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Retno Utaminingsih¹, Ayu Rahayu²

^{1,2}Universitas Sarjanawiyata Tamansiswa, Yogyakarta

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The Development of *LKM* Science Basic Concept Based on Tri N (*Niteni Nirokke Nambahi*) to Instill Students' Critical Thinking

Retno Utaminingsih¹, Ayu Rahayu²

^{1,2}Universitas Sarjanawiyata Tamansiswa, Yogyakarta

¹retno.utaminingsih@ustjogja.ac.id

Article Info

Keywords

3N (Niteni Nirokke Nambahi)
Student Worksheet (LKM)
Critical Thinking Skills

Abstract

This research was categorized as an R & D research that aimed to develop Student Worksheets (LKM) in the Elementary Science Basic Concepts course. This course is used to instill students' critical thinking skills. The design developed in this study uses the 4D design (four D-Models) proposed by Thiagarajan, Semmel, & Semmel (1974), which consists of the following stages: 1) defining 2) planning, 3) developing. And 4) dissemination. The instruments used in this study were expert validation sheets and student response questionnaires. The data analysis technique in this study used expert validation data analysis and analysis questionnaire data of student response. The assessment from the material expert got a score of 4.67, which means a very good category. Then, the assessment results of the media experts get a 4,17 score means in the good category. The average value of expert validation $(4.67+4.17):2=4.42$ is in the very good category. Based on these results, the LKM based on 3N Science Basic Concepts (Niteni Nirokke Nambahi) was made feasible in the learning process. By implementing 3N-based LKM (Niteni Nirokke Nambahi) in learning, students' critical thinking skills increased. It can be seen from the results of the student response questionnaire. It was found that students gave a positive response with a percentage of 90.2%, which was in the 51% - 100% interval. These results are also supported by the student LKM answers, where the average value of 7 LKMs is 76.3. It means that the value has met the specified KKM.

Keywords: 3N (Niteni Nirokke Nambahi), Student Worksheet (LKM), Critical Thinking Skills

Introduction

Learning in college or university is categorized as adult learning. Adult education, according to Knowles, is called andragogy education. He stated that andragogy is an art and science that deals with ways to help adults to learn (Knowles, 1997: 8). Education for adults aims to strengthen knowledge, skills, and various experiences in carrying out their functions and roles in life (Sujarwo, 2016). One education approach for an adult is "andragogy." Andragogy is an educational process that helps adults discover innovation or knowledge related to social settings and education. It promotes individual, organization, and community health (Sujarwo, 2016: 159).

The science learning process in higher education should reflect interactive, holistic, integrative, contextual, thematic, effective, collaborative, and student-centered characteristics (Tim Kurikulum dan Pembelajaran, 2014: 53). According to Rokhimawan (2016: 2), "Following the demands for higher education curriculum innovation which requires every competency given by students must be juxtaposed with a mastery of certain skills." They triggered mastery of hard skills and soft skills, which are indispensable in the learning process. The hard skills mean mastery of lecture material (theory), while soft skills assist in strengthening the hard skills. According to Wagner (2008), soft skills mean the ability to think critically and solve problems.

Critical thinking skills are basic abilities to solve problems (Azizah, Sulianto, and Cintang, 2018: 62). According to Wijayanti, Pudjawan, and Margunayasa (2015), critical thinking ability is the ability of students to solve problems and take decisions (conclusions) from considering various aspects and points of view. The ability to think critically is an important intellectual capital possessed by students when dealing with problems. Critical

thinking skills are included in higher-order thinking skills.

Lau in Azizah, Sulianto, and Cintang (2018: 62) state the character of a student with critical thinking are: 1) they able to understand the logical correlation between ideas, 2) they can formulate ideas briefly and precisely, 3) They also can identify, constructing, and evaluating arguments, 4) They can evaluate their decisions, 5) They also able to evaluate evidence and hypothesize 6) They can detect inconsistencies and common errors in reasoning, 7) They can analyze problems systematically; 8) They able to identify the relevance and importance of ideas, 9) They can assess one's beliefs and values, and 10) able to evaluate someone's thinking ability

The critical thinking ability of each student is different. It depends on the exercises that are often done to instill critical thinking skills. Then, instilling students' critical thinking skills can be done with various activities such as observing every phenomenon in the learning process, especially in observing the phenomena in science. In addition, students can do things exemplified by the lecturer to understand better the material presented. The students can express their opinions regarding the material being discussed and add new ideas from observations and practices carried out in the learning process. That method can instill the student's critical thinking skills.

Moreover, Ki Hajar Dewantara's teachings explained that observing, imitating, and adding new ideas in the learning process are often known as *Tri N*, *niteni*, *nirokke*, and *nambahi* activities. *Niteni* is derived from the word "titen" which carefully recognizes an object's meaning (nature, characteristic, procedure, truth). *Niteni* means the searching process in finding the meaning (nature, characteristics, procedures, truth) of an observed object through sensory. *Nirokke* can be translated as imitate. The method of imitation is human nature, more accurately called *iradat* or desire to imitate anything that attracts attention. While *Nambahi* can be interpreted to develop/add (to innovate / to add value). "*Nambahi*" or add/develop is an advanced process of "*Nirokke*." There is a creative and innovative process to give innovation to the imitated model (Widyawati, Setyawan, and Kuncoro, 2019: 49).

According to Ermawati and Rochmiyati (2020: 9), *niteni* identifies carefully using all five senses. *Nirokke* imitates what is taught through models/examples from teachers/learning resources by involving thoughts, sensing, feelings/conscience, and spiritually integrally and harmoniously. Through the process of reciting/through sound; imitating by reading, imitating by writing, imitating through movement, imitating by trying/experimenting, imitating by demonstrating or practicing, imitating by presenting. *Nambahi* adds value to what has been learned through models/examples from teachers/learning resources by developing creativity and ideas. Through the process: adding by designing, adding by creating, adding by improvising.

Niteni, *nirokke*, and *Nambahi* activities to instill critical thinking skills can be assisted by Student Worksheet (LKM). It also can be used as a guide in learning activities by students. Student Worksheet (LKM) is one of the tools that can support learning to help and facilitate active and effective interactions between participants and learning resources to improve their learning outcomes. Through LKM, each student's experience or learning task in constructing knowledge independently or in groups can be structured systematically.

Student worksheets (LKM) are teaching materials that are integrated, so they help the students to study the material independently. LKM has several functions as follows: 1) as guidance in conducting learning activities; 2) as an observation sheet; 3) as a discussion sheet; 4) as a discovery sheet; 5) as a media to train students more critically in conducting teaching and learning activities; 6) increase student interest in learning if the learning activities guided through LKM are more systematic, colorful, and illustrated to attract students' attention (Suyanto in Afandi and Jalal, 2017: 328).

According to Poerwanti (2014), Student Worksheets are sheets containing assignments that students must do. Meanwhile, according to Irvan, Nurdiansyah, & Hayati (2015), Student Worksheets are activity sheets that trigger student enthusiasm during lectures. This LKM can encourage students to participate in lecturing activities (Mairing & Lorida, 2013). The LKM developed requires students to actively participate in classes, be independent, responsible, and disciplined. Through LKM, students are expected to be motivated to study independently, so the learning process is more effective and efficient. It is because the students can understand the lecture material (Ni'mah, 2016). Following Lestari, Sudarisman, & Sugiyarto's (2014) opinion, LKM in learning can encourage students to think actively. Thinking is a process that produces new mental representations through information transformation that involves complex interactions between various mental processes such as judgment, abstraction, reasoning, imagination, and problem-solving (Listiani, 2018).

LKM is a student guide to discover new concepts. LKM can be used as a guide for students in increasing the effectiveness of learning activities either individually or in groups to master the material and obtain optimal learning outcomes. They also can apply critical thinking skills in the learning process. Therefore, through the

LKM developed by the lecturer, it is expected that every student will have a more focused guide in carrying out their learning activities so that it will ease in developing critical thinking skills.

Educators can facilitate the development of student's critical thinking skills through the use of LKM, which will guide student activities in the learning process. Then, the LKM developed is adapted to the science material and based on 3N (*niteni, nirokke, nambahi*). Indeed, the students' critical thinking skills are more visible and well embedded in students.

Method

The type of research used is development research. The development design and in this study used the 4D design (four D-Models) proposed by Thiagarajan, Semmel, & Semmel (1974), which consisted of 1) defining stages; 2) planning; 3) development; and 4) dissemination.

The definition stage consists of student analysis, namely students, curriculum analysis, lesson plans, and material analysis. The design phase consists of selecting the format and the initial design of the Student Worksheet (LKM). The development phase consists of validation and field trials. Science learning experts and media experts carried out expert validation. Field trials using a one-shot experiment case study design.

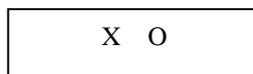


Figure 1. Design of the One-Shot Case Study Experiments

Note:

X = Treatment: the use of student worksheets (MFIs) in Lecture

O = student response assessment

The dissemination stage is carried out by attending a seminar on research results. The instruments used in this study were expert validation sheets and student response questionnaires. The data analysis technique in this research is the expert validation data analysis technique carried out using qualitative analysis. Expert validation assessment criteria are shown in Table 1 below

No	Score Length	Criteria
1	$4,206 < \bar{X}$	Very good
2	$3,042 < \bar{X} \leq 4,206$	Good
3	$2,598 < \bar{X} \leq 3,042$	Good Enough
4	$1,792 < \bar{X} \leq 2,598$	Pretty good
5	$X \leq 1,792$	Very Not good

In addition, data analysis techniques used student response questionnaire data analysis. It is used to determine student responses using the Guttman scale. According to Widoyoko (2020:116), the Guttman scale is in the form of statements series in which a respondent is asked to express his opinion using an agree or disagree answer. Student data analysis response questionnaires were carried out by calculating the scores obtained by students, calculating the percentage of student responses, categorizing the rate of student responses based on the following table

The percentage score in each student	Category
51 % - 100%	Positive
0 % - 50 %	Negative

*(Widoyoko, 2020: 116)

Results and Discussion

At the definition stage, a student analysis has been carried out, namely students, curriculum analysis, in this case, is RPS, and the analysis of lecture material. The students who are the subjects of this research are the second-semester students who take the Elementary Science Basic Concepts course. Curriculum analysis is carried out by analyzing the RPS. The issues used are the Basic Science Concepts course. The learning material in this course is

emphasized on Physics material. This physics material is more capable of instilling students' critical thinking skills than the materials developed in the Student Worksheet (LKM). That material consists of Form, Force, Motion and Newton's Laws, Energy and Energy Changes, Vibration and Waves, Electricity and Magnetism, Solar System, and Natural Resources and Technology.

The format and initial draft of the Student Worksheet (LKM) were obtained at the design stage. In the even semester of the 2020-2021 academic year, the learning activity in university is carried out online. It is following the regulations of the minister of education regarding the coronavirus pandemic. In addition, according to the leader's policy in the Sarjanawiyata Tamansiswa University, online lectures are carried out through the sipedar.ustjogja.ac.id platform. This semester it becomes the background for developing Student Worksheets (LKM) for the Elementary Science Basic Concepts course, adapted to online learning. The developed Student Worksheet (LKM) is in the form of ms word, where the Student Worksheet (LKM) is distributed to students through the LMS (Learning Management System) sipedar.ustjogja.ac.id. LKM is given to students in each meeting. The LKM is made in MS Word to make it easier for students to fill out and answer questions in the space provided at the LKM.

At the development stage, expert validation and testing are done and carried out on learning activity. The validation value of the learning material expert was 4.67, and it was included in the very good category. Inputs from learning material experts are:

- 1) The LKM is good. Videos add the material descriptions, and some have been linked to the development of science and technology. Some questions trigger the students to think critically.
- 2) There is enough space for students to answer questions/activities at the LKM. However, it can be expanded again. The example on page 23, to answer the wave is, have a wider space, considering that there is still space below the question:

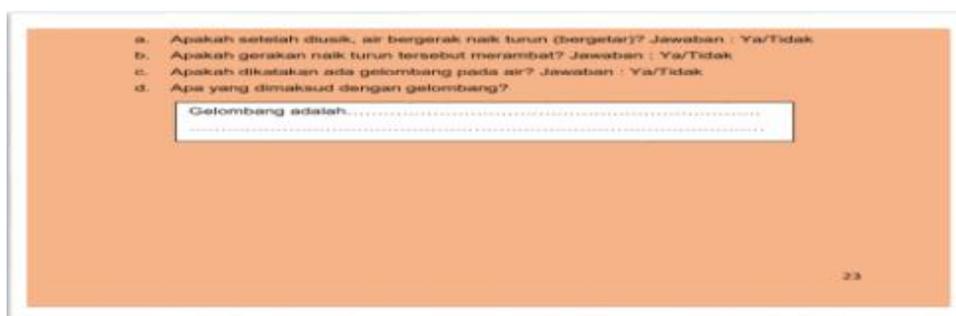


Figure 2. Input from Learning Material Expert

- 3) The additional activities can be developed again, for example, through other alternative activities. After the experimental *nirokke* activity, each student can design an experiment according to the science concept at each meeting.

The value of the media expert got a score of 4.17, and it was in a good category. Inputs from media experts are:

- 1) The page does not have to be full color. The most important thing is that the layout is attractive, so it is not boring when students use this LKM.
- 2) The image quality has to replace better quality, so it is not broken and more attractive.
- 3) The layout of the text can be more varied, but it is not random so that it is easier to read.

The following is the assessment results from the validation expert for the Student Worksheet (LKM) 3N-Based Science Basic Concepts (*Niteni Nirokke Nambahi*), which consists of 30 assessment items

Table 3. Results of Expert Validation

No	Considered Aspects	Validator 1	Validator 2
1	The LKM Interface	4,5	3,33
2	Presentation Component	4,4	4,0
3	Contents Feasibility	5,0	5,0
4	Learning Aspects	4,6	4,0
5	<i>Ketamansiswaan</i> Aspect	4,75	4,0
6	The suitability aspect of LKMs in Cultivating Critical Thinking Skills to Students	4,75	4,75
Average		4,67	4,17
Total Average		4,42	

The average value of expert validation is $(4.67+4.17) : 2 = 4.42$. It is categorized in the very good category, so the 3N-based Science Basic Concepts LKM (*Niteni Nirokke Nambahi*) is very good for the learning process. Based on student response data, it was found that students gave a positive response with a percentage of 90.2%, which was in the 51% - 100% interval. Based on these results, the 3N-based LKM Science Basic Concepts (*Niteni Nirokke Nambahi*) were made feasible in the learning process. The dissemination stage is carried out with a seminar on research results.

3N-based LKM (*Niteni Nirokke Nambahi*) is needed in the Basic Science Concepts course because it can instill critical thinking skills, especially in solving problems and making decisions from various aspects and points of view. The critical thinking ability of each individual is different, depending on the exercises that are often done to develop their critical thinking skills. With the existence of the 3N-based LKM (*Niteni Nirokke Nambahi*), students' continuous practices are carried out so that it is easier to instill critical thinking skills in students in Basic Science Concepts courses. The following are some activities carried out by students in LKM to instill critical thinking skills.

KEGIATAN NITENI

Kegiatan 1 Getaran
Lakukan demonstrasi berikut dan jawab pertanyaan di bawahnya.
Sediakan sebuah penggaris plastik dan buku tebal. Letakkan penggaris plastik di atas meja dengan ditindih buku tebal seperti pada Gambar 1.

Gambar 1. Penggaris disimpangkan dengan simpangan tertentu

- Jika penggaris ditarik ke titik A, saat dilepaskan maka penggaris akan bergerak melewati titik ... dan ...
- Apakah penggaris yang disimpangkan dengan simpangan tertentu akan bergerak bolak-balik? Jawaban : Ya/Tidak
- Titik manakah pada Gambar 1 yang dikatakan sebagai titik keseimbangan? Jawaban: Titik
- Apakah penggaris seperti pada demonstrasi di atas dikatakan bergetar?

Figure 3. One of the *Niteni* activities in the LKM

KEGIATAN NIROKKE

Lakukan percobaan berikut.

Percobaan 1: Hukum Newton

- **Tujuan Percobaan**
Mengetahui aplikasi Hukum Newton 1 dalam kehidupan sehari-hari
- **Alat dan Bahan Percobaan**
 - Gelas plastic
 - Kertas HVS
- **Langkah – langkah Percobaan**
 - Letakkan gelas di atas kertas.
 - Tarik kertas secara perlahan, amati apa yang terjadi.
 - Letakkan kembali gelas di atas kertas.
 - Tarik kertas secara perlahan, amati apa yang terjadi.

Figure 4. One of *Nirokke* activities in the LKM

KEGIATAN NAMBAHI

D. Data Hasil Pengamatan
Pertanyaan

- Apa yang terjadi dengan gelas apabila kertas ditarik secara perlahan?
Jawaban:
- Apa yang terjadi dengan gelas apabila kertas ditarik secara cepat?
Jawaban:

E. Analisis Data
Pertanyaan
Jelaskan percobaan yang Anda lakukan dalam kaitannya dengan hukum Newton.
Jawaban

.....

.....

.....

.....

.....

Figure 5. One of the activities added in the LKM

From the pictures above, it can be seen that through *Niteni Nirokke Nambahi* activities at LKM, students are asked to analyze problems, solve problems, make decisions (conclusions) from various aspects and points of view. It also can understand logical relationships between ideas. It can formulate ideas briefly and precisely, able to identify, construct, and evaluate an argument. They also can assess decisions, evidence, and hypotheses. Critical thinking skills are very important to be instilled in students, especially *PGSD* students that are prospective elementary school teachers. It needs to be done to appropriately observe and solve various problems they will encounter in the school environment (Fakhriyah, 2014: 96). In addition, students' critical thinking skills also reach the stage of creating (C6) or developing their experiments on science material after passing through various stages of learning. In line with the statement of King (Putra & Sudarti: 2015:48), that states the critical thinking is categorized as higher-order thinking skills. Taxonomy Bloom places the activities of analysis and synthesis, evaluation, and creation at a higher hierarchy when compared to knowledge, understanding, and application. Because this realm requires a stage of high-level thinking skills, including critical thinking skills, and creating activities (C6) or developing their experiments on science material is one of the essential thinking skills instilled in students. Those can be seen in the figure below:

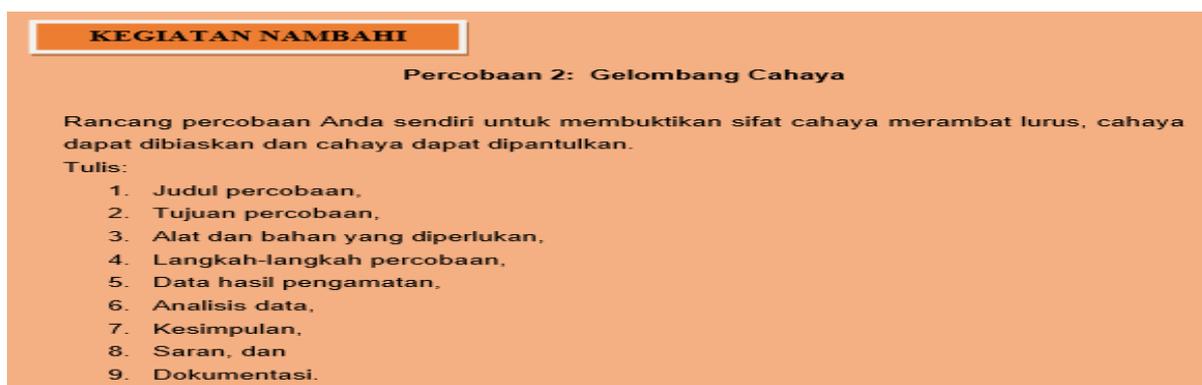


Figure 6. One of *Nambahi* activities with designing the trial by their self

The various activities and exercises are covered in 7 LKM-based 3N (*Niteni Nirokke Nambahi*). Seven meetings include substance material, force, motion and Newton law, energy changes, vibration and waves, electricity and magnets, solar systems, and natural resources and technology. Student critical thinking skills are increasingly added. It can be seen from the results of the student response questionnaire where students gave a positive response with a percentage of 90.2%, which was at 51% - 100% interval. These results are also supported by the results of the Student LKM Answer obtained an average score of 76.3. it means the value has fulfilled the specified KKM. The following is a diagram of the average value distribution of students at 7 LKM based on 3N (*Niteni Nirokke Nambahi*).

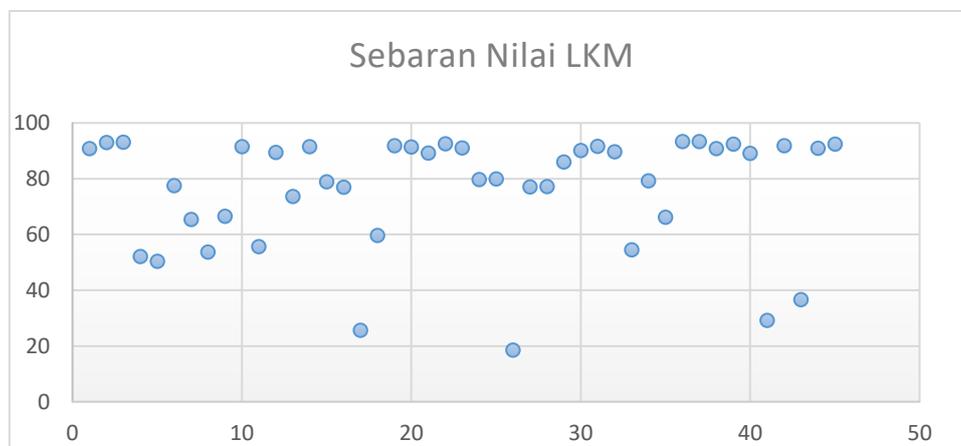


Figure 7. Diagram of the Distribution of Average Value of Students in 3N-based LKMs (*Niteni Nirokke Nambahi*)

Through *niteni* activities by marking using all the five senses carefully. *Nirokke* activities by imitating what is taught involve the mind, senses, feelings/conscience, and spiritual integrally and harmoniously. Through the imitating process by trying/experimenting, imitating by demonstrating or practicing, imitating by presenting. Through *Nambahi* activities by adding what has been learned through models/examples from teachers/learning resources, developing creativity and ideas and designing, adding by creating, adding by improvising through 3N-

based LKM (*Niteni Nirokke Nambahi*) in 7 Basic Science materials Concepts course. It included the form, Force, Motion and Newton's Laws, Energy and Energy Changes, Vibration and Waves,

Conclusion

This R & D research uses the 4D design (four D-Models) proposed by Thiagarajan, Semmel, & Semmel (1974), which consists of the following stages: 1) define 2) design, 3) develop, and 4) dissemination. The results of the assessment of the material expert got a score of 4.67 means a very good category. The results of the assessment from media experts got a 4.17 score in the good category. The average value of expert validation $(4.67+4.17):2=4.42$ is in the very good category. Based on these results, the 3N-based Science Basic Concepts LKM (*Niteni Nirokke Nambahi*) was feasible in the learning process. The applying of critical thinking skills is carried out through various activities *Niteni Nirokke Nambahi*. Those various activities and exercises at seven 3N-based LKMs (*Niteni Nirokke Nambahi*) cover materials of matter and its form, force, motion, and Newton's laws, energy and changes in energy, vibration and waves, electricity and magnetism, the solar system, and natural resources and technology in 7 meetings. The students' critical thinking skills are getting better embedded. It can be seen from the results of the student response questionnaire, where it was found that students gave a positive response of 90.2%, which was in the 51% - 100% interval. These results are also supported by the student LKM answers, where from the student LKM answers, the average value of 7 LKMs is 76.3, where the value has met the specified KKM.

Recommendations

The 3N-based LKM (*Niteni Nirokke Nambahi*) can instill critical thinking skills in other subjects. It can also be applied at the university level and the university's different education levels.

Acknowledgements or Notes

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References

- Afandi, A., & Jalal, A. (2019). Pengembangan LKM dengan Pendekatan Open Ended untuk Meningkatkan Kemampuan Berpikir Kreatif pada Mata Kuliah Geometri. *Delta-Pi: Jurnal Matematika dan Pendidikan Matematika*, 6(2).
- Azizah, M., Sulianto, J., & Cintang, N. (2018). Analisis keterampilan berpikir kritis Siswa sekolah dasar pada pembelajaran matematika kurikulum 2013. *Jurnal Penelitian Pendidikan*, 35(1), 61-70.
- Ermawati, E., & Rochmiyati, S. (2020). Implementasi Tri-n (*Niteni-nirokke-nambahi*) dan Ppk (Penguatan Pendidikan Karakter) pada Perangkat Pembelajaran Teks Deskripsi Kelas VII di SMP. *Jurnal Pendidikan Bahasa dan Sastra Indonesia*, 9(1), 8-13.
- Fakhriyah, F. (2014). Penerapan Problem Based Learning dalam Upaya Mengembangkan Kemampuan Berpikir Kritis Mahasiswa. *Jurnal Pendidikan IPA Indonesia*, 3(1), 95-101
- Irvan, Nurdiansyah, F., & Hayati, M. (2015). Pengembangan Lembar Kerja Mahasiswa pada Materi Fungsi Distribusi dengan Menggunakan Model Desain Dick and Carey pada Program Studi Pendidikan Matematika FKIP UMSU. *Prosiding Seminar Nasional Matematika dan Terapan 2015 (pp. 187-193)*. Medan, Indonesia: Fakultas Keguruan dan Ilmu Pendidikan, Universitas Muhammadiyah Sumatera Utara
- Knowles, Malcom. 1997. *The Modern Practice of Adult Education Andragogy versus Paedagogy*. New York : Association Press.
- Lestari, N., Sudarisman, S., & Sugiyarto, S. (2014). Pengembangan LKM Model PBL Berbasis Potensi Lokal pada Mata Kuliah Bioteknologi untuk Meningkatkan Kemampuan Berpikir Kritis Mahasiswa di Universitas Muhammadiyah Kupang. *Bioedukasi : Jurnal Pendidikan Biologi*, 7(2), 18-22.

- Listiani, I. (2018). Efektivitas Lembar Kerja untuk Memberdayakan Kemampuan Berpikir Kritis Mahasiswa Pendidikan Guru Sekolah Dasar. *Jurnal Penelitian Pendidikan*, 35(1), 17-26.
- Mairing, J. P., & Lorida, D. (2013). Pengembangan Lembar Kerja Mahasiswa Berbasis Masalah dan Proyek pada Mata Kuliah Analisis Data. *Jurnal Pendidikan*, 14(2), 53-61.
- Ni'mah, S. (2016). Lembar Kerja Mahasiswa Berbasis Inkuiri Terbimbing untuk Meningkatkan Keterampilan Proses Sains Mahasiswa. *Lentera : Jurnal Pendidikan*, 11(2), 70-79.
- Mursali, S., & Safnowandi, S. (2016). Pengembangan LKM Biologi Dasar Berorientasi Pembelajaran Inkuiri untuk Meningkatkan Keterampilan proses Sains Mahasiswa. *Bioscientist: Jurnal Ilmiah Biologi*, 4(2), 56-62.
- Poerwanti, E. (2014). *Perencanaan Pembelajaran Praktikum*. UMM: Tim AA Pekerti
- Putra, P.D.A & Sudarti. (2015). Pengembangan Sistem E-Learning untuk Meningkatkan Keterampilan Berpikir Kritis Mahasiswa Pendidikan Fisika. *Jurnal Fisika Indonesia*, 19(55),45-48
- Rokhimawan, M.A. (2016) Pengembangan LKM Berbasis Keterampilan Proses Sains pada Mata Kuliah Pembelajaran IPA MI 1. *Jurnal Pendidikan Dasar Islam*, 8(1), 1-11
- Sujarwo. 2016. *Pendidikan Orang Dewasa*. Disampaikan dalam Diklat Pekerti untuk Dosen. UNY Tim Kurikulum dan Pembelajaran. 2014. *Buku Kurikulum Pendidikan Tinggi*. Jakarta: Direktorat Pembelajaran dan Kemahasiswaan Dirjen Dikti Kemdikbud
- Undang-undang Nomor 20 tahun 2003 tentang Sistem Pendidikan Nasional
- Wagner, T. 2008. *The Global Achievement Gap*. New York: Basic Books.
- Widyawati, A., Setyawan, D. N., & Kuncoro, K. S. (2019) The Design of e-Book Natural Science Practicum Guide based Tri-N (Niteni, Nirokke, Nambahi). *Jurnal Fisika Compton*, 6(2) Desember 2019
- Widoyoko, Eko Putro. (2020). *Teknik Penyusunan Instrumen Penelitian*. Yogyakarta: Pustaka Pelajar.
- Wijayanti, D. A. I., Pudjawan, K., & Margunayasa, I. G. (2015). Analisis Kemampuan Berpikir Kritis Siswa Kelas V Dalam Pembelajaran IPA Di SD No. 1, 2, dan 3 Kaliuntu Gugus X Kecamatan Buleleng. *Mimbar PGSD Undiksha*, 3(1).

Authors Information

Retno Utaminingsih

Universitas Sarjanawiyata Tamansiswa

Yogyakarta

E-mail Address: retno.utaminingsih@ustjogja.ac.id

Ayu Rahayu

Universitas Sarjanawiyata Tamansiswa

Yogyakarta
