ANALYSIS OF THE WEAKNESSES OF HYBRID LEARNING DURING THE PANDEMIC: CASE STUDY IN BASIC NATURAL SCIENCE (BNS) LECTURES

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Abstract

Data on deficiencies regarding preparation, planning, processes and assessment is the information needed to make improvement efforts in the future. Therefore, this research was conducted to analyze the weaknesses of hybrid learning implemented in Basic Natural science (BNS) courses. This qualitative descriptive research was carried out at the Primary Teacher Education (PTE) Study Program during the preparation, planning, learning and assessment of learning outcomes. Qualitative data was collected using observation and documentation methods. The collected data was analyzed using qualitative analysis from Miles and Huberman. The weaknesses of hybrid learning that we found include coordination carried out with senior lecturers whose expertise is non-science education, late submission of SIMAKSI to BKSDA, CPMK is limited to Science Process Skills (SPS), objectives only cover basic SPS, there are no guidelines for preparing reports, science topics are limited to ecosystems, multi tasking, the learning time interval is only two weeks, the SPS instrument only uses tests, and the tests are carried out online. It is hoped that these results can be used as evaluation material in order to improve the implementation of hybrid learning in science courses, especially BNS.

Keywords: Basic natural sciences, weaknesses, hybrid learning.

Abstrak

Data kekurangan tentang persiapan, perencanaan, proses dan assessment merupakan informasi yang dibutuhkan untuk melakukan upaya perbaikan dimasa yang akan datang. Oleh karena itu, penelitian ini dilakukan untuk menganalisis kelemahan pembelajaran hybrid yang diimplementasikan pada mata kuliah IKD. Penelitian deskriptif kualitatif ini dilaksanakan pada Prodi PGSD selama proses persiapan, perencanaan, pembelajaran sampai dengan penilaian hasil belajar. Data kualitatif dikumpulkan menggunakan metode observasi dan dokumentasi. Data yang terkumpul dianalisis menggunakan analsisi kualitatif dari Miles and Huberman. Kelemahan pembelajaran hybrid yang kami temukan di antaranya koordinasi dilakukan dengan dosen senior yang keilmuannya non-pendidikan sains, telatnya pengajuan SIMAKSI ke BKSDA, CPMK terbatas pada KPS, tujuan hanya mencakup KPS dasar, tidak ada pedoman penyusunan laporan, topik sains dibatasi pada ekosistem, multi tasking, interval waktu pembelajaran hanya dua minggu, instrumen KPS hanya menggunakan tes, dan pelaksanaan tes dilaksanakan secara daring. Hasil ini diharapkan dapat menjadi bahan evaluasi dalam rangka memperbaiki implementasi hybrid learning pada mata kuliah sains khususnya IKD.

Kata Kunci: ilmu kealamiahan dasar, kelemahan, pembelajaran hybrid

INTRODUCTION

Hybrid learning is a solution to minimize the negative impact of prolonged online learning implementation policies during the pandemic. This learning has been proven to be able to help elementary and middle level students, as well as university students, master a number of learning objectives. The learning objectives include mastery of concepts, scientific attitudes, scientific process skills, and even scientific literacy and scientific literacy (Alsalhi et al., 2019; Harahap et al., 2019; Li et al., 2019) which are competencies needed in this century. 21 this. Several advantages cause hybrid learning to improve various science learning outcomes, including the creation of active learning through supervision and assessment that is more valid compared to online learning (Rahmadi, 2021), minimizing academic stress for the digital generation (Mucshini & Mahamahasiswandari, 2020), and participants students like it because they can interact with other students and can absorb the material well (Hidayati et al., 2022)

Apart from the advantages, it turns out that hybrid learning also has weaknesses. Fauzi & Setiawati (2021) ound that the weaknesses observed include (1) the price of providing supporting equipment which is still relatively high, (2) the availability of devices and a good internet network is required, (3) the academic development of students who choose to study online is still difficult to monitor, and (4) students who study online tend to experience decreased motivation and sense of responsibility for learning. This can create a gap in mastery of learning objectives between students who study offline and online at home. Another weakness is the difficulty of learning independently and not being able to ask questions directly if there is material that is not understood (Kenney & Newcombe, 2011; Lestari et al., 2021).

Based on previous explanations, investigations into the weaknesses of hybrid learning are still limited to aspects of the teaching and learning process. In this research, we list the weaknesses of hybrid learning implemented in IKD courses. This list of weaknesses is reviewed from the aspects of preparation, planning, process and assessment at the end of the lesson. Theoretically, the results of this research can be used as a primary source for further research, enriching knowledge and providing information about the weaknesses of hybrid learning in science learning in higher education. The practical benefit is that lecturers can use this information to carry out preparation, planning, teaching and learning processes up to the assessment stage. It is hoped that this effort can improve all stages so that student understanding can be facilitated more optimally from time to time.

RESEARCH METHOD

The research we conducted is a qualitative descriptive study. The research was carried out at the Primary School Educator Education Study Program, Mataram University. Data on hybrid learning weaknesses was collected during the preparation, planning, teaching and learning activities and implementation of assessments in IKD courses in the odd semester of the 2020/2021 Academic Year. Data sources include the activities of the team implementing the preparation process, planning, teaching and learning activities and implementation of the assessment. The method used is the observation and documentation method as used by Morgan (2022), and Supena et al. (2021). Qualitative instruments in the form of documents include photos, coordination notes, discussion notes, RPS, and assessment sheets. The qualitative data obtained was then analyzed qualitatively based on Miles and Huberman, namely through stages: (1) data reduction, (2) data visualization, and drawing conclusions (Asipi et al., 2022). Data reduction is the process of evaluating the information collected to obtain essential information. This step includes summarizing, selecting crucial aspects, focusing on important points, and identifying relevant motifs and patterns. Data depiction is carried out through summaries, diagrams, interconnections between categories, flowcharts, and similar methods. In qualitative research, information is presented in the form of narrative text. Conclusions are supported by valid and consistent evidence to produce reliable and convincing conclusions.

RESULTS AND DISCUSSION

In the context of education and teaching, especially in learning, lecturers' duties are divided into 3, namely planning, implementing planning, and conducting evaluations. Apart from that, quite a few lecturers carry out additional activities, namely preparation. In the planning process, lecturers develop RPS based on an analysis of student needs, material and student characteristics, as well as the availability of learning facilities. By considering these various variables, learning becomes quality, both in terms of the process and learning outcomes that can be mastered by students. Several studies have confirmed this. One of them is maximizing the function of pedagogy that combines social constructivism and critical theory in learning (Botes & Barnett, 2022). In the PGSD Study Program, the effectiveness of the RPS, especially in science learning, can be observed from student learning achievements in science courses (Syazali & Umar, 2022). In its implementation, learning was carried out during 16 face-to-face meetings, structured assignments,

and independent study. When implementing distance learning (PJJ) during the Covid-19 pandemic, face-to-face learning was carried out online. Some use virtual face-to-face through video presentations, and online discussions via online or on Unram, and various social media. For evaluation, the instrument generally used is the essay test.

Since face-to-face learning was abolished to avoid the spread of the Covid-19 virus, the instant solution used in the early days of PJJ was full online. Face-to-face meetings have been replaced with virtual meetings using Zoom, Google Meet and various other online platforms (Syazali, Erfan, et al., 2022). Research results show that students give negative perceptions of its implementation (Rahmatih & Fauzi, 2020; Widodo et al., 2020). As a solution to this problem, prepare, plan, implement, and don't forget to carry out an assessment that is not fully online, but combined with off-line learning. This combination of online and offline learning has become popularly known as hybrid learning. In science learning, offline learning is carried out by utilizing the environment around where students live as a Natural Laboratory. This laboratory itself functions as a learning resource which is carried out through practice-based learning to solve problems. This has been proven to be effective in developing science process skills and student knowledge aspect learning outcomes (Syazali, Widiada, et al., 2022). However, every learning always has weaknesses, this is also the case with hybrid learning implemented during PJJ. Based on analysis of various documents, we found at least 10 weaknesses (Table 1).

Table 1. Weaknesses of hybrid learning during the implementation of PJJ

No	Observed Aspects		Weaknesses Found
1	Learning preparation	a.	Coordination is carried out with senior lecturers whose expertise is non-science education
		b.	SIMAKSI proposal to BKSDA
2	Learning planning	c.	CPMK is limited to SPS
		d.	The objectives only cover the basic SPS
3	Implementation of learning	e.	There are no guidelines for preparing reports
		f.	Science topics are limited to ecosystems
		g.	Multitasking
		h.	The learning time interval is only two weeks
4	Learning assessment	i.	The SPS instrument only uses tests
		j.	The test is carried out online

The weaknesses of hybrid learning listed in Table 1 are different from the findings of several previous studies. Singh et al. (2021) found that some of the weaknesses of hybrid learning are technical difficulties, lack of interaction, unfair access, and challenges in assessment. Hybrid

learning requires reliable internet access and technology, which can be a challenge for some students and faculty members. Hybrid learning may reduce the amount of face-to-face interaction between students and faculty members, which can negatively impact student engagement and motivation. Hybrid learning could exacerbate existing gaps in access to technology and reliable internet, which could disproportionately impact students from low-income backgrounds. Hybrid learning can make it difficult for faculty members to assess student learning effectively, especially if assessments are not designed to accommodate the hybrid format. Another weakness is the difficulty in maintaining student involvement. Hybrid learning can make it difficult for faculty members to maintain student engagement and motivation, especially if students are not required to attend face-to-face classes (Ka'bai et al., 2022). It is important to note that the disadvantages of hybrid learning during the COVID-19 pandemic may vary depending on the specific context and application of the hybrid learning model.

1. **Learning preparation**

Effective preparation is the key to successful science learning. Here are some ways to prepare for science lessons. Observe students' varied ideas about science. Educators should observe the ideas students bring to science classes and prepare teaching plans to help students develop a more meaningful understanding of science (NSTA, 2017). Implement teaching plans and assess learning outcomes. Educators must implement their teaching plans, assess and reflect on learning outcomes, and adapt their teaching to improve students' understanding. Engage in data-based decision making. Educators must engage in data-based decision making regarding teaching behaviors, strategies, and selection of topics, activities, and materials. Developing dispositions for effective science teaching. Educators must develop dispositions for effective science teaching, including a sense of responsibility to students and society and a dedication to the need to continually improve, in part through active involvement in the larger science education community.

Design and conduct investigations. Educators can help students prepare for authentic science learning by providing opportunities for them to design and conduct their own investigations, with guidance from educators and scientists (Dolan et al., 2008). Focus on core practices that support ambitious science teaching. Educator preparation programs should focus on core practices that support ambitious science teaching, such as engaging students in scientific practices, supporting argumentation, and developing students' scientific literacy (Stroupe et al., 2020). Provides

opportunities for various activities. To develop proficiency in science, students must have opportunities to participate in a variety of activities, including conducting investigations, sharing ideas with peers, and special ways of speaking and writing (Council, 2010). Undergoing a bachelor's program. Secondary science educator preparation includes undergraduate courses that are stand-alone majors, taken concurrently with educator preparation programs, or taken as part of a combined degree program (Olson, 2017). By following these guidelines, educators can help students develop a strong foundation in science and engineering for success in the 21st century.

The implementation of hybrid learning at MK BNS that we have carried out fully adopts, and some adapts, important things in preparation for science learning as stated previously. However, there are two weaknesses, namely that coordination is carried out with peer lecturers whose scientific background does not come from science education. This has an impact on the less than optimal preparations carried out. This is evident from the lack of quality worksheets prepared to help students construct their science knowledge. In fact, worksheets are an important medium in science learning because their effectiveness has been empirically tested based on research results (Mahyuny et al., 2022; Nuha et al., 2023). Another weakness in the preparations made for implementing hybrid learning is the SIMAKSI arrangements with the NTB BKSDA. Some of the locations chosen by students as sources for learning science through the scientific investigation process are conservation areas. To be able to officially enter this area requires SIMAKSI. The weakness is that this is not taken care of, so that several groups of students experience rejection by field officers in each of these conservation areas. This is of course a technical obstacle and has a negative impact on the learning process in the field.

2. Learning planning

Planning science lessons is critical to effective teaching and learning. Here are several reasons why science learning planning is important. Identify learning objectives. Science teaching planning involves identifying learning goals during various phases of the teaching continuum and addressing them through various types of classroom talk (Scott, 2005). This helps educators focus on what they want students to learn and how they can achieve it. Foster engagement. Science teaching planning involves the use of experimental learning models in an effort to encourage engagement (Lahiri et al., 2022). This helps students become more interested in Science, Technology, Engineering, and Mathematics (STEM) subjects and careers. Develop leadership skills. Incorporating Service Learning Projects (SLP) into the science curriculum is an effective

way for students to adopt the leadership skills necessary to apply their traditional education on the social determinants of health into targeted action (Lahiri et al., 2022). Through PPL, students can hone their skills not typically covered in science curricula, including program planning, fundraising, marketing, etc., and feel better able to take on more significant leadership roles in the future. Increase retention. Planning and delivery of science programs needs to start from students' experiences with the phenomena, and from their own connections to the subject and laboratory materials (Wishart & D'Elia, 2013). This helps engage disenfranchised students in science learning and improves their retention in high school. In short, science lesson planning is important for identifying learning objectives, encouraging engagement, developing In the implementation of hybrid learning, good science learning planning practices have been adopted. However, there are still weaknesses. These weaknesses include that CPMK is only limited to mastery of KPS, and KPS itself only covers the basic level. Science does not only consist of the SPS aspect, but also the product/knowledge aspect, and the attitude aspect which includes attitudes towards science and scientific attitudes. SPS does not only include basic SPS, but also integrated SPS or superior SPS (Can et al., 2017). Learning that only focuses on one aspect of science can have a negative impact on mastery of the other two aspects. This happened to a PGSD student at Mataram University. Science learning is only focused on product aspects. Even though students have mastered this aspect well on the one hand (Syazali & Ilhamdi, 2022), on the other hand their SPS is very low (Syazali et al., 2021). This is because these two aspects of science have a strong correlation (Artayasa et al., 2017). SPS itself is even said to be a fundamental competency that students need to master other aspects of science (Prayitno et al., 2015). Likewise, learning only focuses on basic SPS. This can have a negative impact on students' mastery of integrated SPS. Even though students need competency in good integrated KPS in order to get a more meaningful practice-based learning experience.

3. **Implementation of learning**

Implementation science can help educators maximize their efforts to improve classroom functioning and student learning outcomes by providing strategies to ensure that practice-based learning is implemented effectively. The following are several sources and strategies for implementing learning in science learning using implementation science. Teach implementation science. Teaching tools have been developed to provide new learners with a clear definition of implementation science (Curran, 2020). Conceptualize the instructor. Instructors should be

conceptualized as implementing evidence-based practices in higher education classrooms (Soicher et al., 2020). Focus on strategy. Implementation science focuses on the strategies used to implement evidence-based practices, not on intervention research. Maximize successful outcomes. Implementation science is the study of how evidence-based programs can be implemented to maximize successful outcomes. Provide resources. The New York State Department of Education offers Science Standards Implementation Resources to assist educators and administrators in implementing the New York State Science Learning Standards (Department, 2023). By using these resources and strategies, educators can implement science learning effectively and maximize successful outcomes.

Science learning has been implemented well because it adopts implementation science as explained previously. However, in practice there are still several weaknesses. This weakness is that science topics are limited to ecosystems. Although not all topics can be effective with certain learning, there are several topics with the same character that can be facilitated with the same learning model. Another topic that has relatively the same character as the ecosystem topic is biodiversity. Another weakness of the hybrid learning that we apply is multitasking. Multitasking is a process in which a person performs many tasks simultaneously. However, research shows that multitasking can have a negative impact on learning, especially with regard to students' grades (Limniou et al., 2020). Multitasking increases cognitive load, which can negatively impact learning. For example, in a traditional lecture hall, students process information through listening and taking notes. Their cognitive effort to store information into long-term memory depends on the complexity of the topic, the clarity of the lecture, and their familiarity with the learning tasks. Research has shown that students who engage in multitasking behavior have worse academic performance than those who do not engage in multitasking behavior (Gonzáles-Gutierrez et al., 2022). In contrast, students who participated in flipped classrooms, where they acquired basic concepts and principles on their own before class, and then focused on application and discussion during class time, reported engaging in less multitasking behavior and engaging in deep, active learning (McLean et al., 2016). Overall, multitasking can negatively impact learning by increasing cognitive load and decreasing academic performance. Therefore, it is important for students to avoid multitasking and focus on one task at a time to optimize their learning experience.

4. **Science learning assessment**

In the implementation of the results assessment that we carried out, the weakness lies in the instrument which is only limited to using tests. Several weaknesses of tests in measuring SPS can be viewed from various aspects, including limited coverage, emphasis on memorization, inadequate completion time, subjectivity in assessment, lack of feedback, and inability to measure real-world application. Tests often focus on specific content knowledge and may not fully assess students' ability to apply scientific processes and skills in real-world situations (Mat, 2019). Tests often prioritize memorizing facts and formulas, rather than assessing students' understanding of scientific concepts and their ability to think critically and solve problems (Hendri & Setiawan, 2016). Tests are often timed, which can put pressure on students and limit their ability to fully demonstrate their science process skills (Ituma & Twoli, 2011). Some science process skills, such as communication and collaboration, are difficult to assess objectively and may bias test scorers (Stupnitskaya et al., 2022). Tests often provide a single score without detailed feedback regarding students' strengths and weaknesses in science process skills, making it difficult for students to improve their skills (Tegeh et al., 2021). ests may not accurately measure students' ability to apply science process skills in real-world contexts, which is an important aspect of scientific literacy.

Another weakness is that the test is carried out online. Some of the disadvantages of tests carried out online include technical problems. Online tests are prone to technical issues such as internet connectivity issues, server errors, and compatibility issues with different devices and browsers (Zaika et al., 2021). These issues can interfere with the testing process and affect the reliability and validity of the results. Online exams are also more susceptible to cheating than traditional paper-based exams. Most students can easily access external resources, collaborate with others, or use tools and software that are not permitted during the exam (Nagy & Warta, 2021). This can compromise the integrity of the assessment and lead to inaccurate results. Additionally, online tests often have limited question types, which may not fully assess students' understanding and application of knowledge and skills (Zaika et al., 2021). For example, multiple-choice questions are commonly used in online tests, but they may not effectively measure higher-order thinking skills.

Another downside is the lack of personal interaction. Online tests lack personal interaction This can make it difficult for students to understand their mistakes and improve their performance. The inability to measure practical skills is also a weakness of tests conducted online.

Some courses, such as science and engineering, require hands-on practical skills that cannot be assessed effectively through online tests. This may limit the usefulness of online testing in these disciplines. Online tests may not be accessible to all students, especially those with disabilities or limited access to technology (Zmiivskiy et al., 2021) (Safitri et al., 2022, 2023; Uswatun Hasanah et al., 2023). This can create unfairness in the assessment process and affect the validity of the results.

CONCLUSION

Our findings show that hybrid learning implemented in science learning has weaknesses in the preparation, planning, implementation and assessment stages of learning. At the preparation stage, the weakness was that coordination was carried out with senior lecturers whose expertise was non-science education, and the delay in submitting SIMAKSI to BKSDA. At the planning stage, the weakness is that the CPMK is limited to KPS, and the objectives only cover basic KPS. At the implementation stage, there were no guidelines for preparing reports, science topics were limited to ecosystems, multi-tasking, and the learning time interval was only two weeks. The weakness in the assessment stage is that the SPS instrument only uses tests, and the tests are carried out online.

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