

Students' verbal communication skills using e-handout aided Schoology with problem-based learning model on lup-optic topics

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Abstract. This study aims to determine the verbal communication skills of (1) class A and B (2) Class A than B (3) XI MIA SMAN 1 SLEMAN students after participating in learning to use the E-Handout aided PBL model based Schoology on optical-Lup topic. This study was included in the study design one-shot case study. This research was done in class XI MIA 3 and XI MIA 5 SMA Negeri 1 Sleman. In this study, verbal ability students judged by the ability of the student in preparing the report. Based on the analysis of the results of research and discussion be concluded as follows: (1.a) The verbal communication skill in class A is moderate with an average value of 56.3. (1.b) Verbal communication skills class B is high with an average value of 65.5. (2) Verbal communication skills in class B is better than Class A. (3) Verbal communication skills of XI MIA SMAN 1 SLEMAN students is high with an average score is 60.9. It can be concluded that is using E-Handout Based Problem Based Learning Model aided Schoology can develop student's verbal communication skill.

Keywords: *optic, verbal communication, problem based learning, e-handout, schoology*

1. Introduction

The education system has a big task in equipping students who are ready for the 21st century global demands. 21st century education emphasizes learning that can improve life skills, learning and thinking skills and ICT literacy [1], [5]. Communication, collaboration, critical thinking, and creative is also indispensable in education in the 21st century as the students' competencies [4], [6]. One of the subjects given in high school on the science major is physics. In physics learning Students are expected to understand a phenomenon, knowing how things work and can solve problems related to the subject matter [7], [11]. The topic that needs special attention in Physics lesson is the Optical. Results from the 2015 National Examination showed a decrease in the absorption of this topic compared to other topics. In 2015/2016 optical and waves topic got the third-highest percentage compared to other topics, with a percentage of 57.20%. In the year 2016/2017 optic and waves topic got the lowest percentage after dynamics topic, with a percentage of 44.67%. In the year 2017/2018 light and waves topic got the lowest percentage than any other topics, which is 40.61%.

Abstract concepts in physics required students to be able in expressing concepts in it [7], [12]. Critical thinking skills, communication and media is necessary for students to solve the problem well. Communication skills in learning still not get enough attention by the teacher [13], so that these skills are still relatively low in Indonesia. Communication skills requires students to convey the ideas orally



and in writing and to clarify and defend the ideas that have delivered [14]. Communication skills also have great impact on student's achievement because there is a process of delivering information in a study [14].

Communication requires interaction between people so that there is a process of creation and exchange messages with other people [15]. Communication can be done by means of verbal and non-verbal. Verbal communication is done with words and sentences to convey a message (oral or written), b) non-verbal communication is done with sign language (gestures, mimic or symbol) [16]. Verbal communication skills can be enhanced through a presentation in class, starting with the easier task and move to a more challenging task [17]. Verbal and non-verbal communication are equally important in conveying information.

Problem-based learning is suitable to achieve educational goal in 21st century. This learning model emphasizes communication, collaboration, critical thinking, and creative in learning [2], [18]. The main characteristics of Problem Based Learning, is: (a) emphasize on student-centered process, (b) learn through small groups of students, (c) Teachers can act as moderator as well as facilitator, (d) There are problem that use to motivate students in learning and the focus of the organization, (e) issue provide a basis for progress in the clinical problem-solving skills, (f) self-directed learning helps the acquisition of new information [2], [19]. Problem Based Learning needs to be combined with digital technology to match the demands of the 21st century.

Schoology as a interactive media based on e-learning can be combined with problem based learning. The media facilitates teachers, students, parents to build a collaborative community of students to meet the educational goals of the 21st century [20]. Schoology directs students to apply the use of technology and communication in the learning process. Schoology create a dynamic educational support that can be adapted to new ideas of teachers and students [21]. Schoology has included several features that support the learning process, as follows: 1. Program (Program), the feature to create a class of subjects; 2. Group (group), the feature to create a group; 3. Resources (Learning Resources), the feature to add material (assignments, quizzes, files, discussions, and media album) [5], [22].

Handout is a simple learning material that can be developed by teachers. Handout used to facilitate and provide assistance or information as a handle instructional materials for students, and to support other teaching topics or explanations of teacher [22], [24]. Handout created from some of the relevant literature based on basic competencies and main topic usually being taught to students [22]. The material presented in it are taken from some of the literature that has some relevance to the material being taught [24]. A handout will guide teachers in teaching regularly and clearly. Handouts will also help students to reduce usage of notes as many notes be quite time consuming [23]. Handout basically the same as the E-handout, the differences were only in shape. Regular handouts made in printed form (printed teaching materials), while e-handout made not in printed form.

This study aims to determine the verbal communication skills of students after participating in learning to use the e-handout aided PBL model based Schoology on optical-Lup topic.

2. Research method

This study design is a one-shot case study. This research was conducted in SMA Negeri 1 Sleman. The number of respondents were 57 respondents which consisted of two different groups, is a class XI MIA 3 and XI MIA 5. The study design will be shown in table 1.

Table 1. Research design.

X^a	O^b
X Learning	
^a E- Handout Learning based PBL Model assisted Schoology	
O Test	
^b Verbal communication skills of students	

In practice, students use Schoology to access the handouts, LKPD and PhET. Problem Based Learning model is a learning model that applied of this study. Students will experiment with PhET

according to LKPD. Experiments conducted in groups, one group consists of 5-6 students. After the experiment, the students reported the results of experiments according to the instruction written in LKPD and create reports based on the experimental results. Students are given 1 week to complete the report. Verbal communication data obtained of the report made by students. Indicators report assessment is the author's name, title, school ID, purpose of the report, lab instruments, basic theory, observation result, data analysis, discussion, conclusions, clear, coherent, contents of the report and report views. The highest score for each indicator is 4, while the lowest score for each indicator is 1. Final score of student's communicate skill is calculated using the formula 1:

$$\left[\frac{\text{Total score of Indicator 1-6}}{24} \times 20 \right] + \left[\frac{\text{Total score of Indicator 7-10}}{16} \times 50 \right] + \left[\frac{\text{Total Score of Indicator 11-14}}{16} \times 30 \right] \quad (1)$$

The obtained score of each student then classified based on categorized of Score as shown in table 2.

Table 2. Categorization of scores of students.

Score	Category	Frequency
$80 < X \leq 100$	Very high	
$60 < X \leq 80$	High	
$40 < X \leq 60$	Moderate	
$20 < X \leq 40$	Low	
$0 < X \leq 20$	Very low	

To define the category as a whole verbal communication skills, use the following mathematical equation:

$$\frac{\text{Total of repondents}}{\text{maximum score of the respondents}} \times 100 \quad (2)$$

3. Results and Discussion

Based on the results of data analysis, verbal communication skills of students will be presented in the table and graph below.

Table 3. Results of the verbal communication skills analysis of class A and B students

Score	Category	Frequency	
		Class A	Class B
$80 < X \leq 100$	Very high	4	3
$60 < X \leq 80$	High	8	21
$40 < X \leq 60$	Moderate	0	2
$20 < X \leq 40$	Low	0	0
$0 < X \leq 20$	Very low	7	2

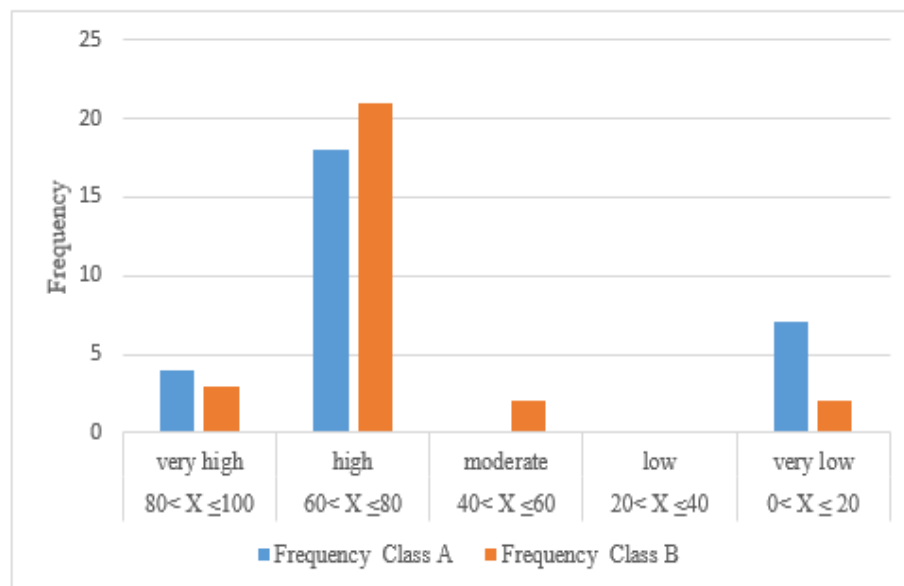


Figure 1. Graph students verbal communication results of class A and B

Verbal communication skill is the ability of a student to communicate something both orally and in writing. Verbal skills tested were verbal skills in writing. Students are required to report lab results on the formation of a shadow on the positive lens. Indicators report assessment is the author's name, title, school ID, destination reports, lab instruments, basic theory, observations, data analysis, discussion, conclusions, clarity, coherently, the contents of the report and report views. The results of the analysis of this report be made as a result of verbal communication students.

From table 3 and figure 1 can be seen that in the very high category there are 4 respondents from class A and 3 respondents from Class B. In the high category there were 18 respondents 21 respondents class A and class B. In Moderate Categories no respondents from class A and 2 respondents from class B. In low categories no respondents from both classes. And in the very low category there are 7 respondents from class A and 2 respondents from Class B. The verbal communication skills of class A students are quite adequate with an average value of 56.3. While the verbal communication skills of class B students are relatively high with an average value of 65.5. From the results of the analysis of the two classes above it can be said that grade B students have better verbal communication skills than class A.

Table 4. Results of the verbal communication skills analysis of SMAN 1 Sleman students

Score	Category	Frequency
$80 < X \leq 100$	Very high	7
$60 < X \leq 80$	High	37
$40 < X \leq 60$	Moderate	2
$20 < X \leq 40$	Low	0
$0 < X \leq 20$	Very low	9

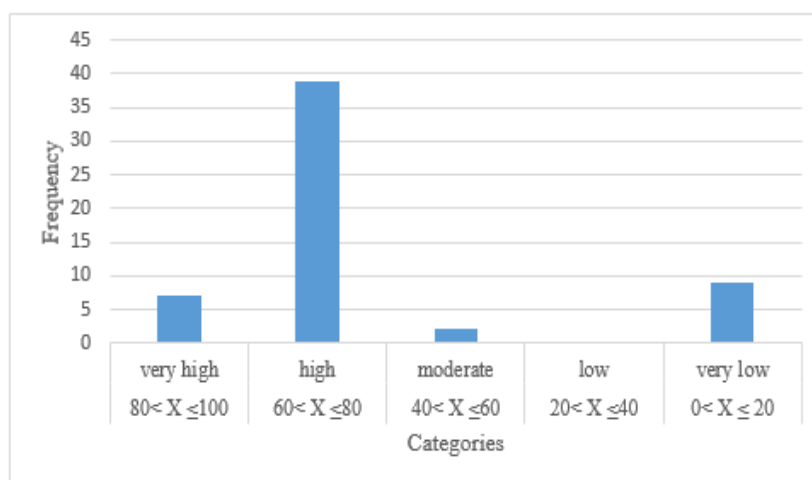


Figure 2. Graph students verbal communication results of SMAN 1 Sleman.

From table 4 and figure 2, there are 7 students included in the criteria is very high, 39 students included in the high criteria, 2 students are moderate, 9 students classified as very low and no student is classified in sufficient criteria. Verbal communication skills of class XI MIA SMAN 1 SLEMAN students is high with an average score is 60.9. Problem Based Learning learning model can improve verbal communication skills of students [25]. PBL model application based SSI effect on the development of critical thinking skills, written and verbal communication and cognitive learning outcomes [26]. PBL models can improve the communication skills of students [27]. Thus, it can be concluded that the c-handout Problem Based Learning Model Based aided Schoology can be used to train the verbal communication skills of students in Lup-optic topic.

4. Conclusion

Based on the analysis of the results of research and discussion be concluded as follows: 1) The verbal communication skills in class A is moderate . 2) The verbal communication skill in class B is high. 3) The verbal communication skill in class B is better than class A. 4) Verbal communication skills of class XI MIA SMAN 1 Sleman students is high. 5) E-Handout Problem Based Learning Model Based aided Schoology can develop students verbal communication skills.

References

- [1] Resita I and Ertikanto C 2018 *Proc. International Conference on Science, Mathematics, Environment and Education (Solo)* vol 1022 (Bristol: IOP Publishing) p 1–8
<https://doi.org/10.1088/1742-6596/1022/1/012025>
- [2] Mayasari T Kadarohman A Rusdiana D and Kaniawati I 2015 *Proc. Jurnal Pendidikan Fisika dan Keilmuan* **2** 48–55 <http://doi.org/10.25273/jpfk.v2i1.24>
- [3] Sadiqin I K Santoso U T and Sholahuddin A 2017 *Jurnal Inovasi Pendidikan IPA* **3** 52–62
<http://dx.doi.org/10.21831/jipi.v3i1.12554>
- [4] Suarsana I and Mahayukti G 2013 *Jurnal Pendidikan Indonesia* **2** 264–75
<https://doi.org/10.23887/jpi-undiksha.v2i2.2171>
- [5] Wahyuni S 2017 *Jurnal Pendidikan IPA Indonesia* **6** 70–178
<https://doi.org/10.15294/jpii.v6i1.7205>
- [6] Shelia T Y 2014 *Turkish Online Journal of Distance Education* **12** 166–73
<https://dergipark.org.tr/download/article-file/155703>
- [7] Hill M Sharma M D and Johnston H 2015 *European Journal of Physics* **36** 1–20
<https://doi.org/10.1088/0143-0807/36/4/045019>
- [8] Manurung S R and Mohardi Satria 2016 *Journal of Education and Practice* **7** 91–8
<https://doi.org/S0167876099000501>

- [9] Psycharis S Chalatzoglidis G Kalogiannakis M 2013 *Eurasia Journal of Mathematics, Science and Technology Education* **9** 11–21 <https://doi.org/10.12973/eurasia.2013.912a>
- [10] Ramlo S 2012 *Teaching and Teacher Education* **28** 928–35 <https://doi.org/10.1016/j.tate.2012.04.002>
- [11] Safadi R 2017 *Physics Education* **52** 1–9 <https://doi.org/10.1088/1361-6552/52/1/014002>
- [12] Miller K Lasry N Chu K and Mazur E 2013 *Physical Review Special Topics - Physics Education Research* **9** 1–5 <https://doi.org/10.1103/PhysRevSTPER.9.020113>
- [13] Carlgren T 2013 *Interchange* **44** 63–81 <https://doi.org/10.1007/s10780-013-9197-8>
- [14] Setyawan D N Sarwanto and Aminah N S 2017 *Jurnal Penelitian Pembelajaran Fisika* **8** 14–25. <http://journal.upgris.ac.id/index.php/JP2F/article/view/1332/1143>
- [15] Halimah L and Sukmayadi V 2019 *International Journal of Instruction* **12** 289–304 <https://doi.org/10.29333/iji.2019.12219a>
- [16] Sutiyatno S 2018 *Journal of Language Teaching and Research* **9** 430–37 <http://dx.doi.org/10.17507/jltr.0902.28>
- [17] Grace D M and Gilsdorf J W 2004 *Journal of Accounting Education* **22** 165–72 <https://doi.org/10.1016/j.jaccedu.2004.06.001>
- [18] Mcloone S C Lawlor B J and Meehan A R 2016 *Journal of Problem Based Learning in Higher Education* **4** 71–80 <http://dx.doi.org/10.5278/ojs.jpblhe.v0i0.1243>
- [19] Jones B D Epler C M Mokri P Bryant L H and Parette M C 2013 *Interdisciplinary Journal of Problem-Based Learning* **7** 34–71 <https://doi.org/10.7771/1541-5015.1344>
- [20] Sicat A S and Ed M A 2015 *International Journal of Education and Research* **3** 159–78 <http://www.ijern.com/journal/2015/January-2015/14.pdf>
- [21] Rosy B 2018 *Indonesian Journal of Informatics Education Schoology* **2** 1–6 <https://doi.org/10.20961/ijie.v0%vi%0i.21612>
- [22] Erlinda N 2016 *Jurnal ilmiah pendidikan Fisika* **5** 223–31 <https://doi.org/10.24042/jpifalbiruni.v5i2.122>
- [23] Koswara A and Mundilarto M 2018 *Jurnal Inovasi Pendidikan IPA* **4** 11–25 <http://dx.doi.org/10.21831/jipi.v4i1.6193>
- [24] Sujiono and Widiyatmoko A 2014 *Unnes Science Education Journal* **3** 685–93 <http://journal.unnes.ac.id/sju/index.php/usej%0A>
- [25] Fatchurrohman A E Sarwi and Utsman 2017 *Journal of Primary Education* **6** 140–46 <https://journal.unnes.ac.id/sju/index.php/jpe/article/view/17567>
- [26] Wilsa A W Susilowati S M E and Rahayu E S 2017 *Journal of Innovative Science Education* **6** 129–37 <https://journal.unnes.ac.id/sju/index.php/jise/article/view/17072>
- [27] Pasaribu L H 2016 *SIGMA* **2** 46–51 <http://jurnal.ulb.ac.id/index.php/sigma/article/viewFile/1294/1277>