International Journal of Social Science And Human Research

ISSN(print): 2644-0679, ISSN(online): 2644-0695

Volume 04 Issue 12 December 2021

DOI: 10.47191/ijsshr/v4-i12-44, Impact factor-5.586

Page No: 3773-3780

The Development of KPS Based Practicum Module for Physics Subject to Improve Student's Reporting Skills

Mohammad Lutfiyadi [1], Rufi'i[2], Yoso Wiyarno[3]

[1,2,3]Education Technology, Postgraduate, University PGRI Adi Buana of Surabaya

ABSTRACT: This study aims to develop a physics practicum module based on Science Process Skills, which improves students' reporting skills. The type of research used is called R&D or research and development methods that refer to the 4-D model with the following stages: Define, Design, Develop and Disseminate. The data collection technique used a questionnaire. The data was delivered descriptively to analyze the feasibility of the developed practicum module and an assessment rubric for student practicum reports to determine the improvement in students' reporting skills. Validation questionnaires were given to Content experts and media design experts, while field trial questionnaires were given to physics teacher colleagues and students. The validation results of content experts and media design experts are classified in the "feasible" criteria by obtaining a score of 3.85 for Content expert validation and 3.56 for media design expert validation.

Moreover, the results of the development trial received a score of 3.81 from peer validation which was classified in the "feasible" criteria. The student responses obtained a score of 3.82, which was classified in the "interesting" criteria. The results of the n-gain test have received a value of 0.63, which was classified in the "fair" criteria. Based on these data, the researcher concluded that the developed KPS-based physics practicum module is feasible and can improve students' reporting skills.

KEYWORDS: Practicum Module, Reporting Skills, Scien Process Skills

I. INTRODUCTION

Quality human resources are an essential factor in the globalization era, but the quality of Indonesian human resources is still relatively low. The low quality of human resources is generally due to the low quality of Indonesian education. We can prove this by looking at a survey conducted by the Program for International Student Assessment (PISA) in 2018, which showed that education in Indonesia was low because it was ranked 74th out of 79 countries (Kumparan, 2019).

Several factors influence the low score of Indonesian education. One of them is students' lack of active and creative involvement in the learning process. The learning process carried out still does not meet the 21st-century learning paradigm aligned with constructivism theory (Furqan et al., 2016). The problem that is often found in the school environment is the absence of a practicum module based on a scientific approach following the demands of the curriculum. Innovative practicum modules must be developed to help students master life and career skills, learning and innovation skills, and information media and technology skills (Fajarianingtyas & Hidayat, 2020). Students will learn better if they are involved in meaningful activities in the learning process (Hanif et al., 2019). Therefore, it is necessary to develop a practicum module that can facilitate these various problems, namely a physics practicum module based on science process skills to improve student skills, including reporting skills.

The module is a teaching Content that has the ability to make students learn independently without or with teacher guidance (Utami et al., 2018). The module has several advantages, namely: high student motivation because the tasks assigned are following their abilities and there are clear boundaries, students can find out the development and shortcomings of brands in learning, the results achieved by students are according to their abilities, the load of the Content studied will be more evenly distributed, and learning takes place efficiently (Rufii, 2015). Modules should be designed as well as possible so that students can understand in their way (Suhermi et al., 2020).

Science process skills need to be possessed to generate and use scientific information, conduct research, and solve problems (Alia et al., 2017). Science process skills also have several advantages. For example, students can understand well about facts and concepts, have a more active role in working with science, and have the opportunity to learn science processes and products simultaneously (Arsih, 2014). Indicators of scientific process proficiency are observing, classifying, interpreting, predicting, asking questions, hypothesizing, planning experiments, using tools/Contents, applying concepts, and communicating (Arsih, 2014).

Communication skills are skills needed to convey the results of their findings to others both orally and in writing in preparing reports, making papers, etc. (Semiawan et al., 1992). In learning physics, communication skills that can be trained are

written skills because one of the life skills students need to have is written communication skills (Depdiknas, 2007). One of the written communication skills that students can train is systematically compiling and submitting practicum reports.

Therefore, the purpose of this study is to develop a physics practicum module based on Science Process Skills as a companion teaching Content that facilitates teachers and students in the learning process, which is expected to improve student skills, including reporting skills.

II. RESEARCH METHODS

The research method used in this research is the research and development method or Research and Development. Research and Development is a research method used to produce a product and test its effectiveness (Sugiyono, 2016). The research method used refers to the 4-D model, which has four stages: Define, Design, Develop and Disseminate, as shown in Figure 1.

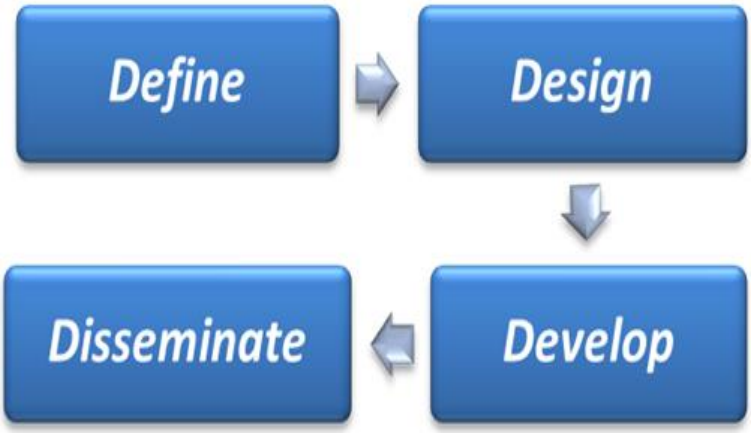

Figure 1. Research Development Procedure
Source: (Herawati & Muhtadi, 2018)

The data collection technique used in this study was in the form of a questionnaire. While the research instruments used were in the form of expert validation instruments consisting of Content experts and media design experts, peer validation instruments, attractiveness test instruments given to students, and report writing skills instruments in the form of questionnaires or practicum report assessment rubrics. The rubric for the assessment of the practicum report will be tested first to analyze the validity and reliability of the instrument.

The data analysis technique used in this study is a qualitative descriptive analysis technique that describes the results of the Development of a physics practicum module based on PPP. The data obtained through the instruments used were then analyzed using qualitative descriptive statistics. This analysis aims to describe the characteristics of the data on each variable.

III. RESEARCH AND DEVELOPMENT PROCESS

The Development of the PPP-based physics practicum module is carried out using a 4-D model with the stages: Define, Design, Develop, and Disseminate, which will be explained as follows:

A. Define (Definition)

This stage is the analysis and problem identification stage to obtain various information related to the Development of the PPP-based physics practicum module. The identification results indicate that problems are still faced in the learning process. These problems include the absence of a practicum module used in the learning process and a lack of understanding of students' work steps in practicum activities. Students cannot study independently because there are no teaching Contents that facilitate. Students still encounter difficulties in preparing practicum reports.

B. Design (Design)

The next stage in developing the KPS-based physics practicum module is the design stage. This stage includes making a physics practicum module based on science process skills or Ketrampilan Proses Sains (KPS) class XI SMA in the even semester. This stage involves making the practicum module's design, selecting the format, and making the cover. The module design is made to simplify producing modules and has a guide in making the PPP-based physics practicum module.

Image 1. Module Cover

The selection of the module format includes choosing the typeface, spacing, arrangement of Contents, etc. Meanwhile, the cover is designed as attractive as possible to provide attractiveness using CorelDraw 2019.

C. Develop (Development)

This stage includes expert validation and development trials. Expert validation consists of Content expert validation and media design expert validation. The feasibility and attractiveness score follows this Likert scale:

Table 1. Likert Scale (Febriana et al., 2014)

Score	Feasibility Criteria	Attractiveness Criteria
$3{,}26 < \bar{x} \leq 4{,}00$	Feasible	Interesting
$2{,}51 < \bar{x} \leq 3{,}26$	Fair	Fair
$1{,}76 < \bar{x} \leq 2{,}51$	Not Worth It	Not Worth It
$1{,}00 < \bar{x} \leq 1{,}76$	Not Feasible	Not Interesting

Meanwhile, development trials were carried out to obtain student responses and validate physics teacher colleagues.

Content expert validation was carried out by Dr. Nanang Winarno, S.Si., S.Pd., M.Pd, a physics education lecturer at the Indonesian Education University. The data obtained from the validation results of the Content shown in Table 2.

Table 2. Data from Content Expert Validation

Assessment Aspect	Score	Feasibility Criteria
Content Eligibility	3.88	Feasible
Presentation	3.80	Feasible
language	3.75	Feasible
Product Benefits	4.00	Feasible
Average	**3.85**	Feasible

Based on the data in Table 2 above, we can see that the Content experts' validation results obtained an average score of 3.85 from a maximum score of 4.00 which means that the product is feasible.

Dr. H. Ibu Priono Leksono, M.Pd, conducted the media design expert validation. He is a lecturer in Learning Technology at PGRI Adi Buana University, Surabaya. The data obtained from the validation results of media design experts are shown in Table 3.

Table 3. Data of Media Design Expert Validation Results

Assessment Aspect	Score	Feasibility Criteria
Module Size	4.00	Feasible
Module Cover Design (*Cover)*	3.33	Feasible
Module Content Design	3.63	Feasible
Average	**3.56**	**Feasible**

Based on the data obtained from the validation results of media design experts listed in Table 2 above, we can see that the average score obtained is 3.56 out of a maximum score of 4.00. Based on the table of feasibility criteria, the media design expert's validation results are classified in the "feasible" criteria.

After the experts said the KPS-based physics practicum module was feasible, the module was tested on students to get a response as a user. At this stage, validation is also carried out by colleagues consisting of three masters of education in physics. The data from peer validation are shown in Table 4 below.

Table 4. Data from Peer Validation Results

Assessment Aspect	Score	Feasibility Criteria
Media	3.83	Feasible
Content	3.75	Feasible
Language	3.88	Feasible
Average	**3.81**	**Feasible**

Based on Table 3 above, we can see that the peer validation aspects include media, Content, and language aspects. Overall, the results of peer validation obtained an average score of 3.81 from a maximum score of 4.00, which was classified as "feasible."

Furthermore, the assessment aspects used in the student response questionnaires evaluated media, Contents, learning process, and language use. Meanwhile, the data on student responses to the KPS-based physics practicum module tested can be seen in Table 5.

Table 5. Student Response Data

Assessment Aspect	Score	Attractiveness Criteria
Media	3.82	Interesting
Content	3.79	Interesting
Learning	3.84	Interesting
Language	3.81	Interesting
Average	**3.82**	**Interesting**

Based on the data in Table 4, the overall average score of student responses to the PPP-based physics practicum module is 3.82 out of a maximum score of 4.00, which means the KPS-based physics practicum module is 'feasible.
Based on the data described above, we can see that:

- The average score of content expert validation is 3.85
- The average score of media design experts is 3.56
- The average peer validation score is 3.81
- The average score obtained from student responses is 3.82

These data show that the KPS-based physics practicum module is "appropriate" for alternative teaching Content in the physics learning process. More details on the overall assessment results of the PPP-based physics practicum module can be seen in the diagram in Figure 2.

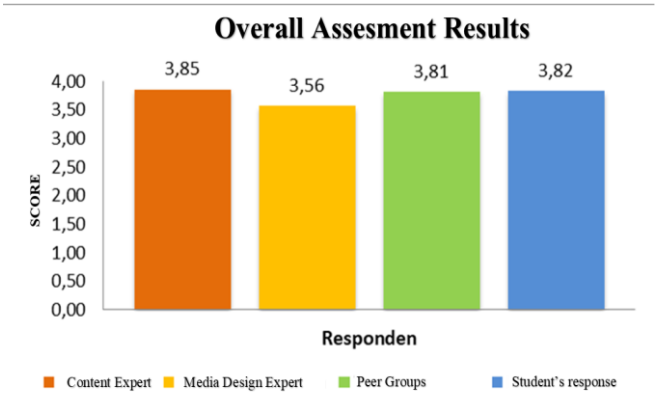

Figure 2. Overall Assessment Results

D. Dissemination (Distribution)

The science process skills-based physics practicum module (KPS), which has gone through various stages of development and is declared suitable for use in the learning process, is then distributed in a limited way in SMAN 4 Pamekasan.

IV. DATA ANALYSIS

After the KPS-based physics practicum module is said to be "feasible" to be used in the learning process and distributed in a limited way to students, data collection on report writing skills is carried out to determine the improvement in reporting skills before using the practicum module compared to after using the practicum module. The instrument used to obtain data on skills in compiling reports is an assessment rubric for practicum reports. However, before that, it is necessary to know whether the instrument used is valid and reliable utilizing a validity test and reliability test.

The instrument used consisted of 10 questions with 30 students as respondents. The validity test was carried out using SPSS, the results of which can be seen in Table 6 below.

Table 6. Validity Test Results

	Pearson Correlation	Sig. (2-tailed)	N
B01	0.475	0.008	30
B02	0.639	0.000	30
B03	0.565	0.001	30
B04	0.559	0.001	30
B05	0.488	0.006	30
B06	0.481	0.007	30
B07	0.378	0.040	30
B08	0.529	0.003	30
B09	0.708	0.000	30
B10	0.685	0.000	30

The instrument can be said to be valid if the significance value obtained is less than 0.05. Based on Table 6 above, we can see that the significance value obtained for all items is <0.05, which means that all items are said to be valid. Meanwhile, the reliability test results can be seen in Table 6 below.

Table 7. Reliability Test Results

Cronbach's Alpha	N of *Items*
0.747	10

The instrument is said to be reliable if the Cronbach's Alpha value is greater than 0.6. Based on table 7 above, we can see that the Cronbach's Alpha value obtained is 0.747 > 0.6, which means that the instrument used is classified in the reliable criteria.

Table 8. Calculation Results of N-Gain

Pretest	Postes	N-Gain	Criteria
65.63	87.15	0.63	Fair

After the instrument is said to be valid and reliable, the instrument can be used to obtain report writing skills data. The increase (Gain) of reporting skills can be seen by comparing the results before using the PPP-based physics practicum module (pretest) with the results after using the PPP-based physics practicum module (post-test). Improved reporting skills are calculated using the N-Gain equation using MS Excel. The results of the N-Gain calculation can be seen in Table 8.

Based on the data in Table 8 above, we can see that the student's pretest score is 65.63 while the student's post-test score is 87.15. Meanwhile, the increase in students' reporting skills is 0.63, which is classified in the fair criteria.

V. DISCUSSION

The research that aims to produce a KPS-based physics practicum module product is a type of research and development using a 4-D development model. The steps taken are defining, designing, developing, and disseminating stages.

The first stage is the define stage. At this stage, identification and problem analysis are carried out in the initial analysis, student analysis, concept analysis, and learning objectives. The results obtained at this definition stage are discovering problems that require the development of a physics practicum module. Modules are developed in print media.

The next stage is the design stage. At this stage, there are several steps, namely making the design of the practicum module, selecting the format, and making the cover. Here, the format and module components selection is adjusted to a good theoretical study of module development. Then the practicum module that has been compiled is consulted with the supervisor so that it gets input and suggestions to improve and perfect the practicum module.

The next stage is the development stage, which aims to produce a finished product in the form of a practicum module that has been revised by Content experts and media design experts. The validation carried out by Content experts and media design experts aims to find out the shortcomings and weaknesses of the practicum module. After the practicum module is validated and comments and suggestions are given from content and media design experts, the revision stage is carried out. After the revision phase is complete, the practicum module is tested on students. The development trial was carried out to find out the responses or responses from physics teacher colleagues and also to find out the students' responses to the practicum module that had been developed.

The last stage of developing the KPS-based physics practicum module is the dissemination stage. The distribution of this practicum module is only limited to students of SMA Negeri 4 Pamekasan.

The results of the feasibility of the KPS-based physics practicum module show that, overall, the "Appropriate" practicum module is used as teaching Content. The feasibility was validated by content expert validation, media design expert validation, peer validation, and student responses to the KPS-based physics practicum module. This can be seen in Table 9 below.

Table 9. Overall Assessment Results

Assessment Aspect	**Score**	**Feasibility Criteria**
Content Expert	3.85	Feasible
Media Design Expert	3.56	Feasible
Peers	3.81	Feasible
Student Response	3.82	Feasible
Average	**3.76**	**Feasible**

Based on the data analysis above, the average overall score from the results of Content expert validation, media design expert validation, peer validation, and student responses is 3.76 out of a maximum score of 4.00, so that the physics practicum module is based on science process skills (KPS) "Feasible" is used as a reference source for learning in physics subjects. This is in line with research conducted by (Fadillah & Angraini, 2018), which states that developing a genetics practicum module based on science process skills for biology education students is feasible and practical to use in the implementation of practicum.

In addition, this research is also relevant to the research conducted by Widayanti et al., (2018), which said that the development of PjBL-based Melde experimental practice worksheets was very feasible to use in learning. Also, following research conducted by Yulia et al., (2017), developing a physics practicum module based on science process skills to improve problem-solving abilities of high school/MA students is said to be feasible and can improve students' problem-solving skills.

This is also reinforced by research conducted by (Murniati et al., 2018) which states that the preparation of practical instructions based on quality science process skills is very good and practical, as well as research conducted by Puspita (2019) which said that the development of PPP-based modules as biology teaching Contents is feasible and interesting to use.

Furthermore, there is also research conducted by Rahmat et al., (2020) which says that the development of an integrated science module based on KPS meets the criteria for validity and is declared effective for use by grade VII junior high school students. Also, Dewi's (2019) research states that developing an elementary science practicum book for PGSD students is appropriate to use in a lecture as teaching Content.

In addition to knowing the feasibility of the PPP-based physics practicum module, this study aims to determine the magnitude of the increase in students' report preparation skills. The improvement in report preparation skills can be seen by comparing the scores before using the KPS-based physics practicum module (pretest) with the scores after using the KPS-based physics practicum module (post-test) using the normalized gain formula (N-Gain).

However, previously the skill data instrument for compiling reports in the form of a report assessment rubric that will be used must be said to be valid and reliable first. The validity and reliability tests were carried out using SPSS, which showed that the instrument was declared valid and reliable. After the instrument is said to be valid and reliable, it is then used to obtain report writing skills data which produces an average pretest value of 65.63 and an average post-test value of 87.15. Meanwhile, the increase in reporting skills calculated using the N-gain formula obtained a value of 0.63, which was classified as "fair".

Based on the data above, it can be seen that the physics practicum module based on science process skills (KPS) developed can improve students' reporting skills. This is in accordance with research conducted by Prasetya et al., (2019) which states that guided inquiry-based student worksheets on salt hydrolysis Content are categorized as very suitable for use and can also improve students' scientific literacy.

This research is also following the study conducted by Jumadi (2018), which states that developing a PPP-based science module is feasible and can improve students' critical thinking skills.

VI. CONCLUSIONS

From this study, the researcher conclude that:

1. The physics practicum module based on science process skills is feasible to be used as teaching Content in the learning process and can improve students' reporting skills.
2. The researcher encourage rrecommendations for further research. For example, the further study to test the effectiveness of the development of the Science Process Skills (KPS) based physics practicum module and to develop this Science Process Skills (KPS) based physics practicum module for other students' level.
3. It is proven that using Science Process Skills or Ketrampilan Proses Sains (KPS), learning activities can be more varied and interesting.

REFERENCES

1) Alia, N., Sunarno, W., & Aminah, S. (2017). Pengembangan Modul Fisika Pada Materi Listrik Dinamis Berbasis Keterampilan Proses Sains (Kps) Untuk Meningkatkan Kemampuan Berpikir Kritis Siswa Sma / Ma Kelas X. 6(1).
2) Arsih, F. (2014). Keterampilan Proses Sains. UNP Press.
3) Depdiknas. (2007). Konsep Pengembangan Model Integrasi Kurikulum Pendidikan Kecakapan Hidup. Balitbang.
4) Dewi, T. M. (2019). Pengembangan Buku Penuntun Praktikum Ipa SD Berbasis Keterampilan Proses Sains Pada Mata Kuliah Praktikum Ipa Sd Untuk Mahasiswa Pendidikan Guru Sekolah Dasar (Pgsd). Simbiosa, 8(1), 28. https://doi.org/10.33373/sim-bio.v8i1.1803
5) Fadillah, E. N., & Angraini, E. (2018). Pengembangan Modul Praktikum Genetika Berbasis Keterampilan Proses Sains Untuk Mahasiswa Program Studi Pendidikan Biologi. Edubiotik : Jurnal Pendidikan, Biologi dan Terapan, 3(01), 34–42. https://doi.org/10.33503/ebio.v3i01.77
6) Fajarianingtyas, D. A., & Hidayat, J. N. (2020). Keterampilan Proses Dan Hasil Belajar. Jurnal Pendidikan Sains Indonesia, 8 (2)(2), 152–163. https://doi.org/10.24815/jpsi.v8i1.15515
7) Furqan, H., Yusrizal, Y., & Saminan, S. (2016). Pengembangan Modul Praktikum Berbasis Inkuiri Untuk Meningkatkan Keterampilan Proses Sains Dan Hasil Belajar Siswa Kelas X Di Sma Negeri 1 Bukit Bener Meriah. Jurnal Pendidikan Sains Indonesia (Indonesian Journal of Science Education), 4(2), 124–129.
8) Hanif, S., Wijaya, A. F. C., & Winarno, N. (2019). Enhancing Students' Creativity through STEM Project-Based Learning. Journal of Science Learning, 2(2), 50. https://doi.org/10.17509/jsl.v2i2.13271
9) Herawati, N. S., & Muhtadi, A. (2018). Pengembangan modul elektronik (e-modul) interaktif pada mata pelajaran Kimia kelas XI SMA. Jurnal Inovasi Teknologi Pendidikan, 5(2), 180–191. https://doi.org/10.21831/jitp.v5i2.15424

10) Jumadi, J., Sunarno, W., & Aminah, N. S. (2018). Pengembangan Modul Ipa Berbasis Keterampilan Proses Sains Untuk Meningkatkan Kemampuan Berpikir Kritis Peserta Didik Kelas Vii Smp Pada Materi Kalor. INKUIRI: Jurnal Pendidikan IPA, 7(2), 262. https://doi.org/10.20961/inkuiri.v7i2.22986
11) Kumparan. (2019). Menilik Kualitas Pendidikan Indonesia Menurut PISA 3 Periode Terakhir. KumparanSains. https://kumparan.com/kumparansains/menilik-kualitas-pendidikan-indonesia-menurut-pisa-3-periode-terakhir-1sO0SlXNroC
12) Murniati, Muslim, M., & Sardianto, M. . (2018). Pengembangan Petunjuk Praktikum Fisika Sekolah I Berbasis Keterampilan Proses Sains Mahasiswa Calon Guru. Jurnal Inovasi dan Pembelajaran Fisika, 5(1), 15–25.
13) Prasetya, C., Gani, A., & Sulastri, S. (2019). Pengembangan Lembar Kerja Peserta Didik Berbasis Inkuiri Terbimbing pada Materi Hidrolisis Garam untuk Meningkatkan Literasi Sains. Jurnal Pendidikan Sains Indonesia, 7(1), 34–41. https://doi.org/10.24815/jpsi.v7i1.13556
14) Puspita, L. (2019). Pengembangan modul berbasis keterampilan proses sains sebagai bahan ajar dalam pembelajaran biologi Module development based on science process skills as teaching Contents in biological learning. Jurnal Inovasi Pendidikan IPA, 5(1), 79–87.
15) Rahmat, A. N. T., Ramlawati, & Rusli, M. A. (2020). Pengembangan Modul IPA Terpadu Berbasis Keterampilan Proses Sains Pada Materi Sistem Pernapasan. Jurnal IPA Terpadu, 3(2), 54–61.
16) Rufii, R. (2015). Developing Module on Constructivist Learning Strategies to Promote Students' Independence and Performance. International Journal of Education, 7(1), 18. https://doi.org/10.5296/ije.v7i1.6675
17) Semiawan, C., Tangyong, A. ., Belen, S., Matahelemual, Y., & Suseloardjo, W. (1992). Pendekatan Keterampilan Proses. Gramedia.
18) Sugiyono. (2016). Metode Penelitian Kuantitatif, Kualitatif dan R&D. Alfabeta.
19) Suhermi, Rufii, & Wiyarno, Y. (2020). Modul Matematika Berbasis Konstruktivis-Kolaboratif. 4, 1609–1618.
20) Utami, T. N., Jatmiko, A., & Suherman, S. (2018). Pengembangan Modul Matematika dengan Pendekatan Science, Technology, Engineering, And Mathematics (STEM) pada Materi Segiempat. Desimal: Jurnal Matematika, 1(2), 165. https://doi.org/10.24042/djm.v1i2.2388
21) Widayanti, W., Yuberti, Y., Irwandani, I., & Hamid, A. (2018). Pengembangan Lembar Kerja Praktikum Percobaan Melde Berbasis Project Based Learning. Jurnal Pendidikan Sains Indonesia, 6(1), 24–31. https://doi.org/10.24815/jpsi.v6i1.10908
22) Yulia, L. D., Sunarno, W., & Aminah, N. S. (2017). Pengembangan Modul Fisika Berbasis Keterampilan Proses Sains (Kps) Untuk Meningkatkan Kemampuan Pemecahan Masalah Siswa SMA / MA. 6(2), 344–354.