ANALYSIS OF THE IMPORTANCE OF FORMATIVE ASSESSMENT OF MATHEMATICS LEARNING IN IMPROVING MATHEMATICAL UNDERSTANDING

Susilo Adi Prayoga[1], Imam Mahdi[2], Nindya Ayu Salsabila[3], Taufik Ramadhan[4], Santika Lya Diah Pramesti[5]
UIN K.H. ABDURRAHMAN WAHID PEKALONGAN
Email: susilopkl68@gmail.com[1], imam.mahdi@mhs.uingusdur.ac.id[2], nindyaslsbll01@gmail.com[3], taufik.ramadhan@mhs.uingusdur.ac.id[4], Santikalyadiahpramesti@uingusdur.ac.id[5]

ABSTRAK

Pembelajaran matematika seringkali menekankan pada konsep belaka. Penerapan konsep dalam soal yang masih jarang dilakukan membuat mahasiswa kurang memahami materi tersebut. Untuk itu dilakukan penelitian ini agar siswa mampu memahami pembelajaran melalui dilakukannya asesmen formatif sebagai bentuk latihan dalam mengerjakan soal. Penelitian ini menggunakan metodologi kualitatif. Istilah "penelitian kualitatif" mengacu pada penelitian dengan pendekatan deskriptif dan penggunaan analisis yang konsisten. Prosedur dan susunannya dikaji lebih mendalam dalam penelitian kualitatif. Teori tersebut dijadikan pedoman untuk memastikan fokus penyelidikan sesuai dengan fakta yang ada. Teknik pengumpulan data yang digunakan adalah studi lapangan dan studi pustaka. Kajian pustaka dilakukan dengan mencari jurnal yang terpercaya. Sedangkan studi kasus dilakukan dengan menggunakan observasi dan wawancara. Hasil penelitian menunjukkan bahwa pelaksanaan asesmen formatif secara terus-menerus dapat membantu meningkatan pemahaman matematika siswa. Dikarenakan asesmen formatif memberikan umpan balik yang tepat dan mendalam, sehingga siswa dapat memahami kekuatan dan kelemahan mereka serta dapat mengembangkan strategi untuk memperbaiki pemahaman mereka merupakan landasan fundamental dalam penyelenggaraan pendidikan.

Kata kunci : asesmen formatif, pembelajaran matematika, pemahaman matematika.

ABSTRACT

Mathematics learning often emphasizes mere concepts. The application of concepts in questions is still rarely done, making students less likely to understand the material. For this reason, this research was carried out so that students were able to understand learning through carrying out formative assessments as a form of practice in working on questions. This research uses qualitative methodology. The term "qualitative research" refers to research with a descriptive approach and consistent use of analysis. The procedures and structure are studied in more depth in qualitative research. This theory is used as a guide to ensure the focus of the investigation is in accordance with existing facts. The data collection techniques used were field studies and literature studies. The literature review was carried out by looking for trusted journals. Meanwhile, case studies are carried out using observations and interviews. The research results show that implementing formative assessments continuously can help improve students' understanding of mathematics. Because formative assessments provide precise and in-depth feedback, so that students can understand their strengths and weaknesses and can develop strategies to improve their understanding, this is a fundamental basis in the implementation of education.

Keywords: formative assessment, mathematics learning, mathematics understanding.

INTRODUCTION

Education is one of the main pillars in a country's development, and student development is the main focus in the educational process. Understanding student development is the key to designing effective and relevant education, so as to produce quality individuals. In this case, assessment is an important instrument to help educators understand how far students have developed in the learning process (Sari, 2023). Education is an important process that humans must go through. Through the learning process in education, a person is guided to develop their mindset and personality to become a person who is competent and has noble character so that they can play various roles in their respective life environments. Therefore, everyone must obtain education (Andini et al., 2018).

Mathematics is one of the subjects that must be taught, in Republic of Indonesia Law no. 20 of 2003 concerning the National Education System states that Mathematics is one of the 10 compulsory subjects. Among these subjects, mathematics is one of the important subjects. Mathematics is the mother of various sciences, this means that mathematics is considered a source of knowledge for the basis of other sciences (Albar et al., 2023). Almost all aspects of daily life require mathematics. In its application, mathematics as an abstract and logical subject requires a more in-depth evaluation approach to ensure that each student truly understands the mathematical concepts being taught (Azka Fuadia & Lya Diah Pramesti, 2023).

Assessment in education is not only about giving grades or measuring final results, but also about collecting in-depth information about student development during the teaching and learning process. In the independent curriculum, there are two types of assessment, namely formative assessment and summative assessment. Formative assessment aims to monitor the learning process and evaluate the achievement of learning objectives. In addition, formative assessments are carried out to identify students' learning needs, overcome obstacles they may face, and obtain information about student development (Kemendikbudristek, 2022).

According to Putri in Yuliani et al (2018) stated that understanding is the mastery of a number of learning materials, where students do not just know and

know, but are able to re-express concepts in a form that is easier to understand and are able to apply them. Mathematical understanding is the ability to recognize, understand and apply mathematical concepts, procedures, principles and ideas (Sumarmo in Haq, 2016). In the educational context, understanding mathematics is the goal of a mathematics learning process, which includes the ability to understand concepts, distinguish a number of mutually exclusive concepts, as well as the ability to carry out calculations in a manner that applies to broader situations or problems.

Mathematical understanding also involves the ability to develop a mathematical outlook, appreciate the processes of mathematization and abstraction, and have pleasure in applying them. In the mathematics learning process, understanding concepts is a very important part, because understanding mathematical concepts is an important basis for thinking in solving mathematical problems and everyday problems.

Based on this background, the author is interested in conducting research with the title "**Analysis of the importance of Formative Assessment of Mathematics Learning in Improving Mathematical Understanding**".

This research uses qualitative methodology. The term "qualitative research" refers to research with a descriptive approach and consistent use of analysis. The procedures and structure are studied in more depth in qualitative research. This theory is used as a guide to ensure the focus of the investigation is in accordance with existing facts. The data collection techniques used were field studies and literature studies. The literature review was carried out by looking for trusted journals. Meanwhile, case studies are carried out using observations and interviews.

DISCUSSION

Formative assessment is a process of collecting data regarding the extent to which students have progressed in mastering targeted competencies. According to Higgins in Azka Fuadia and Lya Diah Pramesti (2023), formative assessment is a task that must be carried out by students in the learning process which aims to provide feedback carried out by teachers to improve students' learning achievements. In this guide, formative assessment is often also called Assessment for learning, which can be interpreted as the process of collecting data or information regarding how well students have progressed in mastering

competencies and making decisions about the most effective learning activities as a facility for each student to achieve appropriate mastery of the material. optimal.

Formative assessments are carried out during the teaching and learning process. Formative assessment is part of the way teachers and students teach in the classroom learning process. Formative assessment is different from summative assessment. Summative assessments are carried out at the end of the learning process and are used as a result of report cards or determining student grade promotion and graduation. Formative assessment is an assessment that has the aim of providing information or feedback for students to improve a learning process (Kemendikbudristek, 2022).

Based on the definition of formative assessment above, it can be concluded that formative assessment is a process of collecting data or assessing students which aims to provide feedback to students and improve the learning process so that learning objectives can be achieved. According to Altika et al (2023) there are three principles in formative assessment. First, it is integrated into ongoing learning activities. Second, it involves students in every activity carried out. These three assessments are not only related to student progress, such as mastery of the domain of attitudes, students' attitudes in learning, students' learning styles and collaboration in ongoing learning.

In the 21st century, changes are needed in schools and the teaching and learning process. Formative assessment is one part of teaching and learning activities. It was previously mentioned that this formative assessment is part of the steps in effective learning. According to Angelo and Cross in Altika et al (2023). From this formative assessment, students receive feedback from the teacher regarding what, how much, and how well students can understand the lesson. The teacher then uses existing information to improve the learning process where there are still deficiencies so that it can be made more effective and efficient.

This formative assessment is carried out during learning activities. In one face-to-face meeting, formative assessment can be carried out more than once, for example, at the beginning of the learning process using joint response techniques

and the teacher checks students' mastery of the knowledge learned at the previous meeting. In the middle of the learning process the teacher checks the students' understanding of what is being studied again using questioning techniques. Furthermore, at the end of the lesson, an evaluation is conducted to check students' mastery of the competencies achieved in the lesson that has ended at that time.

Data from the results of the formative assessment, teachers can find out which parts of the material or competencies have been mastered by students, whether there are still parts that students have not mastered well. Therefore, the teacher must be able to immediately decide what action needs to be taken, for example the teacher repeats the lesson on a part of the material that the students have not mastered well. Teachers must improve ongoing learning and plan subsequent learning well by looking at the results of the formative assessments that have been obtained. In this way, formative assessment can make learning of higher quality and guarantee the achievement of the goals of a learning process for students. Formative assessment and the learning process will become one unit, this formative assessment planning is created as a integration between the planning of the learning process in the school RPP.

Additionally, formative assessments aim to achieve a deeper understanding of students, rather than simply measuring knowledge. This can enable teachers to evaluate the extent to which students truly understand the concepts taught and are able to apply them in relevant contexts. Thus, formative assessments help create deeper understanding than the commonly used summative assessments. In implementing formative assessment, there are various tools and methods that can be used, such as formative tests, class observations, interviews, and so on. These methods are designed to provide in-depth information about student progress and provide opportunities for teachers to provide appropriate support.

The impact of formative assessment on student development cannot be ignored either. In research conducted by Andayani and Madani (2023) it was stated that the use of formative assessment can improve students' academic achievement, motivate them to study harder, and develop a deeper understanding of the learning

material. This is clear evidence of how formative assessment can have a positive impact on the educational process.

Overall, this research highlights the importance of formative assessment of mathematics learning in improving students' understanding. This can be seen from several aspects. First, formative assessment allows teachers to provide direct and immediate feedback to students regarding their understanding. This feedback helps students identify areas they need to improve and reinforces proper understanding of math concepts. This is in line with research Nur Budiono and Hatip (2023) which states that the existence of formative assessments allows teachers to monitor students' progress in understanding mathematical concepts and know what needs to be improved. In this way, teachers can make changes to more effective learning strategies to improve student understanding.

Second, formative assessment allows students to identify strengths and aspects that need to be developed in mathematics. This allows them to have a better reflection on their progress and to optimize their learning activities. Formative assessments are often more interactive and involve students in the learning process. For example, through group discussions, short quizzes, or problem-solving exercises, students become more active in learning and have the opportunity to construct their own understanding.

Third, formative assessment can help teachers and schools to integrate student development more effectively. By understanding students' learning needs, teachers can make more specific and relevant learning plans, as well as present student progress more accurately (Nur Budiono & Hatip, 2023) Information obtained from formative assessments can be used by teachers to adjust learning methods and strategies. For example, if many students have difficulty with a particular concept, the teacher can repeat or explain the concept in a different way.

Fourth, formative assessment can facilitate differentiated learning. Formative assessment allows teachers to design learning that suits the needs of each student. By understanding the extent of individual students' understanding, teachers can provide assignments and activities that are appropriate to their level of ability.

Fifth, formative assessments can help students develop important self-monitoring skills in mathematics. By following their own progress, students can increase their awareness of strengths and weaknesses, as well as increase their ability to optimize learning activities (Andayani & Madani, 2023). When students see their progress through formative assessments, they tend to feel more confident in their math abilities. This increase in self-confidence can encourage motivation and desire to learn further.

However, implementing formative assessment is not without challenges. The most common challenges include the time and resources required to conduct regular formative assessments, as well as the teacher training required to carry them out effectively. Additionally, there is also a paradigm shift in views on assessment that may require changes in school culture and practices. Teachers' inability to provide effective feedback and changes in the curriculum can also be a barrier to implementing formative assessment.

In overcoming these obstacles, educators and education stakeholders must work together to support the implementation of formative assessment. Increasing skills with training and professional development for teachers so they can implement formative assessment effectively. In addition, policies and guidelines need to be developed that support the wider use of formative assessment. It is hoped that this policy will make educators more capable of carrying out formative assessments in learning. Likewise, students' needs in each lesson are in the form of sharpening the material so that the material presented is fully understood. Apart from that, students complained about significant differences in the implementation of the final assessment. Therefore, solutions are needed to overcome obstacles so that the implementation of this formative assessment runs as it should in each learning material.

Overall, formative assessment is very important in improving students' understanding in mathematics learning. By integrating student progress, identifying strengths and weaknesses, integrating student development more effectively, and developing self-monitoring skills, formative assessment can help students to

improve their understanding of mathematics and improve their academic achievement. Thus, formative assessment is a very effective tool in increasing students' understanding in mathematics learning. This assessment not only helps students master the material better, but also supports teachers in optimizing the learning process in the classroom.

CONCLUSION

In conclusion, formative assessment is a process of collecting data and providing feedback to students in order to improve their learning progress, and it is an essential tool in enhancing students' understanding and achievement in mathematics. It allows teachers to give immediate feedback, helps students identify their strengths and weaknesses, facilitates differentiated learning, and develops self-monitoring skills. However, the implementation of formative assessment may face challenges such as time constraints, resource limitations, and the need for teacher training. To overcome these challenges, collaboration among educators and stakeholders, professional development for teachers, and supportive policies and guidelines are necessary. Overall, formative assessment plays a crucial role in improving students' understanding and academic performance in mathematics.

REFERENCES

Albar, M., Masitoh, S., & Nursalim, M. (2023). Hubungan Matematika dan Filsafat. *JIIP - Jurnal Ilmiah Ilmu Pendidikan*, *6*(3), 1393–1396. https://doi.org/10.54371/jiip.v6i3.1417

Altika, W., Indryani, & Hasni, U. (2023). Analisis Penggunaan Asesmen Formatif Sebagai Alat Penilaian Perkembangan dan Pembelajaran Anak Usia Dini di TK IT Al-Azka Kota Jambi. *Innovative: Journal Of Social Science ResearchJ*, *3*(2), 13501–13513.

Andayani, T., & Madani, F. (2023). Peran Penilaian Pembelajaran Dalam Meningkatkan Prestasi Siswa di Pendidikan Dasar. *Jurnal Educatio FKIP UNMA*, *9*(2), 924–930. https://doi.org/10.31949/educatio.v9i2.4402

Andini, D. W., Rahayu, A., Budiningsih, C. A., & Mumpuniarti, M. (2018). Pandangan Kepala Sekolah Mengenai Pendidikan Inklusif Dan Anak Berkebutuhan Khusus Di Sekolah Dasar Diy. *Taman Cendekia: Jurnal*

Pendidikan Ke-SD-An, *2*(2), 247–250. https://doi.org/10.30738/tc.v2i2.3142

Azka Fuadia, L., & Lya Diah Pramesti, S. (2023). Analisis Instrumen Asesmen Formatif dalam Meningkatkan Kemampuan Memecahkan Masalah Matematika Siswa. *Prosiding Santika 3: Seminar Nasional Tadris Matematika Uin K.H. Abdurrahman Wahid Pekalongan*, *2011*, 315–327.

Haq, I. izzharul. (2016). *Pengaruh Model Reciprocal Teaching Dan Pbl Terhadap Kemampuan Pemahaman Matematis Siswa Smp*. *c*, 11–33.

Kemendikbudristek. (2022). Panduan Pembelajaran dan Asesmen. *Badan Standar, Kurikulum, Dan Asesmen Pendidikan Kementerian Pendidikan, Kebudayaan, Riset, Dan Teknologi Republik Indonesia*, 123.

Nur Budiono, A., & Hatip, M. (2023). Asesmen Pembelajaran Pada Kurikulum Merdeka. *Jurnal Axioma : Jurnal Matematika Dan Pembelajaran*, *8*(1), 109–123. https://doi.org/10.56013/axi.v8i1.2044

Sari, Z. L. (2023). Pentingnya Penilaian Formatif dalam Memahami Perkembangan Siswa. *GUAU : Jurnal Pendidikan Profesi Guru*, *3*(7), 150–158.

Yuliani, E. N., Zulfah, Z., & Zulhendri, Z. (2018). Pengaruh Model Pembelajaran Kooperatif Tipe Group Investigation (Gi) Terhadap Kemampuan Pemahaman Konsep Matematis Siswa Kelas Viii Smp Negeri 1 Kuok. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *2*(2), 91–100. https://doi.org/10.31004/cendekia.v2i2.51