

# Development of Website-Based Learning to Increase Learning Interest in IPA Lessons in Class IV Students of SDN Klender 04 Jakarta Timur

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**Abstract:-** This study aims to increase students' interest in learning by developing web-based learning for fourth-grade students at SDN Klender 04 East Jakarta. In addition, website-based learning was developed to create interesting learning so that student interest in learning during a pandemic like this can increase. This research is research and development which consists of 10 steps of activities. The subjects of this research were 29 students consisting of 3 students for individual trials, 9 students for small group trials, and 29 students for field trials. The instruments used in data collection were media expert validation sheets, material experts, validation by high school teachers, and response questionnaires for students. Analysis of the data used is descriptive statistical analysis. the results of the media expert's validation showed an average score of 4.6 which was included in the very good criteria. The validation results from material experts showed a score of 4.65 in very good criteria. The increase in students' interest in learning from 51.5% to 81.1%, an increase of 29.6% stated that this development product was appropriate to be used as a learning resource that could increase students' interest in learning.

**Keywords:-** Web-Based Learning, Science, Website.

## I. INTRODUCTION

Learning science in elementary schools is known as learning natural sciences (IPA). The concept of science in elementary schools is a concept that is still integrated because it has not been separated separately, such as chemistry, biology, and physics [1]. Science education in schools is expected to be a vehicle for students to learn about themselves and the natural environment and can be further developed in applying it in everyday life [2]. Activities in science learning will get direct experience through simple observations, discussions, and investigations. In the current state of the pandemic, learning is carried out remotely.

During a pandemic like this, teachers and students need learning media that can display audio and visual objects to students. Moreover, learning is currently carried out remotely because at this time it does not allow face-to-face learning at point schools [3]. Students learn from home and teachers prepare all learning tools. Improving the quality of education, of course, cannot be separated from the learning process. The learning process is an essential activity in education. Updates need to be made to improve the quality of education, starting

with the learning process. The learning process is essentially a communication process in which there are various activities, one of which is the delivery of subject matter [4].

Learning development is very much needed, namely learning that provokes students to actively learn and attracts students to be enthusiastic in learning. The combination of media and information based on precise specifications can be said to be feasible to use [5]. Along with the development of technology, the limitations of print-based learning media can be minimized, one of which is by utilizing technology, namely interactive learning media. The learning model is a series of teaching and learning processes from beginning to end, which involves how the activities of teachers and students, in certain learning designs that are assisted by special teaching materials, as well as how the interactions between teachers and students of teaching materials occur [6].

Researches on the development of website-based learning in Indonesia for the advancement of education include Development of Web-Based Learning Models for Mathematics Lessons [7], Development of Learning Media Using Sparkol Videoscribe in Increasing Student Interest in Science Subjects [8], The Role of Information and Communication Technology ( ICT ) in Higher Education for the 21st Century [9], Implementation of Audio Visual Science Learning Tools to Increase Students' Motivation and Interest in Learning [10], Teaching in Web Base Distance Learning [11]. These various studies were conducted at the secondary school level and have not yet reached an assessment. These studies were conducted on direct and not virtual learning. In this research, the renewable one is where the learning model is packaged online starting from attendance, the beginning of learning to the final stage of learning is packaged in a website whose aim is to make it easier for students and increase student interest in learning with cash on the website.

The web has certain characteristics that must be considered so that the web is appropriate and good for use as a learning medium. Herman Dwi Surjono argues that a good web must meet several criteria including (1) Consistency of layout, navigation, text, and background images. (2) page indicators. (3) the text must be concise/compact, bullet points, type of writing, contrasting colors, underlines only for link addresses. (4) images must be relevant to the material, image descriptions, resolutions, and proportional sizes. (5) audio, the animation must be meaningful, in harmony with the material, and simple [12].

Davey Young said in his research students revealed that they felt online learning was more flexible and comfortable than traditional classroom teaching. The research focused on identifying motivational factors to stimulate students by using web-based learning. Suggestions are made to increase the frequency of using web-based learning which in turn will increase the level of demands from both teaching and learning. Effectiveness is achieved by higher utilization, the introduction of processes, and optimal investment in training time and equipment [13].

Web-based teaching materials are teaching materials that are prepared, run, and utilized with web media. This type of teaching material is often also referred to as internet-based teaching materials or online teaching materials. Three main characteristics constitute the great potential of web-based teaching materials, namely: (a) presenting multimedia, (b) storing, processing, and presenting information, (c) hyperlinks. Because of its online nature, this web-based teaching material has special characteristics according to the characteristics of the web itself. One of the prominent characteristics is the presence of hyperlinks. A hyperlink allows a subject to link to another subject without any physical and geographical restrictions, as long as it is still available on the web. With the hyperlink facility, learning resources become very rich. Search engines can help to find subjects that can be used as links [14]. Physically the portal can be assumed as a gate or entrance to go to a place. As for the various definitions that exist, a portal, in general, can be interpreted as a website that is the entrance to another site on the internet. A portal has advantages, which are the main differences from an ordinary web. These advantages include: (1) easy, web-based portal administration only requires minimal computer experience to manage the contents of a web portal. (2) flexible layout settings, changes in appearance, web size without having to change the entire existing page. (3) interactive content, web portal visitors can submit comments, articles, announcements, and weblinks. (4) pages that can import or export news headlines from other web portals. (5) additional pages for information, on the main page visitors can only see part (synopsis) of the news or information. To see more, visitors simply click on the link. (6) the existence of a survey or poll that provides a quick view, namely the display of survey results can be seen directly. (7) facility to upload or download files. (8) the existence of multilingual facilities to allow visitors to adapt to the language of their respective countries.

## II. METHOD

### A. Research Design

This research is a Research and Development (R&D) research. Borg and Gall (1983: p.772) explain that "educational research and development (R&D) is a process used to develop and validate educational production". Research and development is a process used to develop or validate products used in learning. The process of designing, developing, and evaluating a learning web requires a development model that is appropriate to the conditions in which the product will be used based on the results of a needs analysis. The development model in this study aims to develop

and validate products from the learning aspect, material to create fun mathematics learning.

### B. Research Time and Place

This research was conducted at SD Negeri Klender 04, East Jakarta. The research was carried out from July to August 2021.

### C. Research Subject

The subject of this research consisted of 29 students. Individual trial phase with three students Nine students in the small group trial and two recovered nine students for the field trial.

### D. Procedure

The development procedure in this study was adapted from the methods of Borg and Gall (1983, pp. 772-887). The ten steps of development according to Borg & Gall (1983, pp. 775-776) are: (1) conducting preliminary research and gathering information utilizing literature review, observation, and needs analysis, (2) defining skills, formulation of objectives, determination of learning sequences, and limited feasibility tests, (3) development of initial product forms by mapping competency standards and basic competencies, drafting, and storyboarding, (4) conducting preliminary field testing, (5) revision of product from preliminary field testing results, (6) main field testing, (7) product revision based on main field testing results, (8) operational field testing, (9) final product revision based on main field testing, and (10) domination and implementation product.

### E. Data, Instruments, and Data Collection Techniques

Data, Instruments, and Data Collection Techniques The data in this study were in the form of validation data from media experts, material experts, and practitioners, student response sheets data in learning using website-based learning. Qualitative data in the form of responses to aspects of learning using e-learning from various experts and practitioners. This qualitative data is scored (scoring) to be processed with statistics. In this development research, two types of data collection methods were used, these methods include:

#### 1) Questionnaire

This study used an open questionnaire and a closed questionnaire to obtain data about the appearance and material in the development results. In addition, it also uses a checklist questionnaire to obtain student responses to this web-based learning.

#### 2) Interview

The interview aims to obtain information about the characteristics of the objectives, competency standards in mathematics subjects, and what materials are urgently needed to be developed into learning multimedia. In addition, this interview also aims to identify the needs of students in learning natural sciences.

#### 3) Instrument

The research instrument went through the testing phase, namely homogeneity test, normality test, reliability test, and difference test.

#### 4) Data analysis technique

To see the results of a study, data analysis is needed, therefore data analysis techniques are very important activities in a study. The data obtained in the trial activity is in the form of qualitative data. Qualitative data in the form of criticism and suggestions from media experts, materials, and practitioners. The data is used as a guide for product revisions, as well as obtaining product feasibility.

Data analysis in this development research was conducted to obtain valid, practical, and efficient website-based learning. The step of analyzing the score data from the validation results is in the form of qualitative data and then converted into quantitative data. Data in the form of expert response scores, and student response scores through questionnaires were converted into five-scale interval data. Meanwhile, to obtain the average score of the assessment of the product developed using the following formula:

$$\bar{x} = \frac{\sum x}{n}$$

Information:

$\bar{x}$  : average score

$x$  : total score

$n$  : number of respondents

Based on this formula, to convert quantitative data into qualitative, the guidelines used are as follows: Ideal maximum score = 5 Ideal minimum score = 1.

The component of the web-based science learning product developed is said to be feasible, if at least the level of quality achieved is in a good enough category. Analysis to determine the level of product effectiveness in creating fun learning using data from student responses and observations of student activities. The student response score is then a percentage with a minimum criterion of 75%, so website-based learning products can be said to be effective in increasing student interest in learning.

### III. RESULT AND DISCUSSION

Web-based learning for class IV science subjects was developed based on a needs analysis. Information was obtained by literature study, observation, and interviews with teachers, parents, and students. The data obtained in this activity are: (1) based on the results of the Pustaka study on distance learning during a pandemic that affects students' interest in learning. (2) problems faced by students and parents during distance learning. (3) the solution expected by parents and teachers so that student's interest in learning can increase. (4) from the teacher's point of view, teachers can be helped to correct learning assessments. The development of the initial product of science learning in class IV is web-based with the development of the media. The steps in the development of the media include (1) collecting science material for grade IV SD, (2) product planning, (3) development of web-based learning products, (4) initial product web applications, (5) validation by material experts and media experts, (6) revision, (7) Validation by high-grade teachers, (8) Trial on fourth-grade elementary school students, (9) Product Improvement, (10) Final Product in the form of a web application.

The web-based learning process is a standard demand for the learning process that has not been implemented optimally. Based on the observation data and interviews, the researchers developed web-based learning of science subjects in the form of an e-learning portal by using a website as an alternative solution to science learning problems in schools and to increase student learning requests at school.

The next step is to collect resources and references that can be used in the process of developing web-based science learning. References and URLs that can be used as references for the development of science content or materials, can be in the form of text, images, videos, or animations. Sources are obtained from books, journals, and the internet. After the sources were collected, discussions were held with peer teachers about the content being developed.

The e-learning portal that has been built is identified with the domain address: <http://www.ipaituasik.com>. front web theme display profile as shown in the following figure 1.



Fig. 1. Web Home Theme Display

Science teaching materials uploaded to the portal are displayed in the form of subject matter text. In addition, other materials are available in the form of learning video links that are linked to other URLs. These materials can be studied without having to be downloaded first.

The development of science teaching materials is presented in a chapter-by-chapter format. Students can access materials anywhere and anytime via: <http://www.ipaituasik.com>.

The facilities available on the website in addition to being able to access the material, students can work on practice questions in each chapter, the value is immediately visible after students work on these questions which is very helpful for teachers in terms of assessment. For the validity of the instrument, the researcher tested the validity of the instrument including the validity test and the reliability test. Furthermore, the researchers conducted a prerequisite analysis test. The calculation of the prerequisite test for this analysis includes the normality test, homogeneity test, and the average difference test. Material expert validation on the development was carried out by Drs. AR Supriatna, M.Pd, a science lecturer at Elementary School Teacher Education, State University of Jakarta. Validation is carried out to obtain information that

will be used to improve and improve the quality of science learning materials for grade IV elementary schools. Validation

consists of several indicators which can be seen in the following table 1.

TABLE I. VALIDATION RESULTS BY MATERIAL EXPERTS

No	Aspect	Average Score	Percentage	Criteria
1	Matter	4.8	96%	Very good
2	Language on Material	4.5	90%	Good
3	Understanding	4.3	86%	Good
4	Material Suitability	5	100%	Very good
The average number of aspects		4.65	93%	Very good

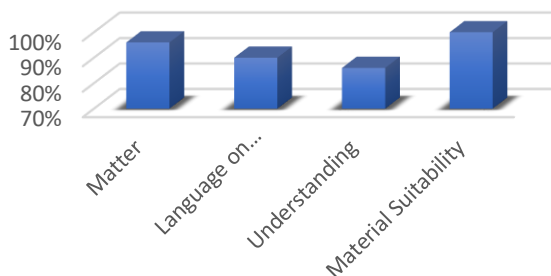


Fig. 2. Material Expert Validation Results Diagram

The overall score is 51 with an average of 4.65 with very good criteria. Determination of product quality assessment

criteria from the material aspect of the material expert refers to the table of converting qualitative data to quantitative data.

Furthermore, based on the conversion results table, all five-scale qualitative data were converted into qualitative data to determine the final criteria for each aspect. The average obtained is 18.6 if it is converted in a four-scale table, it is obtained an average of 4.65 with very good criteria.

The media expert validation was carried out by Dr. Ika Lestari, S.Pd, M.Si, lecturer at the Faculty of Education, State University of Jakarta. Media validation consists of several indicators. The results of media expert validation are in the form of an assessment score on media aspects which can be seen in table 2.

TABLE II. SCORE VALIDATION RESULTS FROM MEDIA EXPERTS

No	Aspect	Average Score	Percentage	Criteria
1.	Content	5	100%	Very good
2.	Language Eligibility	4	80%	Good
3.	Graphic Eligibility	4.5	90%	Good
4	Illustration	5	100%	Very good
The average number of aspects		4.625	92.5%	Very good

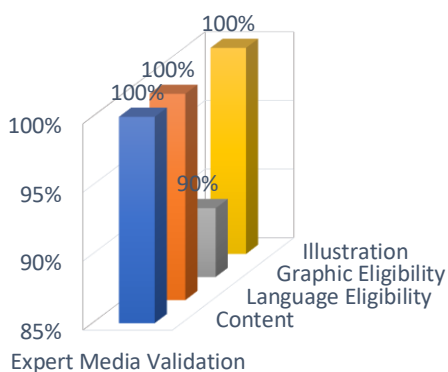


Fig. 3. Media Expert Validation Result Diagram

The data obtained is the total score of 49 which consists of 10 items. The average score is 4.9. Based on these results, the product quality criteria from the media aspect are very good. The suggestions from media experts are as follows: (a) add music/audio at the beginning of the website display, (b) add captions to each image.

Validation by the classroom teacher was carried out by a high-grade teacher at the school, namely Nia Kurniasari, S.Pd with assessment aspects covering material, language, and suitability. The validation results can be seen in the following table 3.

TABLE III. VALIDATION BY THE CLASSROOM TEACHER

No	Aspect	Average Score	Percentage	Criteria
1	Content	4.8	96%	Very good
2	Language	4.5	90%	Good
3	Suitability	4	80%	Good
The average number of aspects		4.43	88,6%	Good



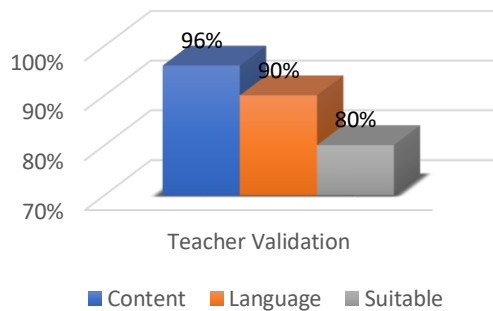


Fig. 4. Diagram hasil Validasi oleh Guru Kelas

The data obtained with a total of 36 with a total assessment of 8 items obtained an average score of 4.5 with good criteria.

Individual trials were conducted by three fourth-grade elementary school students. Selected students are students who are considered to have different abilities. Each student represents a group of students with high ability, medium ability, and low ability groups.

The procedures carried out in the trial are as follows: (1) students receive an explanation of the web that will be used, (2) students operate ipaituasik.com, (3) students open and study science material on the web, (4) students work on Practice questions, (5) after completion, students fill out a questionnaire that is distributed online. In this trial, students were asked to learn the material from revised web-based learning media. Students are asked to observe and pay attention to the appearance of the media and then use the results of the observations as a basis for filling out the questionnaire given.

After going through the individual trial stage, the researcher conducted a small group trial. The data obtained

from the small group trial is then used as input for revising or improving the product to be developed before being carried out in field trials.

The field trial was conducted by 29 fourth-grade students at SDN Klender 04 East Jakarta. Students are a group with heterogeneous abilities. The trial procedure is no different from individual and small group trials, namely as follows: (1) students receive an explanation about the web that will be used, (2) students operate ipaituasik.com, (3) students open and study science material on the web. , (4) students work on practice questions, (5) after completion, students fill out a questionnaire that is distributed online.

The results of observations during the implementation of field trials, students seemed so enthusiastic about using the developed web-based science learning. The summary of student comments on the field trial is as follows: (1) ipaituasik.com is quite interesting, students' interest in learning is also seen after learning to use this website, (2) students always ask when it is time to study using this website, (3) students are enthusiastic about working on this website. practice questions by asking questions Next exercise.

A. Analisis Uji Validitas Instrumen

The results of the validity test are from testing the validity of the questionnaire on the variable of student interest in learning from 20 statement items that have been filled out by 58 students. The R table on the validity test is 0.367. From the results of the calculation of validity, it can be seen that  $R_{count} > R_{table}$  so that all items of the student's interest in the learning questionnaire are declared valid.

Furthermore, the researchers conducted a reliability test based on decision making, namely with an alpha of 0.70. The results of the reliability test in this test can be seen in the following table 4.

TABLE IV. RELIABILITY TEST RESULTS

Class	Reference Value	Alfa Cronbach Value	Conclusion
Early Experiment Class	0.7	0.796	Reliable
Early Control Class	0.7	0.883	Reliable
Final Experiment Class	0.7	0.939	Reliable
Final Control Class	0.7	0.935	Reliable

Based on the table above that Cronbach's alpha is all above 0.70, it can be concluded that the statements on the student's learning interest questionnaire can all be trusted or reliable.

B. Analisis Prerequisite Test Analysis

1) Normality test

Normality test with decision-making criteria in this research uses the concept that if  $L_{count} < L_{table}$  then the data is normally distributed, otherwise if  $L_{count} > L_{table}$  then the data is not normally distributed. The normality test of the student learning interest questionnaire data both in the experimental class and in the control class can be seen in the following table.

TABLE V. RESULTS OF THE NORMALITY TEST OF EARLY LEARNING INTEREST

Class	N	$L_{table}$	$L_{Count}$	$\alpha$	Description
Experiment	29	0.161	0.06945	0.05	Normal
Control	29	0.161	0.15462	0.05	Normal

Based on the table above, the experimental class obtained  $L_h = 0.06945$  in the control class  $L_h = 0.15462$  while  $L_t = 0.161$  ( $\alpha = 0.05$ ), it can be concluded that the questionnaire data came from a normally distributed population.

TABLE VI. RESULTS OF THE FINAL LEARNING INTEREST NORMALITY TEST

Class	N	L <sub>table</sub>	L <sub>Count</sub>	α	Description
Experiment	29	0.161	0.1531	0.05	Normal
Control	29	0.161	0.1337	0.05	Normal

Based on the table above, the experimental class obtained  $L_h = 0.1531$  in the control class  $L_h = 0.1337$  while  $L_t = 0.161$  ( $\alpha = 0.05$ ), it can be concluded that the questionnaire data came from a normally distributed population.

2) Homogeneity Test

The researcher draws up a pair of test hypotheses, namely  $H_0$ , namely Variance 1 = Variance 2, and then  $H_1$  which is Variance 1 Variance 2. Next, the researcher determines the real level with  $\alpha = 0.05$  then the researcher determines the rejection criteria, namely rejecting  $H_0$  if  $F_{count} > F_{table}$  or  $F_{count} < -F_{table}$ . The results of the homogeneity test analysis of students' interest in learning are presented in the following table.

TABLE VII. RESULTS OF HOMOGENEITY TEST OF EARLY STUDENTS' LEARNING INTEREST

Class	F <sub>Table</sub>	F <sub>Count</sub>	α	Description
Experiment and control class	1.88	1.06	0.05	Homogen

TABLE IX. EXPERIMENTAL CLASS AVERAGE DIFFERENCE TEST RESULTS

Class	T <sub>Count</sub>	T <sub>Table</sub>	Percentage Point Distribution with Pr=27	Description
Experiment	1.6725	1.3137	0.10 0.20	Different
	2.0032	1.7033	0.05 0.10	Different

TABLE X. CONTROL CLASS AVERAGE DIFFERENCE TEST RESULTS

Class	T <sub>Count</sub>	T <sub>Table</sub>	Percentage Point Distribution with Pr=27	Description
Control	1.6725	1.3137	0.10 0.20	Berbeda
	2.0032	1.7033	0.05 0.10	Berbeda

C. Data Analysis of Material Expert Validation Results

The data obtained from the validation results of material experts are used to make improvements to the learning materials developed in ipaituasik.com. Assessment on the material aspect includes 5 indicators, the average score of the quality of learning materials is 4.65 with very good criteria. This shows that the product developed is feasible.

D. Media Expert Validation Data Analysis

The assessment given by media experts on the display aspect includes 5 indicators. The total score is 49 with 10 assessment items. The average quality score on the media is 4.9 with very good criteria. In addition, improvements were also made based on suggestions given by the validator.

Based on the table, it is known that the F Count = 1.06 and the  $F_{Table} = 1.88$ , with the rules if  $F_{Count} < F_{Table}$  is  $1.06 < 1.88$ , it can be concluded that the student's interest in learning at the beginning has the same data variance. or homogeneous.

TABLE VIII. RESULTS OF HOMOGENEITY TEST OF FINAL STUDENT INTERESTS

Class	F <sub>Table</sub>	F <sub>Count</sub>	α	Description
Experiment and control class	1.88	1.07	0.05	Homogen

Based on the table, it is known that the  $F_{Count} = 1.07$  and the  $F_{Table} = 1.88$ , with the rules that if  $F_{Count} < F_{Table}$  is  $1.07 < 1.88$ , it can be concluded that students' interest in learning at the beginning has the same data variance. or homogeneous.

3) Average Difference Test

The average difference test in this study uses the t-Test: Two-Sample Assuming Equal Variances with the help of Microsoft Excel 2019. The results of the average difference test of students' interest in learning at the beginning of the two classes are presented in the following table.

E. Data Analysis of Validation Results by Class Teachers

Furthermore, the assessment of the validation by the classroom teacher with an assessment of three aspects, namely material, language, and conformity with 8 assessment items. The total score obtained is 38 with an average of 4.5 so that it gets good criteria.

F. Data Analysis of Individual Trial Results

Based on the results of individual trials that have been developed, it is good. The scores given to students in individual trials can be seen in the following figure 5.

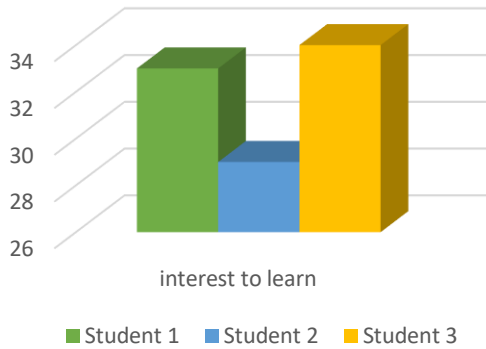


Fig. 5. Diagram skor tanggapan siswa pada uji coba perorangan

The total score obtained by the three students is 96 with a maximum score of 120 with the acquisition of 80% of students giving a positive response to this web-based learning. Based on these scores, it can be said that students' responses are good for the product being developed. However, there are still some things that need to be improved based on comments and opinions from the results of individual trials.

**G. Data Analysis of Small Group Trial Results**

Small group trials were conducted to determine the quality of the learning media developed. From the results of these trials, it can be seen whether the quality of the products being developed is really good or still needs improvement. More trial subjects than individual trials are expected to collect more accurate data. The scores given by students can be seen in the following figure 6.

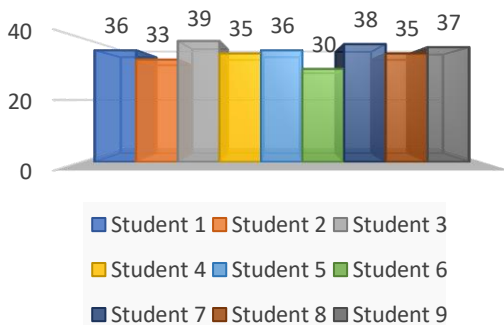


Fig. 6. Diagram of student response scores in limited trials

From the results of the assessment, the average score is 356, or 98% of students agree that this product is feasible. Based on these scores, it can be said that the student's responses to the products developed were good.

**H. Data Analysis of Field Trial Results**

Based on the results of field trials, then an analysis is carried out to determine the quality of the product being developed. By doing an analysis, it can be seen the advantages and disadvantages of the learning media that can be used as the basis for making revisions. The scores given by students in the field trials can be seen in the following figure 7.

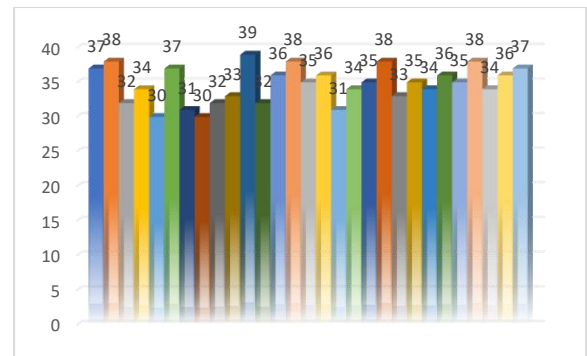


Fig. 7. Diagram of student response scores on field trials

The results of this third trial observation obtained 1,006 with a maximum score of 1,160 with the result that 86.72% responded positively to website-based learning. With the results of the three trials that have been carried out, the researchers continue the research by using website-based learning in further learning.

This shows that the developed product can attract students' attention and can increase student interest in learning. This is indicated by the amount of the percentage, which is more than 75% of the students gave a positive response to the product. Research results are presented in the form of graphs, tables, or descriptive. Analyze and interpret these results before the discussion.

**IV. CONCLUSION**

Appropriate website-based learning is a product developed under media development procedures. In addition, product development goes through the evaluation and validation stages. This is evident from the results of the assessment of material experts and media experts, the results of which are that this product is suitable to be used to increase student interest in learning science in grade IV elementary school. Web-based science learning that can create fun learning and increase student interest in learning during a pandemic like this is the result of a development that received positive responses from students with a score of more than 70%. Evidence that this development product has an impact on increasing student interest in learning is getting an increase of 29.61% Based on the results of the research, it can be suggested the following things: (1) wide utilization, the developed product can be socialized through the Teacher Working Group (KKG). (2) the need for further research by utilizing products that have been developed.

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