

IMPLEMENTATION OF AN EDUCATIVE ASSESSMENT IN PHYSICS EDUCATION STUDY PROGRAM UPH DURING ONLINE LEARNING

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ABSTRACT

Assessment is the collection of information about student learning outcomes. Educative assessment should enable students to respond as images of God and challenge them to grow and learn more. The purpose of this study is to describe the implementation of educative assessment in the Physics Education Study Program during the 2020/2021 academic year at the University of Pelita Harapan. This study used descriptive qualitative research methods. The Implementation of educative assessments were carried out through interdisciplinary assessment in some courses, mid-term and final-term personal reflections in all physics courses, vlogs in material physics courses as mid-term assessments, and used Moodle for review and weekly quizzes. Based on students' feedback, it was known that the interdisciplinary assessment makes students understand the learning material deeper, more comprehensively, and integrated. The interdisciplinary assessment also makes the task load less overwhelming, especially during online learning. Vlogs as a mid-term assessment open space for students to be more creative and expressive to share knowledge in public, stimulate students' curiosity about learning material, and make students grow in their skills to find, summarize, and publish information digitally. At the end of the term, all of the students' learning outcomes resulted in good and excellent grades.

Keywords: Educative assessment; Online learning; Physics education

ABSTRAK

Penilaian adalah pengumpulan informasi tentang hasil belajar siswa. Penilaian Edukatif memungkinkan siswa untuk merespon sebagai gambar Tuhan dan menantang mereka untuk tumbuh dan belajar lebih giat. Penelitian ini bertujuan untuk mendeskripsikan pengimplementasian penilaian edukatif pada Program Studi Pendidikan Fisika selama tahun ajaran 2020/2021 di Universitas Pelita Harapan dengan menggunakan metode penelitian deskriptif kualitatif. Penilaian edukatif dilakukan melalui penilaian interdisipliner pada beberapa mata kuliah, pembuatan refleksi pribadi pada tengah dan akhir semester pada semua mata kuliah fisika, Pembuatan vlog pada mata kuliah fisika material sebagai penilaian tengah semester, dan penggunaan moodle untuk review dan kuis mingguan. Berdasarkan umpan balik mahasiswa, diketahui bahwa penilaian interdisipliner membuat mereka memahami materi pembelajaran lebih dalam, lebih komprehensif dan terintegrasi. Penilaian interdisipliner juga membuat beban tugas tidak terlalu berat, terutama selama pembelajaran online. Pembuatan vlog sebagai penilaian tengah semester membuka ruang bagi mahasiswa untuk lebih kreatif dan ekspresif untuk berbagi ilmu di depan umum, merangsang rasa ingin tahu terhadap materi pembelajaran, dan menumbuhkan keterampilan mahasiswa dalam menemukan, merangkum, dan mempublikasikan informasi secara digital. Pada akhir semester, semua mahasiswa lulus dengan nilai yang baik dan sangat baik.

Kata Kunci: Penilaian edukatif; Pembelajaran online; Pendidikan fisika

Introduction

The COVID-19 pandemic that hit many countries has changed the education system in the last two years. The learning process in Indonesia must be carried out remotely since March 2020 to avoid the spread of the coronavirus. In the 2020/2021 academic year, the learning process must be done completely online. This condition requires the academic community to think about the best practices that must be done so that the learning process remains optimal. The use of technology is also important in the learning process. At that time, various virtual media that could be used in learning began to appear, such as Zoom, Google Classroom, Google Meet,

Microsoft Teams, and others. The existence of these media helps the learning process can be done better because learning can synchronously and asynchronously as long as there is a good internet network. However, the problem is in the assessment process. Many educators feel overwhelmed by getting an objective assessment during a pandemic.

The assessment aims to obtain information about the progress of a student's learning process. Therefore, every educator must think of an appropriate assessment design in the distance learning period so that the assessment process still achieves its goals. In Christian education, the assessment process must be able to help students to respond as the image of God (Brummelen, 2009). Educative assessment is an appropriate assessment designed to address these challenges and problems. The educative assessment produces an authentic assessment (Wiggins, 1998). This helps the Teacher to see clearly the progress of student learning. The educative assessment also provides clear standards and criteria for the expectations of the work given. This makes both teachers and students aware of the expectations that are expected in carrying out their assignments. Clear criteria can help students see their learning material comprehensively and motivate them to improve their performance. Clear criteria and standards can also help teachers provide feedback on student work. Thus, students can realize their strengths and weaknesses in the learning process and a significant learning process will be created even in the distance learning process.

Teacher College is one of the faculties at Pelita Harapan University (UPH). The teacher college has ten study programs, one of which is a physics education study program. As a Christian education, the physics education study program, UPH, strives to develop a significant learning process and an appropriate assessment process during the pandemic. One of the efforts made is to implement educative assessment in core courses. Therefore, this paper aims to explain how the educative assessment will be implemented in the physics education study program, UPH, during online learning in the 2020/2021 academic year.

Educative assessment

Assessment is the collection of information about student learning outcomes. A good assessment not only helps students know about their actual abilities but also empowers them in the mode of being fully human (Nguyen & Phan, 2020). The most common types of assessment carried out in schools are formative assessment and summative assessment. Formative assessment is an assessment that observes student learning outcomes and their development in learning. A summative assessment is a student assessment at the end of the course or the end of the year. Learning assessment can help teachers evaluate the effectiveness of curriculum, teaching strategies, and teaching activities and help students be responsive in learning. Assessment in the Christian approach must enable students to respond to the image of God and challenge students to grow and learn more actively (Brummelen, 2009). Assessment should help students to know themselves more deeply by realizing their strengths and weaknesses. a Christian teacher should provide good feedback on student work to motivate students to learn from mistakes and strive to improve their potential in the future. This will enable students to respond to an assessment as an image of God. This assessment is in line with the objectives of the educative assessment.

Educational assessment is a procedure and feedback provided to improve the learning process and student performance (Wiggins, 1998). According to Buxton, Snider, Suriel, and Gabbitas (2013), educative assessment is an assessment design that promotes meaningful learning. Educational assessment is a general term that covers Assessment as learning (AaL), Assessment for Learning (AfL), and Assessment of Learning (AoL) (Schellekens, et al., 2021). Lonneke et al. said that educational assessment refers to three major themes: (1) Student-teacher roles and relationships within assessment; (2) Assessment learning environment; (3) Educational outcomes assessment. There are four components possessed by educative assessment. That is a forward-looking assessment, the opportunity to conduct a self-assessment, the existence of clear criteria and standards, and FIDeLity feedback (L. Dee Fink, 2003). Educative assessment is different from audit-ive type assessment, which is an assessment designed only to serve as a guide for teachers to provide grades. A comparison of these two types of assessment is shown in Figure 1.

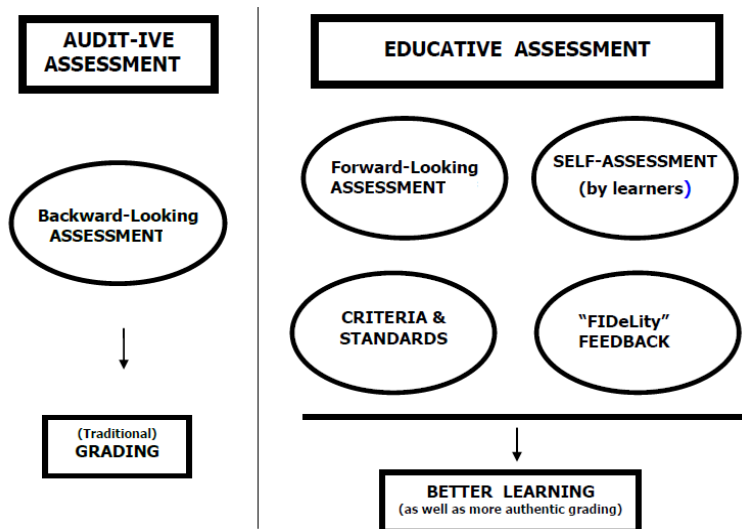


Figure 1. Comparison of audit-ive assessment with educative assessment (L. Dee Fink, 2003)

One of the components of the educative assessment is the Forward-Looking assessment. A Forward-Looking assessment is an assessment carried out by considering when and in what situations students will use the knowledge gained in learning. Based on this, educators will include problems that exist in everyday life in the form of questions or assignments. The characteristics of this assessment are different from the backward-looking assessment principle applied in audit-ive assessment, where backward-looking assessment only focuses on providing an assessment of how well students absorb the material provided during lectures. The backward-looking assessment encourages students to memorize the material more than to apply their knowledge.

A forward-looking assessment will produce an authentic assessment. Authentic assessment is an assessment that emphasizes the learner's ability to demonstrate the knowledge he has in a real and meaningful way (Nurgiyantoro, 2008). Authentic assessment will encourage innovative teaching and learning and fair evaluation. Authentic assessment will encourage innovative teaching and learning and fair evaluation. With authentic assessment, teachers are encouraged to devote more time and energy to thinking about ways that enable their students to learn and grow (Nguyen & Phan, 2020). Some of the benefits of authentic assessment proposed by Nurgiyantoro (2008) are as follows:

1. Authentic assessment allows direct measurement of student performance as an indicator of competency achievement from learning outcomes.
2. An authentic assessment provides opportunities for learners to construct their learning outcomes.
3. Authentic assessment integrates teaching, learning, and assessment processes into one integrated package.
4. Authentic assessment encourages learners to display their best performance because they are given the space to display it according to their characteristics.

The second component of the educative assessment is self-assessment. Self-assessment is a learner's skill to evaluate himself by identifying the gap between what he currently has and what is expected. Self-assessment can increase students' motivation, engagement, and learning performance (Yang, Chen, Flanagan, & Ogata, 2022). Self-assessment is not an innate ability, but self-assessment is a skill that can be learned and improved with practice and feedback (Jönsson, 2008). The third component of the educative assessment is feedback. In general, there are two types of feedback: evaluative feedback and descriptive feedback (Jönsson, 2008). Feedback evaluation is the feedback that contains positive and negative things whose ultimate goal is to socialize. In the learning process, evaluative feedback has no impact on learning. Descriptive feedback is the feedback that is focused on achieving or improving actual performance. Descriptive feedback tends to have a positive impact on the learning process. In the educative assessment the feedback provided is FIDeLiTy, namely Frequent, Immediate, Discriminating, and Lovingly delivered (L. Dee Fink, 2003).

Educative assessment is an assessment based on criteria. Educators must characterize the quality of the best performance expected in a given assignment. The criteria and standards of assessment used to assess student performance must be explained and communicated to students from the start of giving assignments. The tool commonly used for measuring performance scores is a rubric. In the rubric, there are two main things that must be made, namely criteria and standards for achieving performance (Nurgiyantoro, 2008). The criteria describe the competencies to be achieved, while the performance achievement standards are how these competencies are measured and assessed. Achievement standards

are usually made on a numerical scale. The number scale commonly used is 1-4, where a larger number indicates a better performance.

Several research results related to educational assessment are described in this paragraph. Marlina et al's research shows that the application of Authentic Problem Based Learning (aPBL) has a positive effect on Mastery of Science Concepts for fourth graders (Marlina, Utaya, & Yuliati, 2017). Idawati et al proved that Inquiry-Based Authentic Learning in the STEM Program had a positive effect on students' scientific literacy abilities (Idawati, Muhardjito, & Yuliati, 2019). Mohammad Zaky et al found that there was an increase in students' understanding of concepts in static fluids by applying Phenomenon-Based Authentic Learning (Tatsar, Yuliati, & Wisodo, 2020). Widayan Widiana et al. proved that the learning model with project assessment had positive vibes on social studies learning outcomes and the nationalism attitude of elementary school students (widiana, wayan, Tegeh, & Artanayasa, 2021).

Research method

The research method used in this study is descriptive qualitative. Data were obtained through online surveys, student reflections and recapitulation of students' final grades. The research subjects were students of physics education cohort 2018 and cohort 2019 with a total of 32 students. The research was conducted on several core courses of the Physics Education study program in the 2020/2021 academic year. Data analysis was carried out based on the Miles and Huberman's model as shown in Figure 2.

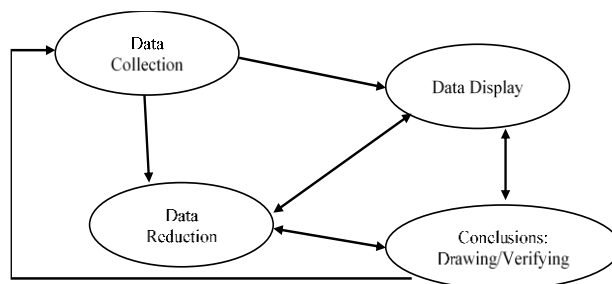


Figure 2. Data Analysis Miles and Huberman's Model (Sugiyono, 2021)

academic year. Implementation is carried out through several types of assessments planned by lecturers at the beginning of each term. The forms of assessments are students' reflections for all Physics content courses, interdisciplinary assessments for several courses, Vlogs as a mid-term assessment for material physics courses, and various weekly assessments through Moodle or Microsoft teams. Some courses also conduct peer assessments for group work. Assessment criteria and standards are detailed in a rubric and given to students at the beginning of the term.

The first form of assessment is the student's reflection. Reflection intends to provide opportunities for students to assess the learning process that has been going on and reflect on their learning experiences in each course. Reflection is done twice, namely in the middle and at the end of the term. An assessment rubric is given to students from the beginning of the lecture. There are four components obtained from student reflection sheets, namely:

1. Facts and personal responses of students to the learning process based on the educational theory they have learned before.
2. Detailed explanations of the parts of learning that help to know more about God and His creation.
3. Personal growth is through self-awareness and self-assessment of their strengths and weaknesses and an action plan for self-improvement.
4. Personal growth is through the ability to describe the achievement of targets and the efforts to achieve better in the next opportunity.

Reflection is one of the authentic assessments of students, where students can be themselves in assessing ongoing learning and assessing themselves. Criteria and standards for reflection assessment are communicated and given to students at the beginning of the term. Therefore, students are clear with the points and the expectations of the reflections made. Making reflections also trains students to be reflective individuals, which is the attitude they need when they become teachers. Lecturers will provide feedback to students a week after reflections are collected based on the criteria and standards listed in the rubric. Based on the explanation above, it can be concluded that reflection is the

implementation of educative assessment because it fulfills the four components of educative assessment.

The second form of implementation is interdisciplinary assessment in several courses. The courses that apply interdisciplinary assessment in the physics education study program are electronics with PSAL Physics, material physics with solid matter physics and nuclear physics, and wave optics with research methodology. Interdisciplinary is done by considering the characteristics and looking at the interrelationships between courses. The interdisciplinary assessment in electronics and PSAP Physics courses is carried out in microteaching. Electronics is a material that will be explored and taught by students in their teaching practice (microteaching) in the PSAP Physics course. Understanding the content will be an assessment for the electronics course, while the pedagogy ability will be an assessment for the PSAL course. Interdisciplinary assessment in these two courses encourages students to explore and understand electronic material more deeply and broadly than what is received in the classroom. Microteaching will train students to teach in a limited scope and classroom atmosphere. It will help them to prepare themselves to become teachers in the future. Every student who does microteaching will get feedback from the lecturer and also their peers directly. Thus, they can find out their strengths and weaknesses in teaching. The students are also allowed to evaluate themselves in preparation and during microteaching.

The interdisciplinary assessment of Wave Optics with a research methodology is to make a paper. The paper is based on class observations and data collection in the Wave Optics course. The result of the paper is a critical analysis of the learning process in the Wave Optics course, which produces ideas or inputs to improve the lecture process. The skills of researching, analyzing, and writing in the form of a paper become an assessment of the research methodology course. This assignment is an exercise for students' final project, where students will make a paper based on the results of observations and teaching experiences at school. The rubric is given to students at the beginning of the term.

Lecturers provide feedback during writing guidance and after papers are submitted. Interdisciplinary assessment is also carried out for material

physics, solid matter physics, and nuclear physics. The assignment is carried out in groups. Each group consists of two to three students. Each group must find and analyze a scientific article covering the three courses and then present it to the three lecturers. The atmosphere of the presentation is conditioned so similarly to the final task test. This assignment encourages students to look at various sciences in an integrated and their usefulness in life.

Based on the description of the forms of interdisciplinary assessment above, it can be concluded that interdisciplinary assessment is part of the implementation of educative assessment. Each form of interdisciplinary assessment carried out fulfills the four components of the educative assessment. All interdisciplinary assessments carried out train students to become teacher candidates. Each lecturer has created and provided an assessment rubric for students at the beginning of the term and immediately given feedback on student work.

Making a Vlog as a mid-term assessment in the Material Physics course is also categorized as an educative assessment implementation. Each student will make a Vlog related to the materials around them and upload it on the YouTube channel to provide information and educate the public. This assessment encourages students to use and utilize technology in the learning process. This activity is following the times and hobbies of students as the Z Generation who are very technology literate and appropriate to the conditions of distance learning. This assessment is also very authentic in describing the development of each student. Each student can construct the knowledge gained and present it according to their personality and creativity. Each student is also encouraged to assess the material presented by a classmate. Assessment rubrics are explained and given to students at the beginning of the semester. It is intended so that students can understand assignment expectations and can prepare themselves long before the midterm exam.

Apart from the assessments described above, each lecturer conducts weekly assessments through Moodle or Teams. Moodle and Microsoft provide features that can provide feedback in real-time and provide a column for feedback on their learning outcomes. This activity is by the

characteristics of educative assessment, namely FIDeLiTy Feedback. The FIDeLiTy Feedback can help students make continuous self-improvement in the learning process.

Student responses are to the assessment process in lectures

Student responses to each type of assessment are obtained through an evaluation form at the end of the academic year and through reflections written by students. Based on the survey results, it is to make reflections on the lectures that have taken place known that all students agree and feel it is important to do it continuously. Some of the students' reasons for the importance of reflection are summarized as follows:

1. Reflection can help students evaluate the learning process that has taken place and help to see their strengths and weaknesses in attending lectures.
2. Making Reflections gives space for students to provide opinions, input, what they get, and responses to learning.
3. Reflection can help students to realize self-development and personal growth during lectures.
4. Reflection can help students explore, recognize, and evaluate their achievements in learning and find solutions for follow-up.

Through the survey, it was known that students had a positive response and saw that interdisciplinary assessments for several courses were effective and efficient. It is effective because it can help students see the material in-depth and in an integrated manner, motivate students to see an application of their knowledge in everyday life and maximize students' training of competence as teachers. Interdisciplinary assessment is considered efficient because it can optimize the workload given to students. By doing one task, students have fulfilled assessments for several courses. Thus, interdisciplinary assessment is deemed appropriate, especially during the pandemic.

Making Vlogs as a mid-semester assessment in material physics courses is the activity most favored by students. It is known from the survey given at the end of the term and through the mid-semester reflection.

Students' comments and responses to the Vlog as a midterm assessment expressed through personal reflection are as follows:

1. Making Vlogs makes students more creative and expressive in conveying the knowledge that has been obtained from lectures.
2. Students become motivated to share knowledge with others
3. Making vlogs triggers students' curiosity about learning materials
4. Make students grow significantly in the skills of finding, summarizing, and attractively publishing information.
5. It trained to learn basic things to provide learning media.

Feedback given by lecturers either directly or through Moodle and Microsoft Teams helps students improve their performance in the next assignment.

Student learning outcomes

Student learning outcomes in subjects that apply interdisciplinary assessment are presented in Figures 3 and 4. Figure 3 shows the distribution of the cohort 2018 grades in Material Physics, Nuclear Physics, Solid-state Physics, and Optics and Wave courses while Figure 4 shows the distribution of the cohort 2019 grades in PSAL Physics and Electronics courses. Based on the two figures, it can be seen that almost all students graduated with good and excellent grades. This fact proves that the application of educative assessment not only helps students during the lecture process but also enables students to complete lectures well.

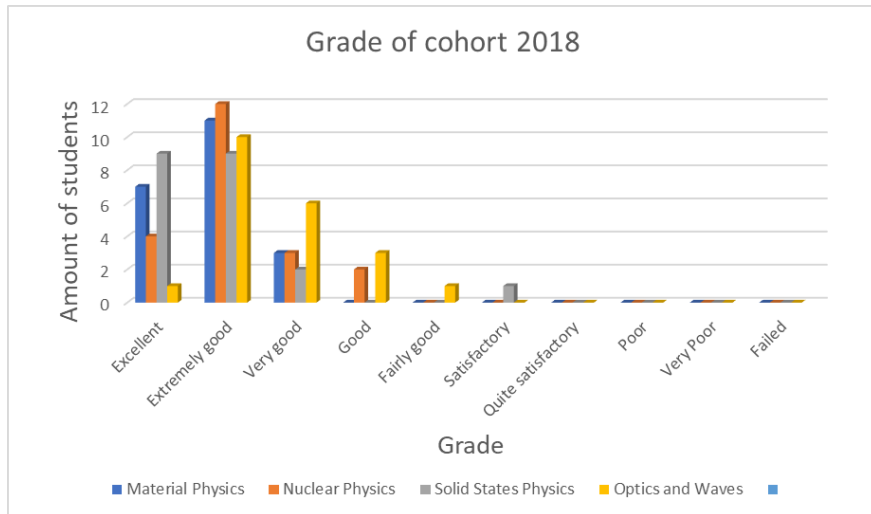


Figure 3. Grade of cohort 2018 in Material Physics, Nuclear Physics, Solid state Physics, Optics and Wave courses

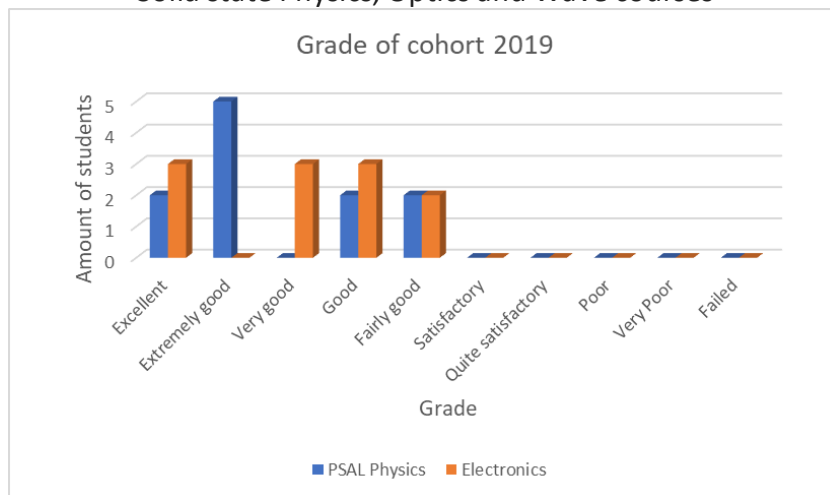


Figure 4. Grade of cohort 2019 in PSAL Physics and Electronics courses

Conclusion

Educative assessment implemented in the Physics Education study program, Universitas Pelita Harapan, in the 2020/2021 academic year. The implementations carried out are making student reflections for all content courses, implementing interdisciplinary assessments in several subjects, making Vlogs as mid-term assessments, and weekly

assignments through Moodle and Teams. These forms of assignment have succeeded in improving the student learning process. It can be seen from the recognition and responses of students found in surveys, student reflections, and student learning outcomes at the end of the semester. These assessments encourage students to improve their learning process and performance as prospective teachers. At the end of the term, it was found that almost all students graduated with good and excellent categories. These are the results and forms of implementation of the educative assessment in the physics education study program, UPH, for the 2020/2021 academic year.

REFERENCES

- Brummelen, H. V. (2009). *Walking with God in the classroom* (3rd ed.). Colorado Springs, CO: Purposeful Design Publications.
- Buxton, C. A., Snider, M. A., Suriel, R., & Gabbitas, B. (2013). Educative assessments for English language learners: The value of increased student writing in science. *The International Journal of Foreign Language Teaching*, 31-38. Retrieved from: <https://ijflt.com/wp-content/uploads/2021/03/Buxton-Writing.pdf>
- Idawati, Muhardjito, & Yuliati, L. (2019). Authentic learning berbasis inquiry dalam program STEM terhadap literasi saintifik siswa berdasarkan tingkatan kemampuan pemecahan masalah siswa. *Jurnal Pendidikan: Teori, Penelitian, dan Pengembangan*, 4(8), 1024-1029. Retrieved from: <http://dx.doi.org/10.17977/jptpp.v4i8.12663>
- Jönsson, A. (2008). *Educative assessment for/of teacher competency (Doctoral dissertation)*, Malmö University, Malmö, Sweden). Retrieved from: <https://portal.research.lu.se/en/publications/educative-assessment-forof-teacher-competency-a-study-of-assessme>
- Fink, L. D. P. (2003). *A self-directed guide to designing courses for significant learning*. San Francisco, CA: Jossey-Bass.
- Marlina, Utaya, S., & Yuliati, L. (2017). Pengaruh authentic Problem Based Learning (aPBL) terhadap penguasaan konsep IPA siswa kelas IV sekolah dasar. *Jurnal Pendidikan: Teori, Penelitian, dan Pengembangan*, 2(11),

1509-1514. Retrieved from:

<http://journal.um.ac.id/index.php/jptpp/article/view/10223>

Nguyen, T. T., & Phan, H. M. (2020). Authentic assessment: A real life approach to writing skill development. *International Journal of Applied Research in Social Sciences*, 2(1), 20-30. <https://doi.org/10.51594/ijarss.v2i1.97>

Nurgiyantoro, B. (2008). *Penilaian otentik*. Cakrawala Pendidikan, 3(3), 250-261. Retrieved from: <https://journal.uny.ac.id/index.php/cp/article/view/320>

Schellekens, L. H., Bok, H. G., Jong, L. H., Schaaf, M. F., Kremer, W. D., & Vleuten, C. P. (2021). A scoping review on the notions of Assessment as Learning (AaL), Assessment for Learning (AfL), and Assessment of Learning (AoL). *Studies in Educational Evaluation*, 71, 1-15. <https://doi.org/10.1016/j.stueduc.2021.101094>

Sugiyono, P. D. (2021). *Metode penelitian pendidikan (kuantitatif, kualitatif, kombinasi, R&D, dan penelitian tindakan)*. Bandung, Indonesia: Penerbit Alfabeta.

Tatsar, M. Z., Yuliaty, L., & Wisodo, H. (2020). Eksplorasi Pemahaman Konsep Siswa pada Fluida Statis Berdasarkan Authentic Learning Berbasis Fenomena. *Jurnal Pendidikan:Teori, Penelitian, dan Pengembangan*, 107—113. <http://dx.doi.org/10.17977/jptpp.v5i1.13150>

Widiana, wayan, I., Tegeh, I. M., & Artanayasa, I. W. (2021). The project based assessment learning model that impacts learning achievement and nationalis attitudes. *Cakrawala Pendidikan*, 389-401. <http://dx.doi.org/10.17977/jptpp.v5i1.13150>

Wiggins, G. P. (1998). *Educative assessment: Designing assessments to inform and improve student performance*. (1st ed.). San Francisco, CA: Jossey-Bass.

Yang, A. C., Chen, I. Y., Flanagan, B., & Ogata, H. (2022). How students' self assessment behavior affects their online learning Performance. *Computers and Education: Artificial Intelligence*, 1-8. <https://doi.org/10.1016/j.caeai.2022.100058>