



Implementation of Web-Based Interactive Students' Worksheets with a Scientific Approach for Algebraic Forms Concepts

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Abstract: The purpose of this study was to describe the achievement of student learning outcomes using web-based interactive Student Worksheets through a scientific approach to the concept of algebraic forms and to determine student responses in the use of web-based interactive Student Worksheets. The method used in this study is a type of qualitative descriptive research. The results showed that the achievement of student learning outcomes using interactive web-based Student Worksheets with a scientific approach to the concept of algebraic forms achieved the Minimum Completeness Criteria. Student responses to the use of web-based interactive Student Worksheets showed a good response. The use of interactive web-based Student Worksheets can be very effective in improving student learning outcomes if the lesson plans, work steps and giving the types of questions on the Student Worksheets are made appropriately and systematically.

Keywords: students' worksheets, scientific approach, algebra.

Abstrak: Tujuan penelitian ini adalah untuk mendeskripsikan pencapaian hasil belajar siswa dengan menggunakan Lembar Kerja Siswa interaktif berbasis web melalui pendekatan saintifik pada konsep bentuk aljabar dan untuk mengetahui respon siswa dalam penggunaan Lembar Kerja Siswa interaktif berbasis web. Metode yang digunakan dalam penelitian ini adalah jenis penelitian deskriptif kualitatif. Hasil penelitian menunjukkan bahwa pencapaian hasil belajar siswa menggunakan Lembar Kerja Siswa interaktif berbasis web dengan pendekatan saintifik pada konsep bentuk aljabar banyak yang mencapai Kriteria Ketuntasan Minimal. Respon siswa terhadap penggunaan Lembar Kerja Siswa interaktif berbasis web menunjukkan respon baik. Penggunaan Lembar Kerja Siswa interaktif berbasis web bisa sangat efektif untuk meningkatkan hasil belajar siswa jika rancangan pembelajaran, langkah kerja dan pemberian jenis-jenis soal pada Lembar Kerja Siswa dibuat secara tepat dan sistematis.

Kata kunci: lembar kerja siswa, pendekatan saintifik, aljabar

▪ INTRODUCTION

The concept of algebraic forms is one of the mathematics learning materials in class VII. The concept of algebraic forms is a prerequisite material that must be mastered by students to solve problems in other materials in mathematics. According to the National Council of Teachers of Mathematics in (Lee et al., 2020) algebra is defined as a set of concepts and skills, as well as a way of thinking that allows students to generalize, analyze, and model mathematical situations. Prior knowledge of basic arithmetic as well as algebraic skills is essential to prepare students to learn how to solve equations (Ngu et al., 2015). MacGregor in (Prendergast & O'Donoghue, 2014) recognizes that algebra is a prerequisite for the study of mathematics and is widely used in further education and work. (Suhaedi, 2013) said that algebra is a very important material to be mastered by students, because either implicitly or explicitly algebra is used in daily life activities. The achievement of student learning outcomes in algebraic

forms is still very low. This is reinforced by research conducted by (Hasibuan, 2015) entitled "Students' Learning Outcomes in Algebraic Forms in Class VII SMP Negeri 1 Banda Aceh in the 2013/2014 Academic Year" the results showed that student learning outcomes of SMP Negeri 1 Banda Aceh in algebraic form were still very low. This is supported because from the research data, it was found that only 1 student (3.7%) could master the algebraic form with a score below 85% and from 27 students only 19 students (70.4%) achieved the Minimum Completeness Criteria, so that researchers believe that students in general have learning difficulties in studying this material. The causes of learning difficulties are due to: (1) low understanding of basic algebraic concepts; (2) lack of interest/willingness; (3) lack of practice to work on algebraic questions; (4) difficulty in analyzing story questions; (5) poor perception of algebra; and (6) less meaningful algebra learning. Herscovics and Linchevski in (Prendergast & O'Donoghue, 2014) revealed that many students find algebra an unpleasant, alienating and difficult experience to understand. Therefore, in learning algebraic material, it is necessary to have an interesting and meaningful learning strategy, easy to understand and can improve the achievement of student learning outcomes.

One of the teacher's efforts to guide students in learning algebraic material so that it is easy to understand is to present learning in the form of Student Worksheets. Worksheets are often used in the field and utilize a three-stage learning cycle (exploration, concept introduction and application concept) to engage students in observational and exploratory learning activities (Zhang et al., 2020). Student Worksheet is a learning device in the form of sheets containing a guide for learning activities that require students to carry out learning activities (Muzayyanah et al., 2020). Student worksheets is also a strategy so that learning is more interesting, this is in line with research (Fannie & Rohati, 2014) who revealed that it is necessary to strive for learning innovation through the application of developing strategies, methods, models in the use of Student Worksheet teaching materials to make it look more attractive. Student worksheets are learning resources in the form of sheets containing brief material, learning objectives, instructions for asking questions and a number of questions that must be answered by students independently (Rahmadani & Putri, 2021). Worksheets make it easier for students to focus on a specific task (Ratliffe, 2013). Worksheets are defined as important tools including the steps of this process determining what students should do next, helping students themselves organize their information in their own minds and at the same time providing the whole class to participate in the given activity (Celikler & Aksan, 2012). The characteristics of the Student Worksheet according to Majid in (Wirdaningsih et al., 2017) namely: (1) contains all the instructions needed by students; (2) the instructions are written in a simple form with short sentences and vocabulary according to the age and ability of the user; (3) contains questions that must be filled out by students; (4) there is an empty space for writing answers and student findings; (5) provide clear notes for students on what they have done; (6) contains simple and clear images. According to (Nanthavanij et al., 2013) the worksheet design should emphasize functionality, practicality, and usability. Classroom worksheets will provide versatility and one-on-one attention to problem solving needed in the classroom (Podolak & Plattsburgh, 2013).

Because this is the era of the industrial revolution 4.0, the world of education is required to follow the current developments of the times, one of which is that teachers

are required to implement various kinds of digital-based learning media. In connection with this, the researcher wants to introduce technology-based learning media that can be accessed via Android or PC to students, so that students can use technology as a learning resource. (Firmadani, 2020) stated that the more advanced technological developments, teachers are required to be able to innovate in implementing learning media that can adapt to the times. So the learning media used in this research is a web-based interactive Student Worksheet. This is reinforced by the results of research conducted (Mujiansyah & Rafsanjani, 2021) entitled "The Effect of Learning From Home (BDR) and the Use of Online-Based Student Worksheets on Economic Learning Outcomes in Class X Sma Negeri 1 Soko Tuban" suggests that the use of online-based worksheets has an effect on student learning outcomes due to several factors, including: (1) Online-based Student Worksheets can stimulate students' interest and willingness in learning because this media attracts attention, (2) online-based Student Worksheet media raises student learning motivation because learning is more free and flexible and can directly relate to everyday life. -day, (3) online-based Student Worksheet media can stimulate students' willingness to learn because this Student Worksheet media is an implementation guide, so students learn to find themselves, (4) online-based Student Worksheet media can train students' skills to think critically and learn to be independent.

As a learning media, the Student Worksheets that are made should be able to change the learning system which has been one-way, which makes students only able to master the material to what extent delivered by educators, and students are more likely to memorize than on understanding the concept. One of the efforts of educators in dealing with these problems is to apply a scientific approach. The scientific approach is intended to provide understanding for students to recognize, understand various materials using scientific approach, that information can come from anywhere, anytime, no depend on unidirectional information from educator (Diani, 2016). The scientific approach is a learning process designed in such a way that students actively construct concepts, laws or principles through the stages of observing (to identify or find problems), formulating problems, proposing or formulating hypotheses, collecting data, drawing conclusions and communicating concepts, laws. or found principles (Hosnan, 2014). Longman in (Maharani et al., 2020) defines the scientific approach as the process of finding information in science, which involves testing ideas by conducting experiments and making decisions based on the results of analysis. (Diani, 2016)states that learning using a scientific approach assisted by Student Worksheets can improve student learning outcomes because students are trained to observe, ask questions, try, reason and communicate through the stages. Harlen in (Mutlu, 2020) revealed that scientific process skills are essential for meaningful learning of science content. Permendikbud in (Tambunan, 2019) reveals the application of the scientific approach in mathematics education including observing, asking, experimenting, associating, and communicating.

From the description above, this study aims to determine how the achievement of student learning outcomes by using web-based interactive Student Worksheets with a scientific approach to the concept of algebraic forms and to find out how students respond after using web-based interactive Student Worksheets in the ongoing learning process.

▪ **METHOD**

The subjects in this study were students of class VII-B at MTs Daarutholibin as many as 34 students. Subjects were taken using a purposive technique where the researcher determined the participants themselves based on the research objectives. The study was conducted on November 23 and 24, 2021. The research design used was descriptive qualitative. Descriptive qualitative research is research that explains concrete, actual, realistic phenomena, because this research aims to describe, systematically, factually and accurately describe the existing facts, characteristics, and relationships between the phenomena studied (Rukajat, 2018). The purpose of a qualitative descriptive study is a comprehensive summary, in everyday terms, of specific events experienced by an individual or group of individuals (Lambert & Lambert, 2013). The data were analyzed using data triangulation which consisted of three stages, namely data reduction, data presentation and conclusion drawing.

The research was conducted in two meetings with different indicators. At each meeting students are given formative test questions contained in the Student Worksheet. At the first meeting, the material given was "determining the elements in algebraic form" such as determining terms, variables, coefficients and constants as well as determining similar terms. At the second meeting the material given was "subtraction and subtraction operations on algebraic forms". In this study, the learning materials were given in the form of learning videos contained in the Student Worksheets. After students listen to the video, the next step is for students to work on the questions on the Student Worksheet.

Before being implemented to students, Student Worksheets containing learning videos and test questions are validated first by validators who are experts in their fields. Test the validity of the questionnaire using a modified Likert scale with 4 alternative answers, namely 1 = invalid, 2 = less valid, 3 = valid, 4 = very valid (Hosnan, 2014). Valid data were analyzed using quantitative descriptive methods by calculating the number of scores obtained from the validation results of the Likert scale which refers to Sugiyono in (Hosnan, 2014) with the score category can be seen in Table 1 below.

Table 1. Category interpretation likert scale score

Score	Criteria
4	Very Good
3	Good
2	Pretty Good
1	Not Good

Then the value of each validation criterion is recapitulated divided by the maximum score and multiplied by 100%. The formula for calculating the validity of each criterion is as follows:

$$Validate\ each\ criterion = \frac{total\ score\ for\ each\ criterion}{maximum\ score} \times 100\%$$

The score criteria obtained from the results of the validation calculation according to Suwaldi in (Hosnan, 2014), can be determined in Table 2.

Table 2. Product validity level criteria

Average score (%)	Category
25 - 39,9	Invalid
40 - 54,9	Less Valid
55 - 69,9	Quite Valid
70 - 84,9	Valid
85 - 100	Very Valid

After the Student Worksheet is declared valid by the validator, then the Student Worksheet is implemented for students.

The data collected in this study were student learning outcomes and questionnaires. The instruments used in this data collection were formative test questions and student response questionnaires. The test questions are presented in a web-based interactive Student Worksheet whose purpose is to see how far the achievement of student learning outcomes in algebraic form material. In the Regulation of the Minister of National Education Number 20 of 2007 it is stated that the technique of assessing learning outcomes can be in the form of tests, observations, assignments, and other forms according to the characteristics of the competence and development of students (Munadi, 2015). Questionnaires were given to students to determine the response to the use of web-based interactive Student Worksheets. This student response questionnaire data serves to determine the extent of the ease and difficulty as well as the obstacles felt by students while using web-based interactive Student Worksheets. Student responses are student responses and reactions given during the learning process (Panjaitan & Marlina, 2016).

The data collected were analyzed descriptively quantitatively. As for learning outcomes, it is analyzed by using evaluation analysis techniques to determine learning mastery by analyzing test result data with learning completeness criteria, the percentage of learning outcomes obtained by students is then compared with the KKM (Minimum Completeness Criteria) which has been determined by Purwanto in (Sihombing, 2017). A student is called complete learning if he has achieved a score of 65 percent and above, because the KKM score at that school is 65. Purwanto in (Sihombing, 2017) to calculate learning outcomes by comparing the number of scores obtained by students with the maximum number of scores then multiplied by 100%. While the percentage of complete learning is calculated by comparing the number of students who have completed learning with the total number of students (maximum students) then multiplied by 100%. The score of the criteria for assessing learning outcomes for Class VII mathematics at MTs Daarutholibin refers to Table 3.

Table 3. Criteria for assessment of learning outcomes

Score (%)	Predicate
89 - 100	Very Good
77 - 88	Good
65 - 76	Pretty Good
≤ 64	Not Good

The response questionnaire used in this study consisted of 3 aspects, namely cognitive aspects, affective aspects and conative aspects. According to (Amir, 2017) the response is divided into three parts, namely cognitive, affective, and conative. Cognitive, which is a response that is closely related to one's knowledge of skills and information about something. Affective, which is a response related to emotions, attitudes and judging someone towards something. Conative, which is a response related to real behavior which includes actions or habits. The questionnaire consists of positive and negative questions. The questionnaire used is a closed questionnaire in the form of a Likert scale with 4 rating scales, namely SS (Strongly Agree) worth 4, S (Agree) worth 3, TS (Disagree) is worth 2, and STS (Strongly Disagree) is worth 1. According to Nunung in (Andriani et al., 2021), the steps of analyzing student response data begin by scoring each answer choice using a Likert scale. Student response questionnaire scores refer to Table 4.

Table 4. Student response questionnaire score

Category Student Answers	Score for Statement	
	Positive	Negative
SS	4	1
S	3	2
TS	2	3
STS	1	4

Furthermore, the student response questionnaire was analyzed using quantitative descriptive statistical methods which were calculated in the form of the distribution of scores and percentages of each instrument (Arikunto: 2006). The formula used is as follows:

$$\text{Results} = \frac{\text{Total score obtained}}{\text{Maximum total}} \times 100\%$$

For the average score interpretation results obtained, the authors use the score categorization as according to (Arikunto: 2006). The interpretation table of student response questionnaires can be seen in Table 5.

Table 5. Interpretation of student response questionnaires

Percentage	Criteria
100% - 81.26%	Very Good
81.25% - 62.51%	Good
62.5% - 43.76%	Pretty Good
43.75% - 25%	Not Good

▪ **RESULT AND DISSCUSSION**

Before being given to students, Student Worksheets containing learning videos and test questions are validated first by validators who are experts in their fields. After the Student Worksheet is revised and declared worthy by the validator, the Student Worksheet is given to students. The research was conducted in two meetings with different indicators. At the first meeting the material given was "determining the

elements in algebraic form" such as determining terms, variables, coefficients and constants as well as determining similar terms. At the second meeting the material given was "addition and subtraction operations in algebraic form. In this study, learning materials were given in the form of learning videos contained in Student Worksheets. After students watch the video, the next step is for students to work on the questions on the Student Worksheet.

The formative test at the first meeting was carried out to 34 students who had participated in the material learning to determine the elements of algebraic forms using web-based interactive worksheets. From the acquisition of student learning outcomes scores at the first meeting, it is known that there are 6 interval classes and 4 interval class lengths with a range of 23. Data on student learning outcomes at the first meeting are presented in the bar chart below.

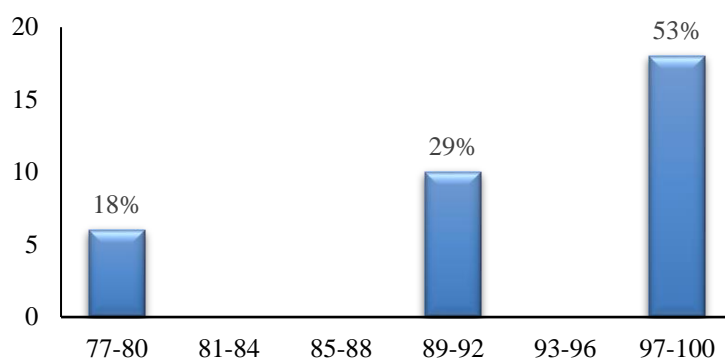


Figure 1. Student learning outcomes at meeting 1

From the data above, it is known that the lowest value is 77 and the highest is 100. With a mean of 93, median of 100, mode of 100 and standard deviation of 8.7. The greatest frequency was in the interval between 97-100 as many as 18 students (53%). Based on the Minimum Completeness Criteria for grade VII mathematics at MTs Daarutholibin is 65, then the learning outcomes of all students at the first meeting have reached the Minimum Completeness Criteria.

Because at the first meeting all students had reached the Minimum Completeness Criteria, the learning at the second meeting continued with the addition and subtraction of algebraic forms. From the acquisition of student learning outcomes scores at the second meeting, it is known that the number of class intervals is 6 and the length of class interval is 8 with a range of 47. The following is the data on student learning outcomes at the second meeting which is presented in a bar chart.

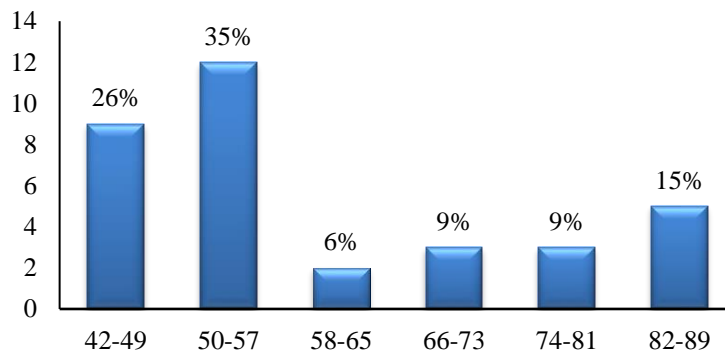


Figure 2. Student learning outcomes at meeting 2

From the data above, it is known that the lowest value is 42 and the highest is 89. With a mean of 59, a median of 53.5, a mode of 42 and a standard deviation of 16.5. The greatest frequency is in the interval between 50-57 as many as 12 students (35%). It can be concluded that students who achieved the Minimum Completeness Criteria at the second meeting were only 11 students or 33%, namely in the 66-73 score range as many as 3 students (9%), in the 74-81 score range as many as 3 students (9%) and in the score 82-89 as many as 5 students (15%). For this reason, it is necessary to follow up on 23 students who have not reached the Minimum Completeness Criteria. The follow-up is in the form of providing remedial either in the form of re-learning with different methods and media, providing special guidance, giving training assignments, or using peer tutors.

From the results of examining the answers of students who did not reach the Minimum Completeness Criteria, there were several difficulties faced by students in solving addition and subtraction operations on algebraic forms, namely the lack of understanding of students in compiling similar terms with positive and negative signs and students' lack of understanding of arithmetic operations. positive and negative. This is in line with research conducted (Nugraha et al., 2019) which states that there are several Factors that cause student errors in working on algebra questions are incorrectly writing operating symbols, forgetting the results of positive and negative sign operations, not being careful and concentrating, forgetting the material that has been taught previously because they do not learn, do not understand the teacher's explanation, are not ready if there is a test, do not understand / misunderstand what is meant by the question, rush to work on the question. (Booth et al., 2017) which reveals the types of misconceptions that occur in algebraic material including: (1) Equations, misconception such as moving, removing, or adding signs to equations, (2) Negative signs, misconception such as moving, removing or adding negative signs, (3) Variables, misconception such as combining variables that do not obey the rules, moving, deleting or adding variables, (4) Fractions, misconception such as adding without equalizing the mention, (5) Operations, misconception occur when students perform addition operations in algebraic form but what is asked in the question is an operation algebraic multiplication. In tune with (Loli et al., 2018) revealed based on a study of the difficulties faced by mathematics teachers and students at the junior high school level, the low understanding of students about arithmetic operations on algebraic forms shows

that there are still many students who find it difficult to distinguish between similar and dissimilar terms, the meaning of coefficients, so they are unable to complete arithmetic operations. algebraic form well. From the problems that arise in the research, it is necessary to have a new strategy in providing understanding to students about arithmetic operations in algebraic form.

To find out the achievement of student learning outcomes at the first and second meetings, the average will be determined. The data on the average student learning outcomes of the first and second meetings are presented in the bar chart below.

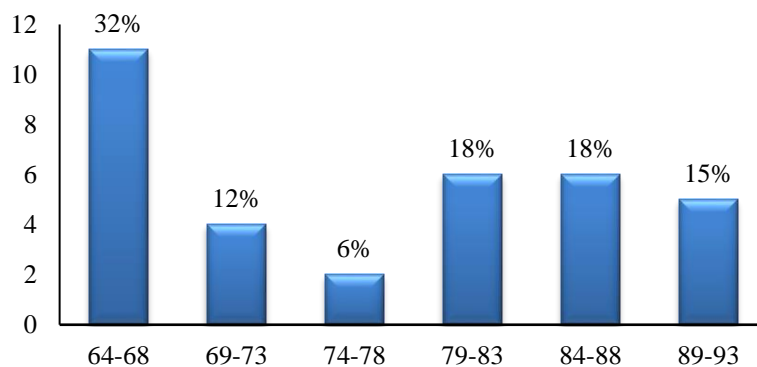


Figure 3. Average student learning outcomes 1st and 2nd meetings

From the data on the average student learning outcomes in the two meetings above, it is known that the lowest average score is 64 and the highest average score is 93. The greatest frequency is in the score interval between 64-68 with 11 students (32%). The data above shows that students who achieved the Minimum Completeness Criteria in two meetings were 28 students (82%) and students who had not reached the Minimum Completeness Criteria were 6 students (18%). It can be concluded that the use of web-based interactive Student Worksheets with a scientific approach to algebraic concepts affects the achievement of student learning outcomes. This is in line with the research results (Diani, 2016) which states that learning physics using a scientific approach assisted by Student Worksheets on the physics learning outcomes of students in class XI SMA Perintis 1 Bandar Lampung has more influence on students' physics learning outcomes compared to those who do not use a scientific approach.

Student responses to the use of web-based interactive Student Worksheets are presented in the table below.

- a. Student responses on cognitive aspects, this relates to one's knowledge, understanding and information about something.

Table 6. Weight of the cognitive indicator questionnaire

Statement	Questionnaire Score Weight			
	SS	S	TS	STS
Web-based Interactive Worksheet is very easy to use	38.2%	61.8%	0%	0%
The language use	20.6%	5.9%	70.6%	2.9%

d in the web-based Interactive Student Worksheet is difficult to understand				
The content of the learning video on the web-based Interactive Student Worksheet is easy to understand	35.3%	58.8%	5.9%	0%
Instructions for filling out questions on the web-based Interactive Student Worksheet are easy to understand	38.2%	47.1%	14.7%	0%
The selection of fonts, font sizes and animations on the web-based Interactive Student Worksheet is right, making it easier for me to follow the learning process	32.4%	55.9%	11.8%	0%
The different types of questions on the web-based Interactive Student Worksheet make it difficult for me to fill them in	20.6%	11.8%	38.2%	29.4%
The study instructions on the web-based Interactive Student Worksheet are not clear and make it difficult for me to use them.	0%	8.8%	44.1%	47.1%
Average score	26,5%	35,7%	26,5%	11,3%

From the results of the average score of the cognitive aspect indicator questionnaire in table 6, it shows that most of the students responding agreed to use web-based interactive Student Worksheets. Both the learning instructions and the question instructions are easy to understand, making it easier for students to fill in the questions. In terms of language, typeface, animation and content of learning videos, it makes it easier for students to follow the learning process. (Khikmiyah, 2021) reveals the online Student Worksheet is a learning tool that contains online and systematic and interesting material and work steps that are used to achieve the learning objectives that have been set. However, there are some students who are still confused in filling out the questions because the types of questions are different, such as matching, grouping, filling in tables and descriptions. This is because students are not used to working on these types of questions in learning mathematics. So that the active role of the teacher as a facilitator is needed to support the needs of students. (Andrianti, 2018) said that the teacher's role as a facilitator is to place students as learning subjects and the teacher's task is to guide and provide stimulus so that students actively express their potential in the learning process. The use of learning media will be more effective if the teacher in the learning process optimizes learning activities in the classroom by using a learning model that is in accordance with the material being studied by students (Yu & Conway, 2012).

- b. Student response on the affective aspect, this related to emotions such as likes or dislikes, attitudes and someone's assessment of something.

Table 7. Affective indicator questionnaire weight

Statement	Questionnaire Score Weight			
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	SS	S	TS	STS
Using a web-based Interactive Student Worksheet makes me enthusiastic about learning mathematics	55.9%	35.3%	5.9%	2.9%
After seeing the web-based Interactive Student Worksheet view I'm not motivated to study it	0%	17.6%	41.2%	41.2%
After using the web-based Interactive Student Worksheet I have no interest in learning math	0%	14.7%	52.9%	32.4%
The content of the learning videos in the web-based Interactive Student Worksheet is not interesting to watch	0%	5.9%	70.6%	23.5%
The display on the web-based Interactive Student Worksheet is interesting to follow	50%	41.2%	8.8%	0%
The content of the learning videos in the web-based Interactive Student Worksheet is interesting to watch	41.2%	50%	2.9%	5.9%
My curiosity about algebra material arose when I listened to learning videos in web-based Interactive Student Worksheets	50%	41.2%	8.8%	0%
Average score	28,2%	29,4%	27,3%	15,1%

From the average score of the affective aspect indicator questionnaire in table 7, most of the students agreed to use web-based interactive Student Worksheets. Students' curiosity about algebraic form material appears when listening to learning videos in web-based interactive Student Worksheets. Because the learning videos in the Student Worksheet use a youtube link, so students can not only watch one learning video given in the Student Worksheet, but can access and choose for themselves which learning videos will be used as learning resources. (Fannie & Rohati, 2014) suggested that Student Worksheets that were made in an interesting and systematic manner could help students to learn more actively independently or in groups. This is expected to increase the activeness and motivation of students in the learning process.

- c. The student's response to the conative aspect is related to real behavior which includes actions or habits.

Table 8. Weight of conative indicator questionnaire

Statement	Questionnaire Score Weight			
	SS	S	TS	STS
Use Student worksheet Web-based interactive makes me actively ask if there is material that I don't understand	47.1%	44.1%	8.8%	0%
This web-based Interactive Student Worksheet helps me answer questions from the teacher	29,4%	52,9%	17,6%	0%

well				
Using web-based Interactive Student Worksheets makes me passively ask if there is material that I don't understand	32,4%	32,4%	29,4%	5,9%
If there are questions from the teacher I just keep quiet	58,8%	38,2%	2,9%	0%
Average score	41,9%	41,9%	14,7%	1,5%

From the results of the average score of the conative aspect indicator questionnaire in table 8, it shows that most students strongly agree and agree to use web-based interactive Student Worksheets. Students actively ask when there is material that has not been understood, however, many students are still passive in answering questions from the teacher. In this case, both teachers and students must play an active role in the learning process. (Adi, 2016) revealed that when teachers and students play an active role in the learning process, it will create fluency and effectiveness in the learning process so as to increase motivation and maximum learning outcomes.

Table 9. Questionnaire recapitulation

No.	Aspect	Percentage	Criteria
1	Cognitive	69,3%	Good
2	Affective	67,6%	Good
3	Conative	81,1%	Good
Average		72,7%	Good

From table 9, it can be seen that the cognitive aspect shows a good response with a percentage of 69.3%, the affective aspect shows a good response with a percentage of 67.6% and the conative aspect shows a good response with a percentage of 81.1%. It can be concluded that students' responses to the use of web-based interactive Student Worksheets showed a good response which was supported by the overall average score of aspects in the questionnaire, which was 72.7%. This is in line with research (Yusuf, 2010) which revealed that the response to the use of computer-based Interactive Student Worksheets in mathematics learning for students of class XI IPA Plus-02 semester 2 of the 2008/2009 academic year of SMA Muhammadiyah 1 Palembang was good.

▪ **CONCLUSION**

The results showed that the achievement of student learning outcomes using interactive web-based Student Worksheets with a scientific approach that achieved the Minimum Completeness Criteria. Student responses to the use of web-based interactive Student Worksheets with a scientific approach showed a good response.

The use of interactive web-based Student Worksheets can be very effective in improving student learning outcomes if the lesson plans, work steps and giving the types of questions on the Student Worksheets are made appropriately and systematically. Besides being able to improve learning achievement, it turns out that web-based interactive Student Worksheets can also motivate students and make students

more active in the learning process. This is indicated by the large percentage of the average score on the affective and conative aspects.

The weakness in this study is that because students are new to web-based worksheets, at the time of the study more time was spent guiding students using web-based Student Worksheets. Before the media was given to students, there should be a special meeting between researchers and students to discuss how to use the web-based Student Worksheet media.

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