects of using chemicals that are commonly used daily such as cleansers, fragrances, bleach, and exterminators.
3) Identify other chemicals creatively in the surrounding environment which may cause effects for the environment.
4) Convert temperature units based on observations.
5) Explain the greenhouse effect through independent creative thinking.
6) Make self-decisions regarding the use of tools and technology to postpone an increase in environmental temperature.
7) Estimate negative effects due to increase atmospheric temperatures.
8) Design creative ideas such as slogans, poems, or actions to protect the environment from damage.

Design the Learning Implementation

The design of the implementation of integrated science learning using character-based science comic learning media in the learning process used the method of discussion with question and answer techniques for three meetings. The topics discussed in the three meetings are:

1) Meeting I: Earth and Environment.
2) Meeting II: Greenhouse effect and global warming.
3) Meeting III: Human role in environmental care.

Making LKPD

LKPD was developed based on the material in the product in line with the learning objectives. The design of the LKPD was made for three meetings; each meeting consisted of 5 short description questions.

Making the storyline of the comic and determine the character

The storyline in the product aims to facilitate the students to understand the integrated science material, namely global warming. Moreover, the stories in comics could able to make students understand the material, and characters in comics as well as characters value. So, after reading the science comics, students understand the characters embedded in comics, such as curiosity, creativity, care for the environment, and communicative.

Make Preliminary Comic / draft

The preliminary draft was a comic media in the form of a book containing science material packaged in a storyline with the elaboration of material presented through dialogue between characters based on the drawings. Making sketches or comic drawings based on the storyline.

Product Validation Stage

The data was the result of product evaluation conducted by material experts, media experts, teachers, and peers. The results of this assessment were scores and input for product improvement on the self-reliance learning of students. The data played as the basis for knowing the quality of the product by converting scores into qualitative data (data intervals) with a scale of five.

Evaluation of Media and Material Expert

Before the trial, the product was validated by material experts and instructional media experts to determine the feasibility of the product. Material validation carried out by Dr. Insih Wilujeng (lecturer in the Science Learning Practicum course). Meanwhile, validation for media learning carried out by Dr. Eli Rohaeti. They provided product validation quantitatively and qualitatively on the validation sheet. Based on the evaluation by experts, the products must be revised in advance to obtain the feasibility. There were some writing errors and a lack of images and must add.

Table 2. Evaluation Result of Experts

Assessed Aspect	Score	Category
Material	4,1	Good
Anatomy of comic	4	Good
Language	4	Good
Image Quality	3	Enough
Story Rating	4	Good
Overall View	3	Enough

Evaluation by Teachers

Evaluation by a science teacher in junior high school carried out by 2 educators; Indriyani Ika

Puspitasari, S.Pd (Teachers at SMP Muhamadiyah 2 Yogyakarta) and Dwi Nuryanti, S.Pd (Teachers at SMP Ngluwar 1). Based on an evaluation by the teacher, obtained the mean score of 4.3, with excellent criteria.

Table 3. Evaluation Result of Teachers

Assessed Aspect	Score	Category
Material	4,1	4,5
Anatomy of comic	4	4,5
Language	4,25	4,5
Image Quality	3,75	5
Story Rating	4	4,5

Peer Review

Evaluation by peer review carried out by 2 persons; Rina Ning Tyas, S.Pd dan Lusiani S.Pd.Si. Based on an evaluation by peer review, obtained the mean score of 4.47, with excellent criteria.

Table 4. Evaluation Result of Peer

Assessed Aspect	Score	Category
Material	4,5	Excellent
Anatomy of comic	4,87	Excellent
Language	4,25	Excellent
Image Quality	4,37	Excellent
Story Rating	4,5	Excellent
Material	4,37	Excellent

Result of Product Trial

Then, the validated product continued to trial in 2 stages; small-group evaluation and field trial.

Result of small-group evaluation

This step aimed to determine the students' response to the product to improve the self-reliance learning of junior high school students.

Table 5. Result of small-group evaluation

Assessed Aspect	Score	Category
Material	4,2	Excellent
Anatomy of comic	4,25	Excellent
Language	4,4	Excellent
Image Quality	4,3	Excellent
Story Rating	4,5	Excellent

Result of Field Trial

Achievement of Character Building of Students

Measurements on character building of students were based on questionnaires filled out by students before and after the learning process, and observation sheets filled in by observers during the learning process. The characters building in a particular study were creative, caring for the environment, curiosity, and communicative.

Table 6. Result of Field trial

No	Name	Score of Character	
		Pretest	Posttest
1	AD	59	60
2	AL	52	65
3	AN	54	63
4	AP	52	68
5	BG	50	79
6	DM	57	63
7	DD	51	61
8	DN	45	59
9	DY	60	65
10	FT	55	66
11	EL	55	74
12	IL	58	75
13	KH	49	60
14	LL	57	68
15	MR	59	74
16	MN	53	60
17	ZK	63	66
18	MT	54	65
19	NB	53	67
20	NN	65	77
21	NK	51	60
22	NV	50	57
23	NA	65	68
24	SV	47	60
25	TN	51	73
26	WL	55	70

Increasing the Character Score during the learning

Observation techniques used to evaluate the increasing the character score of students during the learning process. Data on increasing the character score of students is presented in Table 7.

Table 7. Data of Character Observation Result

Percentage of score	Meeting I	Meeting II	Meeting I
Mean	19,79	**33,85**	19,79

Increasing the Self-Reliance Learning of Students

Measurements on self-reliance learning of students were based on questionnaires filled out by students before and after the learning process, and observation sheets filled in by observers during the learning process.

Table 8. Data of field trial

No	Name	Score of Self-Reliance Learning	
		Pretest	Posttest
1	AD	88,,33	90,00
2	AL	73,33	83,33

3	AN	70,00	83,33
4	AP	81,67	86,67
5	BG	76,67	85,00
6	DM	76,67	83,33
7	DD	75,00	83,33
8	DN	70,00	85,00
9	DY	83,33	88,33
10	FT	76,67	86,67
11	EL	60,00	86,67
12	IL	86,67	90,00
13	KH	78,33	88,33
14	LL	75,00	88,33
15	MR	66,67	86,67
16	MN	71,67	86,67
17	ZK	73,33	83,33
18	MT	78,33	80,00
19	NB	90,00	96,67
20	NN	80,00	88,33
21	NK	73,33	90,00
22	NV	68,33	78,33
23	NA	60,00	83,33
24	SV	76,67	91,67
25	TN	80,00	85,00
26	WL	85,00	88,33

Increasing the self-reliance learning during the learning process

Observation techniques used to evaluate the increasing the self-reliance learning of students during the learning process. Data on increasing the self-reliance learning of students is presented in Table 9.

Table 9. Data of Observation Result for Self-Reliance Learning

Percentage of score	**Meeting**		
	I	II	**I**
Mean	34,38	38,75	41,88

Result of Different Test for Increasing the Character

Normality Test

The normality test carried out using the Shapiro-Wilk test with a significance level of 5%. The decision criteria used when H0 accepted; if the significance value is higher than 0.05.

Table 10. Normality Test Result

Data	**Shapiro-Wilk**		
	Statistic	**Df**	**sig.**
Score of Pretest	0,94	26	0,575
Score of posttest	0,957	26	0,140

Based on the test results on second data, the sig value is higher than 0.05. So, the data is normally distributed.

Table 11. Paired sample t test of Character

	Mean	**T**	**df**	**sig.**
Pair of pretest and posttest	-1,16538E1	-9,650	25	0,000

The results showed that the probability score was 0,000. The score is lower than 0.05 of the reference score. Means, there are significant differences before and after learning using the product. In other words, there are increasing the students' character after using the product.

Result of Differences on Increasing the Self-Reliance Learning

Normality Test

The normality test carried out using the Shapiro-Wilk test with a significance level of 5%. The decision criteria used when H0 accepted; if the significance value is higher than 0.05.

Table 12. Normality Test Result

Data	**Shapiro-Wilk**		
	Statistic	**df**	**sig.**
Score of pretest	0,94	26	0,735
Score of posttest	0,957	26	0,339

Based on the test results on second data, the sig value is higher than 0.05. So, the data is normally distributed.

Table 13. Paired sample t test

	Mean	**T**	**df**	**sig.**
Pair of pretest and posttest	-1,04481E1	8,319	25	0,000

The results showed that the probability score was 0,000. The score is lower than 0.05 of the reference score. Means, there are significant differences before and after learning using the product. In other words, there are increasing the self-reliance learning of students after using the product.

Product Revision

Revision of Material Experts

The lesson plan has not shown elements of audience, behavior, condition, degree, time, the learning step in each meeting at the core activity must show the part of the comic, and the LKPD. There is no comic synopsis that tells the achievement of each indicator. So, in each episode, there are errors in punctuation and writing.

Revision of media expert

Media expert suggested: the writing system; prepositions, conjunctions, affixes, correct the content pages, and proportion the number of pages in sub-content.

Revision of teachers

The page for character introduction is combined with the character. It needs to have space for each episode to avoid the student enjoys with the comic, but they should enjoy the material.

Revision of small-group trial

The second revision was carried out after the small-group trial. Here, improvements were made, such as the addition of information on the terms used in the description of global warming material and the addition of material on the use of CFCs and the process of destruction of the ozone layer as the effect of CFCs.

Revision of Field Trial

The third revision was carried out after field trials. Based on the findings, there were improvements to the contents of the character-based science comic learning media, such as slogans/posters about global warming.

Final Product Discussion

The final product of this development research is the compilation of character-based science comic learning media to improve the self-reliance learning of junior high school students that have through several revisions. This particular learning media was developed based on good character-based science quality learning media with the procedural model.

CONCLUSION

Based on the finding and discussion, concluded:

1. This study produced a product of character-based science comic learning media using procedural models with the steps of literature study, planning the material of comic media, product design, product validation, small-group evaluation, revisions, field trials, evaluation and product improvement of science comic learning media.
2. The quality of the developed product based on the assessment of material experts, media experts, teachers, and peers is "good." Furthermore, the product was on excellent criteria based on the findings on trial of a small-group evaluation.
3. Based on field trials, there is an achievement of character building and increased self-reliance learning before and after using character-based science comic learning media. Then, the developed product is feasible to use by teachers as learning media and a source of self-reliance learning for students.

Suggestions for Products

1. The product, character-based science comic learning media are expected to use in integrated science learning in schools. And, the product can improve the self-reliance learning and character of students.
2. Further researchers may conduct further research for this product by disseminating the product to different schools.
3. The product can have further development for different grades and classes.

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