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Development of student worksheet "Inokreat" Based Inquiry on Practicum Impact of Cigarette on Health

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Abstract

This study aims to analyze the validity and effectiveness of "inokreat" LKS based on inquiry on the impact of smoking on health. This research is designed as Research and Development (R & D) research consisting of 10 stages: potential and problem stage through questionnaire and interview method, data collection phase, LKS product design, LKS design validation by expert to test the validity of LKS, revision phase I, small scale in 10 random class VIII students, second phase revision, large-scale trial in one class VIII with 29 students to analyze the effectiveness of LKS on learning, product revision, and finished product. Expert judgment result on LKS "inokreat" based on inquiry on the impact of cigarette on health shows that LKS of valid development result is used in learning with percentage of material feasibility aspect 85% and media feasibility aspect 97,2% with criteria very feasible. The results of large-scale trials show that LKS "inokreat" is effective against students' learning outcomes with an average N-Gain score of 0.61 indicating an increase in learning outcomes from pretest to posttest in moderate categories. The average completeness of the classical students reached 89.65%. The average percentage of practicum skills was 88.5% and the presentation skills were 87.85% with very good category and the average of student discussion activity was 75.7% with the active category and the students' responses were 74.8% with the agreed category.

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INTRODUCTION

Smoking behavior among teens today is not new anymore. Many teenagers are still wearing school uniforms both junior and senior high school smoking with friends or own. Based on questionnaire of smoking behavior given to 32 students of class VIII SMP N 2 Weleri, consisting of 16 women and 16 men obtained result that 5 male students stated have started to smoke with span of time start smoking about less than 6 month-1 last year. The frequency of smoking per pupil ranges from 1 to countless. Student smoking activity is influenced by the surrounding environment and peers who have started smoking. Based on the questionnaire it is also known that one of the students who have started smoking claimed not to know that cigarettes can cause addiction, contain chemicals that are toxic and can cause lung cancer. Based on previous research, the highest percentage of a person starting to smoke is at the age of 16-20 years that is equal to 53.1% where age is the age of adolescents (Iqbal 2008). Even based on research conducted by the Ministry of Health in 2013 produced data showing that the age group of smokers every day from the age of 10-19 years reached 11.7% while smokers sometimes in this age group reached 8% (Ministry of Health 2013). Even more than 1000 children and teenagers start smoking for the first time each day, and 750 of them die at young age because of smoking-related diseases that can actually be prevented (Davison et al., 2007). Based on the research can be seen that adolescents who are still at school age has a high enough smoking potential so that the need for efforts from schools through science learning, especially for prevention and treatment for students who have started smoking by using the right approach to achieve the nature of learning that is behavioral changes that occur thanks to experience. Changes in behavior toward better this new will be achieved if the learners are active physically and psychologically in learning (Fathurrahman & Sutikno 2007).

Based on the current curriculum that is the curriculum of 2013 the learning process must use a scientific approach that emphasizes the active student learning. This approach is aimed at 1) encouraging learners to find out 2) learners able to formulate problems, 3) learners are trained to think analytically, and 4) emphasizing the importance of cooperation and collaboration in solving problems (Kemendikbud 2013a). One of the scientific approach models that can be used in the learning process is the inquiry learning model. Inquiry learning model has the main characteristic that is (1) emphasizes on student activity to find and find, (2) all activities conducted by students are directed to seek and find their own, and (3) inkuiri aims to develop intellectual ability as part of mental process so that students are required not only to master the lessons, but also to increase their potential (Majid 2013).

Science lesson in SMP Negeri 2 Weleri especially on addictive substance materials using instructional materials in the form of book packages published by the Ministry of Education and Culture and LKS. Package book and LKS are especially on addictive substance sub material contains only material and a set of questions consisting of multiple choice questions, short stuff and essays. This tends to make students receive the material instantly. Students are not taught to discover the concept of material independently and more often memorize. In fact, as stated by Rustaman et al (2003) that the biology learning process is not enough just by memorizing the material, but more emphasis on giving experience and practice to develop the competence of the students.

Giving experience and practice to find the concept of material independently can be done students through the process lab. Through the process of practicum students can obtain the ability intact so that learning becomes more meaningful for learners. It is said to be meaningful when learners understand the concepts they learn through experience directly and connect with other concepts they already understand (Depdiknas 2013). Based on the results of research Roth (1992) to prove that the lab can be used as a means to improve conceptual understanding and improve student misconception. The need for the implementation of this practicum activity because the learning with

the lab is very effective to achieve the entire realm of knowledge simultaneously, among others, to train the theory can be applied to real problems (cognitive), train the activity planning independently (affective), and train the use of certain instruments (psychomotor) (Rahayuningsih and Dwiyanto 2005). However, based on the results of interviews on science teachers of class VIII SMP Negeri 2 Weleri obtained the result that the enthusiasm of students on practical activities is large but the limited tools and materials in the school laboratory becomes an obstacle for the implementation of practicum activities.

Thus it is necessary to support teaching materials that are able to overcome various problems such as teaching materials in addition to loading materials and exercise questions also contains practical instructions that can be done with tools and simple materials to improve students' conceptual understanding. One of the teaching materials that can be used as a supporter of the main teaching materials is the Student Worksheet (LKS). According to Prastowo (2012), LKS as supporting teaching materials has functions such as (1) facilitating students in understanding the material, (2) able to train students' self-reliance, (3) enabling students, and (4) facilitating the implementation of teaching by educators. While one of the teaching media that can improve students' understanding is the use of interesting props.

Based on the above description, it is necessary that the development of LKS which is a supporter of the main teaching materials used LKS students developed is LKS "inokreat" based on inquiry.

RESEARCH METHOD

This research was conducted in SMP Negeri 2 Weleri, in the academic year of 2016/2017. This research is a Research and Developent (R & D) research. The R & D procedure consists of 10 stages, namely (1) potential stage and problem through interview with science teacher of class VIII SMP Negeri 2 Weleri, (2) data collection that can be used as material for making LKS; (3) product design in accordance with BSNP 2013 which includes the feasibility of content, language, and presentation; (4) LKS design validation by material experts and media experts; (5) revision of phase I based on input from the validator; (6) small-scale test using questionnaire containing the level of legibility both in terms of language, comprehension, writing and display of LKS developed; (7) Revision of phase II, based on the results of small scale test analysis; (8) large-scale trials, to test the effectiveness of the use of LKS in learning; (9) product revisions based on the results of questionnaire data analysis on large-scale test; (10) finished products (Sugiyono 2012). Form of experimental design is Pre Experimental Design with type One Group Pre-test and Post-test Design. The experiment was conducted with two field trials, ie small-scale trial conducted on 10 students of class VIII SMP Negeri 2 Weleri taken at random and large-scale test conducted on one class VIII D SMP Negeri 2 Weleri with the number of students as many as 29 students. The sample on a large scale test is taken by random sampling. The data in this research is data validity of media and material feasibility, data of LKS effectiveness to increase of student learning result.

RESULTS AND DISCUSSION

The results showed that the validity of "inokreat" LKS based on inquiry on the impact of smoking on health based on material feasibility and media feasibility showed valid results. With the average percentage of material feasibility is 85% and media eligibility percentage 97.2% with very reasonable criteria. The result of validation of the material is done by two validators namely lecturers and teachers. Validation results are presented in Figure 1.

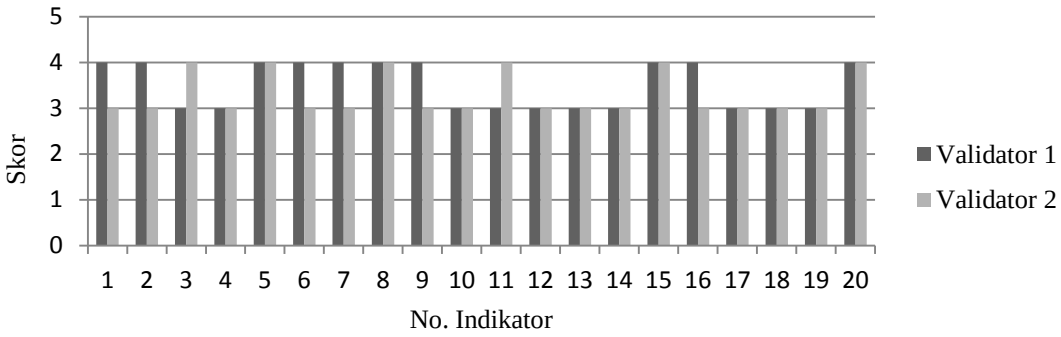

Figure 1 Validation results

The result of validation of material conformity aspects with KI and KD got an average score of 3.5 from material experts, which means that the material presented in the LKS is in accordance with core competence and basic competence, in terms of material coverage, description, and concept recognition up to interaction between concepts. This is supported by the statement Prastowo (2012) that in preparing the LKS need to consider the suitability of the material with the basic competencies described from core competencies. Acquisition of a score of 3.5 could be because the material presented is not fully support the achievement of all basic competencies.

The validation of the accuracy of the material subject to the average score of 3.5 from the material expert, meaning the concepts, definitions, facts, data, examples, cases, drawings and illustrations presented in accordance with the facts in the surroundings surrounding the students, does not result in much interpretation and efficient to improve learners' understanding. This is supported by the statement of Devi (2009), that the material in the LKS that includes concepts, laws, and theories are presented in a systematic, logical, simple, clear, and accurate. Acquisition of a score of 3.5 could be because in the illustration of the picture on the practical work of the observation phase of the image used is the image sourced from google, it would be better to use the image of personal documentation and also does not display examples of real cases in the environment, suffering from a cigarette addiction.

The result of validation of material upgrades received an average score of 3.75 from material experts, which means pictures, illustrations, examples, and cases presented actual and in accordance with the situations and conditions that occur in everyday life. The results of aspect validation encourage curiosity to get an average score of 3 by a material expert, which means the description, practice, and case examples presented are able to encourage learners to think further question and stimulate critical thinking. This is in line with that disclosed by Hidayati (2012), that learning resources that provide knowledge and activities oriented to nature and the environment, can effectively support in learning, motivate students, and involve students in a meaningful learning experience. Obtaining a score of 3.75 could be because the example of a less detailed case only shows images of diseases caused by cigarettes as listed on the cigarette pack without any further explanation.

The results of the validation of the practicum aspect obtained an average score of 3.25 by the material expert, which means the material description is also accompanied by a safety procedure indicated by a warning image to use the mask during the test activity of the substance content in the cigarette and be careful in using fire during but it has not been accompanied by an explanation that work safety is important to apply and there are individual and group direction assignments, but the direction presented still tends to group work. This is in line with that proposed by Santyasa (2007) that the preparation of the practice manual should contain guidance containing directives to students that include the implementation of individual or group practice.

The result of validation of the presentation aspect obtained an average score of 3.3 by the material experts, which means that the consistency of the systematical presentation of the material is still less consistent, stimulating the involvement and participation of learners for independent learning is still lacking, however, for practicum activities conducted in groups will bring up the possibility of existence learners who are not fully involved, while for the methods and approaches presented are fully directed to the method of inquiry. This is in line with one aspect that must be fulfilled in an LKS, ie the activated aspect which emphasizes that the LKS must be qualified to invite the active students in the lesson, emphasizing the process of finding the concept which in this LKS is directed through inquiry method.

The linguistic component validation results obtained an average score of 3.3 by the material expert, which means that the language used in the LKS matches the intellectual development level of the learner, is standardized and easy to understand, excites, and creates no ambiguity. Widjajanti (2008) states that one of the requirements of the construction aspect must meet the language requirements used in the LKS in accordance with the level of child development, the sentence structure used must be clear and simple. Obtaining a score of 3.3 this could be because the language used is still too flat like LKS in general.

Media feasibility assessment includes aspects of construction, didactic aspects, and technical aspects. Media validation results are presented in Figure 2.

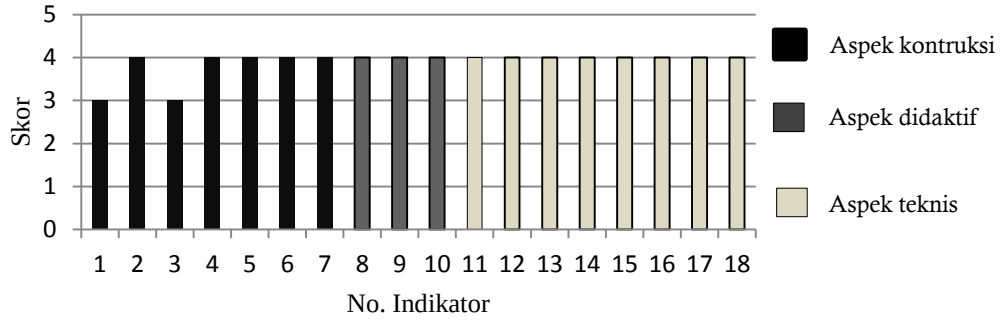

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Figure 2 Media validation results

The results of the construction aspect validation obtained an average score of 3.7 by the media expert, which means the LKS has been completed with identity but the identification of the need to change the place, the learning objectives are clear, the language used in accordance with the level of development of the students, many illustrations of the drawings, there is sufficient space for writing and drawing and the instructions in the LKS are clear. This is in line with the terms of construction in the LKS according to Widjajanti (2008) which states that the construction aspect emphasizes that the student worksheets must meet the language requirements used in the LKS according to the level of child development, the sentence structure used must be clear and simple, using illustrations / drawings which is more than words, contains reading sources according to the scope of student readability and provides sufficient space for students to write or draw, and comes with an identity to facilitate administration.

The result of the activated aspect validation obtained an average score of 4 by the media expert, which means that the developed LKS triggered student involvement, stimulated the depth of thought, and the correspondence between the learning process and the inquiry learning model. This is in line with the requirement to be activated in the LKS according to Widjajanti (2008) which states that the activated aspect emphasizes that the student worksheets must be eligible to engage students actively in the lesson, emphasizing the process of finding concepts, variations of stimulus such as

writing, drawing, discussion and using the tools, as well as the learning experience is determined by the personal development goals of the students.

The results of technical aspect validation get an average score of 4 by media experts, which means cover design, size, size and layout composition, frame use, harmony of font size with image, compatibility of color composition, consistency of font use and image presentation / content effectively, in accordance with applicable standards so that LKS can be read clearly by students. This is supported by Prastowo's statement (2012), that as perfect as any material, if students are not able to read clearly, then LKS will not give maximum results.

Based on the results of material and media validation there are several things that need to be improved, among others, namely the addition of the word LKS before the name of the LKS and the placement of the author's name placed elsewhere. LKS that have been validated then improved and tested on a small scale in terms of language, understanding, writing and appearance. Small scale test was conducted on 10 students of class VIII in SMP Negeri 2 Weleri taken at random. The results of small-scale test show results with very good category with an average percentage of 98%. The results of small-scale trials were then revised phase II based on student responses and comments. The revised LKS are then used for large-scale trials to determine the effectiveness of LKS on student learning outcomes in learning.

The effectiveness test of student learning outcomes is done by large scale trial. A large-scale trial of an inquiry-based "inokreat" LKS was applied to a class of 29 students in SMP Negeri 2 Weleri. Data collection of LKS effectiveness includes cognitive domain learning result which includes posttest score and practicum report, psychomotor academic achievement that includes value of practicum skill and presentation skill, affective domain skill covering discussion activity and student response after learning.

Student learning outcomes of cognitive domains were observed through changes of students before and after following the learning process. Retrieval of learning result data is done individually and group. Individual result data retrieval is done twice before (pretest) and after (posttest) and taking data of learning result by group is taken from activity report report value. The results of pretest, posttest and report values are presented in figure 3.

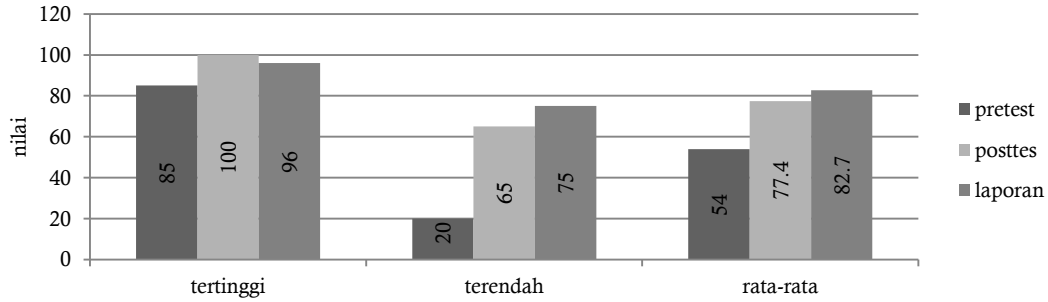

Figure 3 The results of pretest, posttest and report values

Based on the results of the analysis on the data increase student learning outcomes seen from differences in pretest and posttest values calculated using the formula N-gain shows that the average value of N-gain of 0.61 with the category of being. It shows an increase in material understanding after going through the learning process. Increased understanding of the material is the result of students doing their own observation activities, so that the learning experienced by students will be more meaningful. This is in line with that expressed by Aqib (2013), that learning will be more meaningful if students experience what they learn, not just know the material.

The value of posttest obtained by students indicate that there are 4 students who do not complete the KKM as well as 25 other students complete. With the average grade of completeness

klasikal students reach 82.75%. While the value of group reports obtained by students showed that all students expressed thoroughly KKM with the average classical score reached 83 students. It shows the acquisition of good learning outcomes with group learning. Group learning facilitates students to discuss each other, share information and exchange opinions in accomplishing tasks and activities together, so as to obtain good learning outcomes. This is supported by Slavin's (2011) assertion that in group learning, where students work together to help one another master information and complete a task.

Based on the result of posttest value accumulation calculation and the value of report used as the final value of students with KKM 75 obtained data on the number of complete students as many as 26 students, while students who are not complete as many as 3 students. With an average value of 82.8. Classical mastery reach 89.65%. The existence of students who still have not reached KKM can be caused by several factors such as student lazy learning, student environment influence, learning motivation, activity, and readiness of student learning is low. This is in line with that delivered by Mulyani (2013), stating that there are several factors that affect student learning outcomes include physical conditions, basic skills, talents, motivation, the environment, activities, and readiness to learn.

Psychomotorical learning results include data on practicum skills and presentation skills. Student practicum data was collected by observation technique during practice activity of cigarette impact on health. Aspects observed include 10 aspects. Psychomotoric learning achievement of students is presented in figure 4.

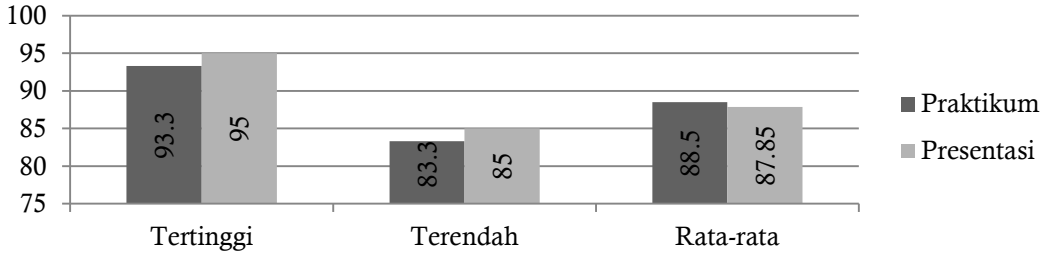

Figure 4 Psychomotoric learning achievement of students

Based on the results of data analysis obtained criteria very good for all students with an average percentage of 88.5%. This suggests that learning by practicum activities can develop science process skills, critical thinking skills, analytical skills, and the ability to apply concepts. This is in line with that proposed by Ariyati (2010) that paktikum/experiments can develop skills, critical thinking skills because students are required to actively solve problems, the ability to analyze, and the ability to apply the concept so that it becomes more meaningful. Also in line with the proposed by Hasrudin and Rezeqi (2012) that the benefits of practicum, among others, to train the skills of the process of science, the formation of scientific attitudes, and train precision. Data on presentation skills are taken in groups during presentation activities that cover 5 aspects. Based on the results of data analysis of student presentation skills obtained very good criteria for all groups with the lowest percentage is 85%, percentage is 95% high, with the average percentage reach 87.85%.

The students' affective learning achievement includes assessment of discussion activities and student responses after learning activities. The students' affective learning results are presented in Figure 5.

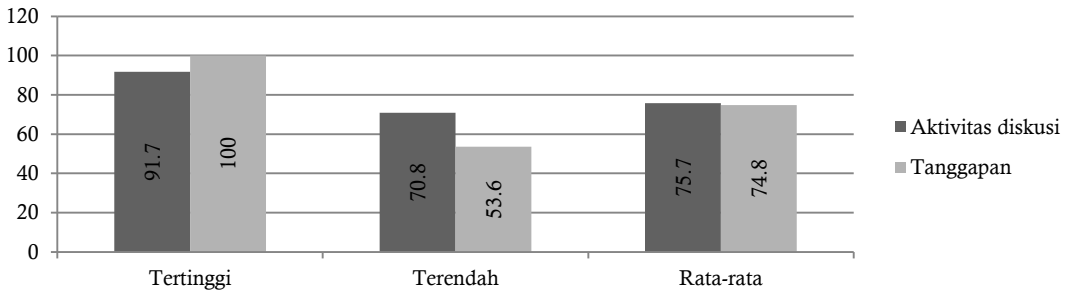

Figure 5 The students' affective learning results

Based on the results of the analysis obtained the results of students with very active criteria amounted to 5 students, while the criteria of 24 other students are active. Differences in student activity are caused because each student has a different character. This is supported by the statement of Ibrahim & Syaodih (2003), that in learning there are principles of individual differences. Each student has a different character and receives influences and treatment from different families. With an average percentage of 75.7% with active criteria.

Analysis of the result of student's response after learning using LKS "inokreat" based on inquiry on the impact of cigarette to health is known that the students who stated strongly agree amounted to 6 people, agree 22 people and 3 people said less agree. With the average percentage of students responses 74.8% with agreed criteria. Based on the analysis it turns out one of the students who stated less agree, on the results of cognitive learning obtained results that are not complete, this is obtained by students with absent number 1. But in 2 other students who answered less agree to get the results of cognitive value complete. This is related to the different individual carriages as Ibrahim & Syaodih (2003) have pointed out. This shows that students' attitudes or behaviors arise because of experience as a result of learning. This is in line with that proposed by Gage and Berliner (1984) who say that learning is a process of behavior change that arises from experience. This statement is also consistent with that of Moh. Surya (1997) that learning can be interpreted as a process undertaken by individuals to gain a whole new behavioral change, as a result of the individual's own experiences in interacting with the environment.

CONCLUSION

Based on the result of the research and discussion, it can be concluded that (1) LKS "inokreat" based on inquiry which developed valid used in learning addictive substance material of cigarette effect to health based on material expert appraisal 85% and media expert equal to 97,2% with very decent category; (2) LKS "inokreat" based on inquiry on the effect of cigarette effect on the effective health of student learning outcomes with average N-gain value of 0.61 with the medium category and the average of 89.65% classical completeness; (3) LKS "inokreat" based on inquiry on the impact of cigarettes on health effective against student practice skills with an average percentage of 88.5% with very good criteria; (4) .LKS "inokreat" based on inquiry on the impact of cigarettes to health effect on student discussion activity with an average percentage of 75.7% with active criteria and the average percentage of students' responses 74.8% with agreed criteria.

REFERENCES

Aqib, Zainal. 2013. *Model-model, Media, dan Strategi Pembelajaran Kontekstual (Inovatif)*. Bandung: Yrama Widya

Ariyati, Eka. 2010. Pembelajaran Berbasis Praktikum untuk Meningkatkan Kemampuan Berpikir Kritis Mahasiswa. *Jurnal Matematika dan IPA Universitas Tanjungpura,* 1(2) Tahun 2010

Davison, Gerald C, Neale, John M, Ann M &Kring. 2007. *Abnormal Psychology (Psikologi abnormal Edisi ke-9).* Terjemahan Nurmalasari Fajar. Jakarta: PT Raja Grafindo Persada

Depdiknas. 2013. *Pembelajaran Tematik Terpadu.* Jakarta: Departemen Pendidikan Nasional

Devi, P.K., R. Sofiraeni, & Khairudin. 2009. *Pengembangan Perangkat Pembelajaran untuk Guru SMP*. Bandung: PPPPTK IPA

Fathurrahman, Pupuh dan Sobry Sutikno. 2007. *Strategi Belajar Mengajar; Melalui Penanaman Konsep Umum dan Konsep Islami*. Bandung: PT. Refika Aditama

Gage, N.L. & Berlner, David, C. (1984). *Educational Psychology 3rd Ed*. Boston, Houghton Mifflin Company

Hasruddin & Salwa Rezeqi. 2012. Analisis Pelaksanaan Praktikum Biologi dan Permasalahannya di SMA Negeri Sekabupaten Karo. *Jurnal Tabularasa PPS Unimed,* 9(1) Tahun 2012

Ibrahim, R & N. Syaodih S.. 2003. *Perencanaan dan Strategi Pembelajaran*. Jakarta: Rineka Cipta

Iqbal MF. 2008. Perilaku Merokok Remaja di Lingkungan RW. 22 Kelurahan Sukatani Kecamatan Cimanggis Depok Tahun 2008 (*Skripsi*). Depok: Universitas Indonesia

[Kemendikbud] Kementerian Pendidikan dan Kebudayaan. 2013a. Materi Pelatihan Guru Implementasi Kurikulum 2013 SMP/MTs Ilmu Pengetahuan Alam. Modul disampaikan pada *Pelatihan Implementasi Kurikulum 2013*. Kementerian Pendidikan dan Kebudayaan

[Kemenkes] Kementerian Kesehatan RI. 2013. *Riset Kesehatan Dasar*. Jakarta: Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan RI

Majid A. 2013. *Strategi Pembelajaran*. Bandung: Remaja Rosda Karya

Moh. Surya. 1997. *Psikologi Pembelajaran dan Pengajaran.* Bandung PPB: IKIP Bandung

Mulyani, D. 2013. Hubungan Kesiapan Belajar Siswa dengan Prestasi Belajar. *Jurnal Ilmiah Konseling* 2(1):27-31

Prastowo, A. 2012. *Panduan Kreatif Membuat Bahan Ajar Inovatif.* Yogyakarta. Diva Press.

Rahayuningsih E & Dwiyanto D. 2005. *Pembelajaran di Laboratorium.* Yogyakarta: Pusat Pengembangan Pendidikan UGM

Roth KJ. 1992. Science Education : It's Not Enough to Do or Relate. *Relevant Research Vol II.* The National Science Teachers Association

Rustaman, N., Dirdjosoemarto, S., Yudianto, S. A., Achmad, Y., Subekti, R., Rochintaniawati, D., & Nurjhani, M. 2003. *Strategi Belajar Mengajar Biologi.* Jakarta : Universitas Pendidikan Indonesia

Santyasa. 2007. Landasan Konseptual Media Pembelajaran. Dalam: *Workshop Media Pembelajaran bagi Guru-guru Banjarangkan Klungkung.*Universitas Pendidikan Ganesha. *On line at http://www.freewebs.com/santyasa/pdf2/ METODE_PENELITIAN.pdf* [diakses tanggal 25 Maret 2014]

Slavin, R.E. 2009. *Psikologi Pendidikan: Teori dan Praktik*. Translated by Samosir, M. 2011. Jakarta: Permata Puri Media

Sugiyono. 2010a. Metode Penelitian Pendidikan. Bandung: Alfabeta

Widjajanti, E. 2008. Kualitas Lembar Kerja Siswa. makalah disampaikan pada Kegiatan Pelatihan Penyusunan LKS Mata Pelajaran Kimia Berdasarkan KTSP bagi Guru SMK/MK. *Jurusan Pendidikan Kimia FMIPA UNY: Yogyakarta 22 Agustus 2008*