

MAKING STUDENT WORKSHEET INTEGRATED SCIENTIFIC LITERACY FOR PHYSICS PRACTICUM KITS ON DYNAMIC FLUID MATERIAL

Allin Wel Ningsi¹, Hidayati^{1*}, Amali Putra¹, Renol Afrizon¹

¹ Department of Physics, Universitas Negeri Padang, Jl. Prof. Dr. Hamka Air Tawar Padang 25131, Indonesia
Corresponding author. Email: hidayati@fmipa.unp.ac.id

ABSTRACT

The use of school facilities and infrastructure has not been used optimally. One of them is rarely using practicum KIT because of the teacher's lack of time to develop worksheets. Schools still apply literacy in reading, writing and numeracy and have not implemented scientific literacy. This application can be done with scientific literacy integrated worksheets for the use of physics practical KIT on dynamic fluid material which is considered in the validity test and practicality. The type of research is research and development (R&D) using the Borg & Gall model in Sugiyono's book. The initial data collection instruments used were questionnaires and interviews conducted by teachers and students. The validation test was carried out by 3 experts, namely Physics lecturers Faculty of Mathematics and Natural Sciences, Padang State University and the practicality test was carried out by 2 Physics teachers and 36 students of class XI science 3. The analytical technique used was descriptive analysis technique. The results of this study obtained a product in the form of student worksheets integrated with scientific literacy for the use of physics practicum KIT on dynamic fluid material. based on product data analysis, a validity value of 0.85 was obtained in the very valid category and the practicality values of teachers and students were 87% and 90.25% respectively in the very practical category. Thus it shows that the worksheet is integrated with scientific literacy using the physics practicum KIT on dynamic fluid material that is feasible to use in the physics learning process.

Keywords: Student Worksheet; Scientific Literacy; KIT Practicum; Dynamic Fluid



Physics Learning and Education is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

I. INTRODUCTION

Education performs an crucial position in enhancing the pleasant of human resources. Improvement of human resources can be done by increasing the quality of education. The government's efforts to improve the quality of education by improving educational facilities and infrastructure as well as the curriculum. One of them uses learning resources that can support the learning process in the form of teaching materials.

Teaching materials are the role of urgent in the learning process. Teaching materials can be part of the learning content that the teacher will convey to students. The existence of teaching materials can help teachers to optimize learning outcomes. Teaching materials serve as a means to achieve learning goals in accordance with the standards of competence and competence of basic. The provision of teaching materials in schools must be in accordance with the applied learning curriculum. The teaching materials used can be in the form of worksheet, books, handouts, modules and so on.

Worksheet is a printed teaching material that contains a summary of the material, instructions for working on tasks that refer to basic competencies. The types of worksheet can be both experimental worksheet and non-experimental worksheet. Worksheet experiential is an worksheet that contains instructions for the use of tools and materials as well as guidelines for conducting an experiment. Non-experimental worksheet can contain text that is used to discuss understanding the concept of physics. worksheet can be used in the learning process as a basic activity that can help students in understanding physics concepts. The use of worksheet in the learning process can stimulate interactive students to be more active so that it is easy to achieve learning objectives.

Another use of worksheet in the learning process is as a guide for students in conducting research, as a discussion sheet and so on. In using this worksheet, students are required to think critically in finding and understanding existing problems so that students can understand concepts based on their experiences. The worksheet presented can be a guide for conducting experiments in the learning process so that students can understand the concepts of physics. In addition, the developed worksheet requires the creativity of the teacher. One of the things that teachers can develop is that worksheet practicum uses the practicum kit provided in schools.

Practicum is a learning activity that requires students to make observations, experiments and test a concept or principle of the subject matter that will be carried out outside or inside the laboratory. Practicum activities require tools and materials for experiments. One of the tools and materials that can be used during practicum is the practicum KIT. KIT stands for Integrated Instrument Component. Practicum KIT is a KIT that is used as a learning medium that can help students understand physics concepts. Practicum KIT needs to be done to make it easier for students to understand physics material and be able to develop critical thinking skills [1]. By carrying out practicum activities using practicum kits, it can increase students' interest in learning and students' critical thinking skills so as to improve student learning outcomes. The practicum KIT demonstrated in the learning process can understand the symptoms or process of an event that students observe directly. In the learning process that is directly observed, it is hoped that students will find it easier to understand physics learning materials. With this practicum method, students can improve their science process skills which have an impact on improving student learning outcomes. Efforts to improve science process skills can also be done by applying scientific literacy.

Scientific literacy is one of the abilities in applying scientific knowledge in everyday life. Literacy has numerous classes of "The maximum important literacy categories are studying, writing and numeracy literacy, medical literacy, technological literacy, monetary literacy, records literacy, visual literacy, ulricular literacy and international recognition" [2]. Scientific literacy consists of the concept of literacy, the process of literacy and the scientific context [3]. Scientific literacy can make students understand the phenomena and symptoms that occur in nature using scientific concepts and scientific processes that have been studied. This can arouse student curiosity so that students can ask questions, find and conclude problems based on the experiences that have been done by the students themselves. This literacy can be a support for the implementation of the 2013 curriculum which requires students to read books, both textbooks and general knowledge books.

The efforts made by the government are expected to improve student competence. However, the reality in the environment has not been in accordance with the expected conditions. This can be known based on the results of preliminary studies in the form of distributing questionnaires and interviews to class XI sciences students and physics teachers.

The results of the questionnaire that have been distributed obtained 63.6% of students have difficulty adapting physics material, 62.3% of students take a long time to master physics material so that students' desire to learn is still low. This is because students still use bold books that are not attractive so that students feel bored and take a long time to master physics material, students also think physics is difficult because the way students learn is still applying literacy, and numeracy. So students don't understand the concept of physics. 70.1% of students easily understand physics material using worksheet, 89.6% of students enjoy carrying out practicum in the laboratory, 90.9% of students easily understand physics material when doing practicum, 75.3% of students do practicum using worksheet as a learning instruction. With practicum activities accompanied by worksheet, students find it easy to understand physics material because practicum activities can hone students' creativity and understanding directly so that students can easily understand physics concepts.

Results questionnaire for physics teachers obtained by teachers not always carrying out basic competencies 4 practicum in the laboratory. In the implementation of practicum, teachers use simple practicum worksheet made by themselves as assessment material. The worksheet created already has a practicum purpose according to student competence so that the presentation given by the teacher is more directed. The available practicum worksheet has not been integrated with scientific literacy. This can trigger misconceptions in students and loss of information received by students if students in the classroom have weaknesses in literacy so that students find it difficult to master concepts, scientific processes and scientific properties. Teachers try to use worksheet according to the demands of the 2013 Curriculum which prioritizes scientific literacy but teachers have difficulty in compiling and developing worksheet due to the lack of time provided in making worksheet. The school has a complete practicum KIT in the form of mechanical practicum KIT, optical wave KIT, magnetic electric KIT, hydrostatic and heat KIT. However, teachers have not utilized all practicum kits, as can be seen from some practicum KITS that are still sealed in school laboratories and the worksheet used do not have guidelines for the use of practicum kits. One of the materials that has not been practised by teachers is dynamic fluid material can be seen from the new practicum KIT and worksheet guidelines for the use of practicum KIT which is not yet available while dynamic fluid material is very close in everyday life.

The initial study showed that there were some problems that did not match the desired expectations. One solution to this problem can be overcome with integrated scientific literacy worksheet for the use of practicum KIT so that an effective learning process is carried out and can improve student competence. Thus students learn with a pleasant atmosphere and use scientific knowledge, so that students can apply it in everyday life. Based on the background that has been revealed, researchers are interested in making an integrated worksheet of scientific literacy for the use of physics practicum KIT, worksheet which will be made to contain dynamic fluid matter. Therefore, the title of this study is "Making Integrated worksheet for Scientific Literacy for the Use of Practicum KIT in Dynamic Fluid Materials".

II. METHOD

This type of research is *Research and Development* (R&D) using the Borg and Gall model in Sugiyono's book. In making integrated student worksheets of scientific literacy using the components of this practicum integrated instrument researchers use six of the ten stages of the *Research and Development* method, namely: (1) Potential and problems, (2) Data collection, (3) Product design, (4) Design validation, (5) Design revision, (6) Product review.

The results of the scientific literacy integrated student worksheet for the use of integrated instrument components that have been made will be tested for validity by 3 experts, namely physics lecturers Faculty of Mathematics and Natural Sciences, Padang State University. The validity test results data obtained analyzed with Aiken's Index (V) are formulated as follows:

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

$$s = r - l_0$$

Information:

V = rater deal index

l_0 = low validity assessment number (in this case =1)

c = highest validity rating number (in this case =5)

r = number given by an appraiser

n = number of raters

After obtaining the rater agreement index, the category of the index value is decided. The results of category decisions based on Indeks Aiken's V are as shown in table 1 below.

Table 1. Decisions Based on Aiken's Index

| Intervals | Category |
|--------------------|--------------|
| ≤ 0.4 | Less |
| $0.4 < V \leq 0.8$ | Valid |
| $0.8 < V$ | Highly valid |

(source: Ref [4])

Furthermore, researchers conduct practicality tests on worksheet that have been validated by experts. The practicality test of the integrated Student Worksheet of scientific literacy is seen from the result sheet of responses of physics teachers and students. The weight of the assessment is carried out based on a likert scale. After the results of the teacher's and student responses were obtained, the researcher analyzed practicality by calculating the total score obtained, divided by the maximum total score, multiplied by 100%. After the analysis was carried out, the results were obtained in the form of a percentage of quantitative data with scoring guidelines in Table 2.

Table 2. Practicality Criteria for the Use of Products.

| Percentage (%) | Criterion |
|----------------|-----------------|
| 0-20 | Impractical |
| 21-40 | Less Practical |
| 41-60 | Quite Practical |
| 61-80 | Practical |
| 81-100 | Very Practical |

(Source: Ref [5])

III. RESULTS AND DISCUSSION

Results

Results this research is an integrated worksheet of scientific literacy for the use of physics practicum KIT in dynamic fluid materials. The worksheet structure made in accordance with the Ministry of National Education 2008 with the design that has been made consists of *covers*, study instructions, competencies to be achieved, supporting information tasks and work steps and assessments. The learning step in worksheet is made based on steps on scientific literacy consisting of a scientific context, a scientific process, and scientific concepts. The worksheet created contains the use of physics practicum KIT. The following is part of the integrated worksheet of scientific literacy for the use of practicum KIT that has been designed:



Figure 1. Student Worksheet Cover

Study that has been carried out obtained two research results, namely the results of validation by experts and practicality by teachers and students to integrated scientific literacy worksheet for the use of physics practicum KIT in dynamic fluid materials. The following is an explanation of the research results.

The results of the validation of integrated scientific literacy worksheet for the use of physics practicum KIT were obtained from validation instruments by three experts in physics lecturers of Faculty Mathematics and Natural Sciences, Padang State University. The validation results obtained are used as guidelines for revising worksheet and determining the feasibility of worksheet that have been made. The scientific literacy integrated worksheet validation instrument for the use of practicum KIT has three assessments, namely 1) Student worksheet structure, 2) Student worksheet assessment, and 3) Scientific literacy. In the validation instrument component, there are several assessment indicators. Each scoring indicator has a score of 1 with a low rating, while a score of 5 with a high rating. The average score and grade point for one assessment component is determined from the scores and values of all indicators contained in the product validation assessment compogen. Based on the assessment obtained validation assessment criteria with a small interval equal to 0.4 having less valid categories, intervals of 0.4 to 0.8 medium categories and more than 0.8 categories very valid [4]. The results of the validation of integrated scientific literacy worksheet for the use of practicum KIT can be explained as follows.

The structure of student worksheets based on the Ministry of National Education 2008 has six indicators, namely 1) Title, 2) Study instructions 3) Competencies to be achieved, 3) Supporting information, 4) Work tasks and steps, 5) Assessment. Analysis of worksheet structure indicator value data based on validation by expert energy can be seen in Figure 2.

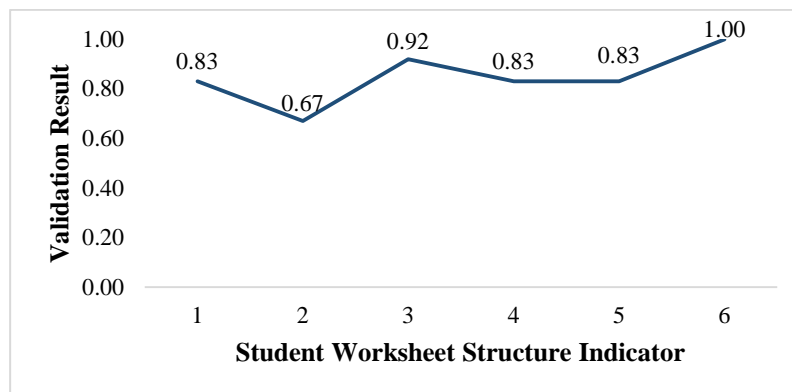


Figure 2 . Student Worksheet Structure Validation Results Graph

Student worksheets have values ranging from 0.67 to 1.00. The value of the six indicators in the integrated worksheet structure of scientific literacy for the use of practicum KIT, there is one indicator in the medium category with a value of 0.67 and the other five indicators are in the very valid category with a range of values of 0.83 to 1.00. From the six indicators, the average value of the student's worksheet structure can be determined, which is 0.85. So it can be concluded that the integrated worksheet structure of scientific literacy for the use of practicum KIT is in the very valid category.

Student worksheet assessment has four assessment components. The assessment components used are 1) Content Eligibility, 2) Language, 3) Presentation and 4) Graphics. Each component of the assessment consists of indicators for which value can be determined. The results of the average assessment of the assessment components of integrated student worksheets of scientific literacy for the use of practicum KIT can be described as follows.

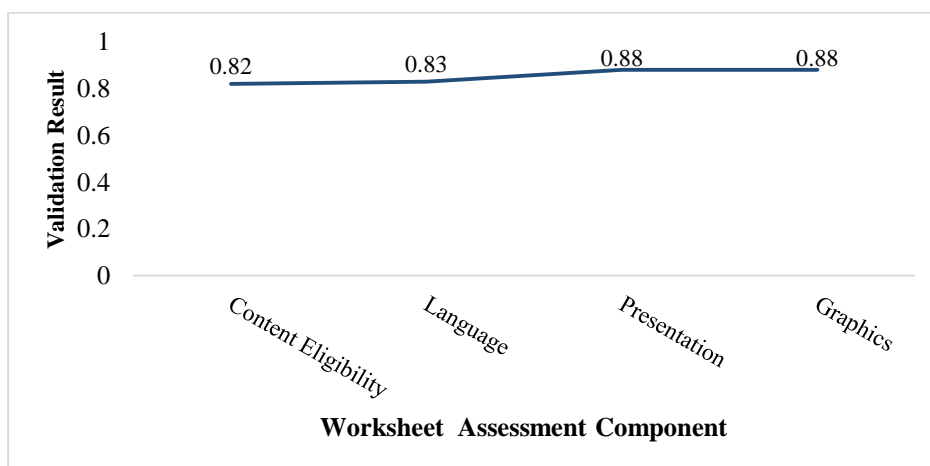


Figure 3. Graph of Student Worksheet Assessment Component Validation Results

The average value of the content service component, namely 0.82, is in the very valid category, the average value of the linguistic component, which is 0.83, is in the very valid category, the average presentation value of 0.88 is in the very valid category and the average value on the graphics is 0.88 is in the very valid category. The average value of each component of the worksheet assessment obtained the average value of the validation of the composition in the worksheet assessment of 0.85 which is in the very valid category. Thus, it can be concluded that the worksheet assessment component is in the category of valid, which is very valid.

The components of scientific literacy assessment have three aspects of assessment. Aspects of scientific literacy assessment are the scientific context, scientific processes and scientific concepts. Each aspect of the assessment consists of indicators that can be determined in value. The results of the assessment of each aspect in the compounding scientific literacy assessment are seen from the average value of aspects in the scientific literacy component which can be seen in Figure 4.

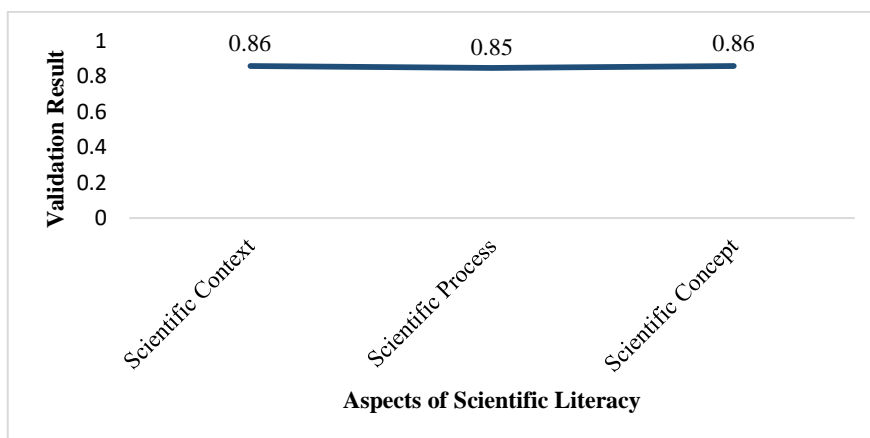


Figure 4. Validation Results of Scientific Literacy Components

The average value of the scientific context, namely 0.86, is in the very valid category, the average value of the scientific process, which is 0.85, is in the very valid category, and the average value of the scientific concept, which is 0.86, is in the very valid category. Based on the average results of each aspect of scientific literacy, the average validation value of the scientific literacy component is 0.86, which is in the very valid category. Thus, it can be concluded that the worksheet assessment component is in the category of valid, which is very valid.

The average product validation components obtained from the assessment indicators of each component are 1) Components of student worksheet structure, 2) Components of student worksheet assessment, and 3) Components of scientific literacy assessment. Based on these values, the plot results were obtained from the data on the average value of the product validation components which can be seen in Figure 5.

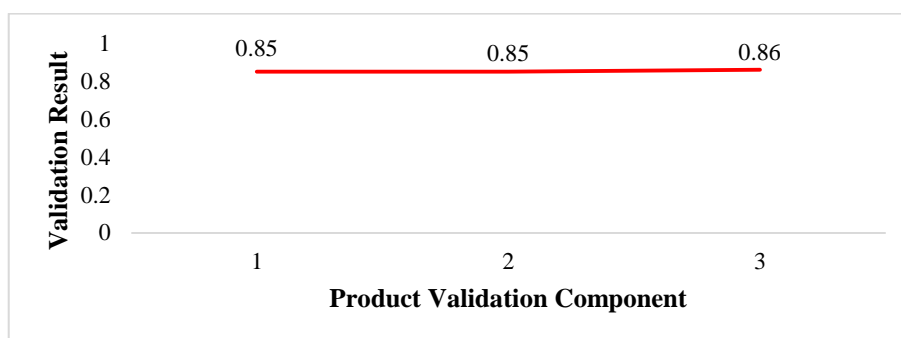


Figure 5. Average Product Validation Results

The average value of the worksheet structure component is 0.85 b the category is very valid, the average value of the worksheet assessment component, which is 0.85, is in the very valid category, and the average value of the literacy assessment component, which is 0.86, is in the very valid category. The average result of the validation assessment component obtained an average value of 0.85 where the value is in the very valid category. Thus, it can be concluded that the validation results of the worksheet assessment are on the category of validity, which is very valid.

After conducting product validation tests, researchers can continue the practicality test at the integrated worksheet of scientific literacy. The purpose of the practicality test at worksheet is to determine the practicality of integrated worksheet scientific literacy. The results of the scientific literacy integrated worksheet practicality test were obtained from teacher and student practicality instruments. The practicality instrument has four components, namely the ease of use component, the attractiveness component, the clarity component and the benefit component. In the practicality instrument component, there are several assessment components. The following is an explanation of the results of teacher and student practicality.

The practical value of integrated scientific literacy worksheet according to the teacher is obtained from the results of the teacher's practicality test analysis. The teacher's practicality test was assessed by two physics teachers. Based on the average score of the teacher practicality component obtained from the assessment indicators of each component, namely 1) Ease of use, 2) Attractiveness, 3) Clarity and 4) Benefits. Based on these values, the results of the plot of the average value data of the teacher's practicality component can be seen in Figure 6.

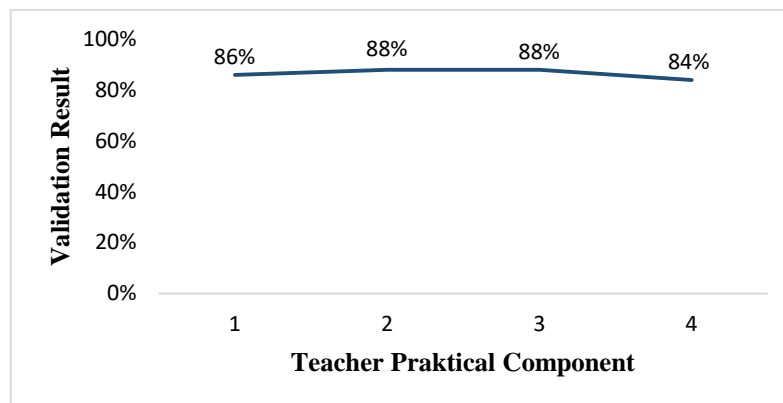


Figure 6. Average Results of Teacher Practicality

The average graph of the teacher's practicality component shows that the ease of use value has a value of 86% which is in the very practical category, the average value of the attractiveness component which is 88% is in the very practical practicality category, the average value of the clarity component is 88% is in the category of very practical practicality, and the average value of the benefit component of 84% is in the category of very practical practicality. The average value of the teacher practicality component obtained an average score of 87% which is in the category of very practical practicality. Thus, it is concluded that the practicality for teachers is in the category of practicality, which is very practical.

The value of integrated worksheet practicality in scientific literacy according to students is obtained from the results of student practicality test analysis. The practicality test of students was assessed by class XI science 3 many as 36 people. Based on the average score of the student practicality component obtained from the assessment indicators of each component, namely 1) Ease of use, 2) Attractiveness, 3) Clarity and 4) Benefits. Based on these values, the results of the plot data on the average value of the student practicality component can be seen in Figure 7.

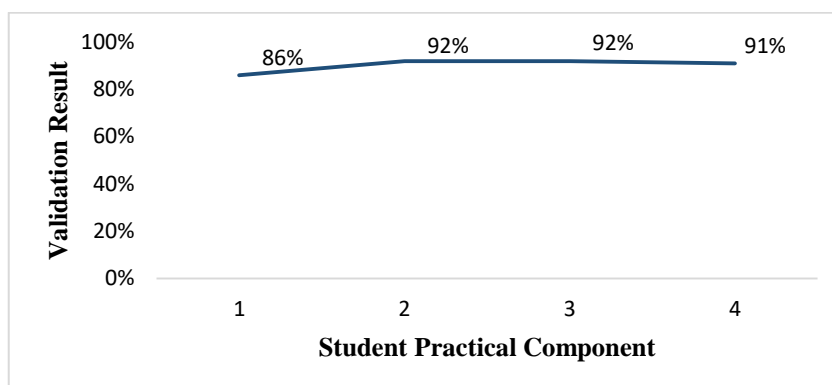


Figure 7. Average Results of Student Practicality Components

The graph of the average component of the practicality of students shows that the value of ease of use has a value of 86% in the category of very practical practicality, the average value of the attractiveness component of 92% is in the category of very practical practicality, the average value of the clarity component of 92% is in the category of very practical practicality, and the average value of the benefit component of 91% is in the category of very practical practicality. Result average practicality component for students obtained an average score of 90.25% which is in the category of very practical practicality. Thus, it can be concluded that the practicality of students is at the level of practicality, which is very practical.

Discussion

In this discussion, the researcher will discuss the research results obtained from validity tests by experts, namely physics lecturers Faculty of Mathematics and Natural Sciences, Padang State University and the results of practicality tests was carried out by 2 Physics teachers and 36 students of class XI science 3. The results achieved first, the product validity test conducted by experts, namely lecturers Faculty of Mathematics and Natural Sciences, Padang State University lecturers. Product validity tests are carried out to see the feasibility of worksheet and become guidelines for improving worksheet products in accordance with suggestions and inputs on the outcomes of the scientific literacy integrated worksheet validity test for the use of practicum KIT in

dynamic fluid materials. The worksheet validation test uses expert validation instrument sheets that have been validated by experts. Based on data analysis, the average value of the validation results of expert validation sheet instruments was obtained by 0.89. Criteria validation with an interval of $V > 0.8$; falls into the category of very valid [4].

There are several assessments of expert validation instruments, namely the structure of worksheet, assessment, and scientific literacy. The worksheet structure consists of six assessment indicators, namely title, study instructions, competencies to be achieved, supporting information, work tasks and steps as well as assessment [6]. The results of the validation of the worksheet structure are moderate assessment indicators with a value of 0.67. This is because the worksheet created does not include work instructions in accordance with scientific literacy. The average value of the validity of the worksheet structure is 0.85 so that the product criteria are obtained at a very valid level of validity with an interval range of $0.8 < V$. This is supported by the preparation of worksheet in accordance with the worksheet structure.

Worksheet assessment consists of 4 assessment components, namely content feasibility, language, presentation and graphics [6]. The content feasibility component on the worksheet validation sheet has six assessment indicators. There are 2 assessment indicators on the feasibility of content having a moderate category. This can be re-leveled by improving worksheet in order to improve the student's developmental mindset. The average value of the validity of the content feasibility component is 0.85 so that the product criteria are obtained at a very valid level of validity with an interval range of $0.8 < V$. This is supported by the presentation of material that is in accordance with basic competencies, complete KIT usage guidelines, and have accurate sources. The worksheet compiled can improve student learning outcomes and improve students' thinking ability and students' independence attitudes in understanding physics concepts [7].

The linguistic component on the worksheet validation sheet contains five assessment indicators. The results of the validation of the linguistic component there are indicators three and four have a moderate value with a value of 0.75. This is because the worksheet presented still has some inappropriate vocabulary, so researchers can improve worksheet by improving it. The average value of the validity of the linguistic component is 0.83 so that the product criteria are obtained at a very valid level of validity with an interval range of $0.8 < V$. This is supported by language, information, symbols and illustrations presented in the worksheet are easy to understand so as to improve the understanding of physics concepts. Category deserves to be obtained because of the use of clear sentence structures, appropriate learning sequences and the use of simple language that can improve students' learning ability [8].

The presentation component on the worksheet validation sheet has four assessment indicators. The average value of the validity of the presentation component is 0.88 so that the product criteria are obtained at a very valid level of valid with an interval range of $0.8 < V$. This is supported by the learning objectives and the series of worksheet in accordance with the structure of the worksheet so that it can attract readers to carry out scientific literacy activities. The validation results of the presentation component there is one indicator that has a medium value of 0.75. This can be improved by correcting the lack of worksheet on the information on the use of practicum KIT for scientific literacy activities. The presentation in teaching materials is very important because the presentation developed by worksheet can increase students' sense of knowing in physics lessons [9].

The graphing component on the worksheet validation sheet has four assessment indicators. The graphing component has 2 assessment indicators having a value of 0.83. This can be improved by fixing the font, lay out and layout on the worksheet. The average value of the validity of the graphing component, which is 0.88, is at a very valid level of validity. This is because there is support for the use of illustrations, worksheet color combinations and *cover* images that represent the contents of the worksheet integrated scientific literacy so that the worksheet used is interesting to read. An interesting illustration is found in the layout of the worksheet which can be interesting to learn and increase the motivation of students to use worksheet in the learning process [10].

Scientific literacy has 3 components of assessment, namely the scientific context, the scientific process and scientific concepts [11]. The scientific context on the worksheet validation sheet is three assessment indicators. In the scientific context, there are 2 indicators that have a medium category with a value of 0.83. The average value of the validity of the scientific context, which is 0.86, is at the level of validity, which is very valid. This is because the worksheet presented is in accordance with the applicable curriculum, concepts and learning objectives of real worksheet as well as the scientific context given to worksheet related to the field of science application.

The scientific process on the worksheet validation sheet contains six assessment indicators. The average value of the validity of the scientific process of 0.85 is at the level of validity, which is very valid. This is because worksheet presents complete tools and materials, clear experimental steps, and there is an evaluation based on scientific analysis of data and phenomena so as to increase student motivation to learn. However, there is one indicator that has a moderate value of 0.75. This can be improved by worksheet the lack of interpretation of data with the scientifically existing phenomenon. Scientific literacy is the ability to use scientific knowledge

that is not only limited to understanding concepts but can also apply them in everyday life or in making decisions [12].

Result validation obtained the average value of the scientific literacy integrated worksheet validation assessment component is 0.85. The average n is in the very valid category where the interval value is $0.8 < V$ [4]. Based on these values the worksheet created can be used and corresponds to what is needed or measured. Instrument is said to be valid if the criteria contained in the swallow instrument reflect what is to be measured [13].

The worksheet created there are several shortcomings that need to be corrected. This can be seen from the validation results which have several comments and suggestions from validators, so that the worksheet that needs to be revised in order to meet the criteria for the assessment component so that the worksheet made is better.

The second result achieved is the results of the worksheet practicality test integrated scientific literacy for the use of physics practicum KIT in dynamic fluid materials. The practicality test is carried out using practicality sheet instruments that have been validated by experts. Based on data analysis, the average score of the validation results of the instrument sheet validation for teachers was obtained 0.88. Criteria validation with an interval of $V > 0.8$; falls into the category of very valid. The average score of validation sheet instrument validation results for students was 0.76. Criteria validation with an interval of $0.4 < V \leq 0.8$; falls into the moderate category.

The worksheet practicality test is obtained from two categories, namely the practicality test according to the teacher and the practicality test according to students. The practicality test consists of four assessment components, namely ease of use, attractiveness, clarity and benefits. The following is an explanation of the assessment components in the practicality test. The ease of use component according to the teacher on the practicality sheet consists of several indicators with an average score of 86 % being at a very practical level of practicality. With the worksheet, it is easier for teachers to deliver learning materials and make it easier for teachers to train students in understanding physics concepts through scientific literacy. Meanwhile, the student practicality test has an average convenience usage component, which is 86%. With the existence of worksheet, it makes it easier for students to understand learning materials through scientific literacy and practicum KIT experiments. The average ease-of-use component of the teacher and student practicality test is 86% where the score is at a level of practicality that is very practical. With the worksheet in the learning process, it can make it easier for teachers to guide students to understand the learning material so as to avoid repeated explanatory events, besides that students can also learn independently through the context and physics concepts contained in the worksheet. The use of worksheet in the learning process can streamline learning time because it avoids repeated explanations. In addition, students can learn through materials and evaluations [14].

The attractiveness component according to students on the worksheet practicality sheet consists of several assessment indicators on the worksheet image statement that are interesting to look at and images can make it easier for students to do the practicum. The average attractiveness component in student practicality is 92%. The average attractiveness component in teacher practicality is 88%. The presence of pictures on worksheet can make it easier for teachers to explain learning materials. The average value of the attractiveness component of teacher and student practicality is 90% where the value has a very practical practicality value. So that the worksheet created can make it easier for teachers to deliver material so that students understand the material provided by the teacher faster. The images in the worksheet are selected according to the material that aims to help the teacher convey the message to the students. The images selected in worksheet are simple and close to everyday life and of good quality to be clear when viewed by students [15].

The clarity component according to the teacher on the worksheet practicality sheet consists of several assessment indicators in the worksheet statement that are in accordance with the demands of the 2013 curriculum that applies scientific literacy and worksheet which already has clear goals and indicators so that it makes it easier for students to easily understand the physics material being studied. The average score of the clarity component in the teacher practicality instrument is 88% and the average score of the clarity indicator in the student practicality instrument is 92%. The average score of the clarity component in the teacher and student practicality instrument is 90% where the score has a very practical level of practicality. The practical results obtained from the clarity component can be concluded that the integrated worksheet of scientific literacy can make it easier for students to apply physics concepts in everyday life.

The benefit component according to students on the worksheet practicality sheet consists of several assessment indicators on the worksheet statement that can make it easier for students to learn more independently and increase student learning motivation and worksheet can be a reference in practicum. The average score of the student practicality benefit indicator is 91%. The average score of teacher practicality indicators is 84%. The average score of the practical benefit component of teachers and students is 87.5%, which has a very practical level of practicality. Based on the results of research that has been carried out, an integrated worksheet of scientific literacy for the use of physics practicum KIT on dynamic fluid materials is suitable for use in the physics learning process.

IV. CONCLUSION

Based on the results of the research and discussion that has been carried out, it can be argued that scientific literacy integrated worksheets for the use of physics practicum KIT on dynamic fluid material that have been made are in a very valid category based on the structural components of the worksheet, worksheet assessment and scientific literacy. This worksheet also has a very practical practical category. Thus the worksheet made can be used in the physics learning process.

REFERENCES

- [1] Setiawan, A., Pursitasari, I. D., and Hardhienata, H.,” Pengembangan KIT Praktikum Difraksi dan Interferensi Cahaya untuk Meningkatkan Penguasaan Konsep dan Kemampuan Berfikir Kritis, Edusentris, Vol. 5, No. 1, pp. 1-13, 2019.
- [2] NCREL, and Metiri Group, “ Engauge 21st Century Skill: Literacy in The Digital Age” , US: NCREL and Metiri Group, 2003.
- [3] Utami, Budi,” *Scientific Literacy in Science Lesson*”, Jurnal Prosiding ICTTE FKIP UNS, Vol. 1, pp. 125-133, 2016.
- [4] Retnawati, H., “Analisis Kuantitatif Instrumen Penelitian”, Yogyakarta: Paranama Publishing, 2016.
- [5] Riduwan,” Belajar Mudah Penelitian Untuk Guru-Karyawan dan Peneliti Pemula”, Alfabeta, 2015.
- [6] Depdiknas, “Panduan Pengembangan Bahan Ajar”, Jakarta: Departemen Pendidikan Nasional Direktorat Jendral Manajemen Pendidikan Dasar Dan Menengah Direktorat Pembinaan Sekolah Menengah Atas, 2008.
- [7] Sherlly Ferdina Arafah, Saiful Ridlo, B.P,”Pengembangan LKS Berbasis Berfikir Kritis pada Materi Amalia”, *Unnes Jurnal of Biology Education*, Vol. 1, No. 1, pp. 47-53. 2012.
- [8] Widarmayati, R. P, “ Profil Validitas LKS Berbasis Keterampilan Proses Pada Subpokok Bahasa Intervetebrata untuk Kelas X SMA, *BioEdu*, Vol. 4, No. 1, pp. 761-764, 2015.
- [9] Khairunnisa, H & Kamus, Z., “Analisis Efektifitas Pengembangan Bahan Ajar Fisika Dengan Konten Kecerdasan Sosial Pada Materi Gerak Parabola, Gerak Melingkar Dan Hukum Newton Untuk Kelas X SMA”, Universitas Negeri Padang, Vol.11, No. 2, pp. 121-128, 2018.
- [10] Yunita, I. E., & Hakim, L., “ Pengembangan Modul Berbasis Pembelajaran Kontekstual Bermuatan Karakter Pada Materi Jurnal Khusus, *Jurnal Pendidikan Akuntansi (JPAK)*, Vol. 2, No. 1, 2014.
- [11] OECD, 2003, “*The Teaching of Science*”, London: David Fulton Publisher, 2003.
- [12] Novili, W. I., Utari , S., Saepuzaman, D., dan Karim, S., “ Penerapan Scientific Approach Dalam Upaya Melatihkan Literasi Sainifik Dalam Domain Kompetensi Dan Domain Pengetahuan Siswa SMP Pada Topik Kalor”, *Jurnal Penelitian Pembelajaran Fisika*, Vol.8, No. 1, pp. 57-63, 2017.
- [13] Sugiono, “ Metode Penelitian Kuantitatif, Kualitatif dan R&D”, Bandung: Alfabeta. 2012.
- [14] Julyal, I.,Gusmawedi., Azrita., “ Pengembangan Modul Pembelajaran Bermuatan Dialog Bergambar Pada Materi Sistem Hormon di SMAN 1 Limbur Lubuk Mengkuang Kabupaten Bungo Jambi”, FKIP : Universitas Bung Hatta, 2014.
- [15] Isnanto, D.,“Pengembangan LKS Berbasis Pendekatan Kontekstual Materi Kegiatan Ekonomi Di Indonesia Siswa Kelas V SD”, *Basic Education*, Vol. 5, No. 32, pp. 3-015. 2016.