



Lecturer vs. Practitioner: How is collaborative class assessment for math learning?

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Abstract

Mathematics education holds significant importance in the educational journey at the school and college levels. However, many students pursuing mathematical education need help comprehending the subject matter, particularly in courses related to mathematics learning media. The phenomenon can be attributed to multiple variables, including diminished motivation, less efficacious learning methodologies, and inadequate pedagogical competencies exhibited by instructors. This study examines the responsibilities of practitioners in collaborative classes within the Higher Education Elementary Linear Algebra (ALE) course, with a specific focus on PGRI Wiranegara University. Data collection in descriptive qualitative research involves several methods, such as observation, interviews, and documentation. The upcoming academic semester, namely the odd semester of 2022/2023, is fascinating. The relationship between Mathematics Education Research Methodology and practitioners facilitated the provision of data. The analysis of collected data involves using reduction, presentation, and conclusions. Empirical research shows that practitioners play a significant role in collaborative classrooms by actively contributing ideas, facilitating learning processes, guiding arguments, and providing explanations. Time restrictions and miscommunication among practitioners hinder the adoption of collaborative classes. The present study posits that practitioners assume a pivotal position within collaborative educational settings and must effectively address the issues they encounter to enhance students' learning outcomes.

Keywords: Assessment; Collaboration; Lecture; Practitioners.

Introduction

Mathematics education is essential and necessitates meticulous deliberation in primary and higher school settings (Levesque, 2017; Shafirova, 2020; Snoddy, 2020). Nevertheless, many mathematics students require assistance comprehending the content (Rudianto et al., 2022), particularly in courses emphasizing comprehension and problem-solving (Ajoudani, 2018). This phenomenon may arise due to various circumstances, including diminished motivation, less efficacious pedagogical approaches, and inadequate instructional competencies exhibited by educators (Fauza et al., 2023; Safitri et al., 2023; Usmyiatun et al., 2021).

One of the prevalent challenges encountered by students pertains to the requirement for a heightened desire to actively engage in studying mathematics. Various reasons can potentially contribute to a decline in motivation (Ahmed et al., 2021; Laila et al., 2023; Sugianto et al., 2023). Perceived irrelevance refers to the subjective perception that something is not relevant or applicable to a particular situation or context. Some students may perceive that mathematics is not as applicable to everyday situations or does not align with their interests and aspirations (Choirudin et al., 2021; Darmayanti et al., 2022; Vedyanti et al., 2023). Numerous students struggle to create meaningful correlations between mathematical principles taught in the educational setting and their practical applications in real-world contexts.

Consequently, the need for robust connections frequently diminishes their excitement and willingness to actively engage in the educational endeavour subsequent problem scenario (Anhar & Darmayanti, 2023; Manasikana et al., 2023; Wulandari et al., 2022). Many pupils encounter challenges when attempting to comprehend and engage with mathematics. When confronted with excessive learning material and an inability to grasp the fundamental concepts, students may encounter feelings of anxiety and a decline in their enthusiasm to participate in academic pursuits actively (Inganah et al., 2023; Sekaryanti et al., 2022; Vidyastuti et al., 2018).

The observable manifestations of students' challenges and engagement in the elementary linear algebra course become apparent as the semester unfolds. Many students opt to retake this course and experience a sense of monotony due to the repetitive teaching approach. This feeling of boredom persists until they realise that student attendance is infrequent. The learning process is characterised by a lack of reciprocal communication, resulting in limited exchange of feedback between individuals or groups. The study materials employed in educational settings are abstract, while the practice questions utilised tend to be tedious. Despite this, students persist in employing traditional resources such as books and even resort to using cell phones to present the outcomes of their group discussions. Many students continue to consult online learning materials that do not align with the prescribed lecture resources. The practical instruction of ALE in the classroom necessitates using a pedagogical method.

Nevertheless, Inefficient Subsequent Pedagogical Methods: Pedagogical approaches characterised by limited interactivity and a lack of accommodation for students' different learning preferences have the potential to result in diminished levels of motivation (Bock, 2018; Chapman, 2018; Denis, 2005). The pedagogical tactics employed in mathematics education predominantly emphasise direct instruction, with limited integration of diverse learning styles or interactive strategies. In this scenario, it is logical to infer that students would encounter sensations of ennui and hence exhibit diminished involvement with the curriculum content (D'Amico et al., 2019; Gai, 2018). One potential determinant impacting student motivation is the need for more assistance and acknowledgement, particularly when surmounting mathematics obstacles.

The absence of assistance might originate from various sources (Afifah et al., 2022; Darmayanti et al., 2023; Zahroh et al., 2023), including teachers, peers, or relatives. Assume that students need more support or acknowledgement for their endeavours in mathematics. In this scenario, it is logical to argue that individuals may encounter a decline in their drive to persist in their pursuit of academic accomplishments. The final factor to consider is the influence of environmental factors. Recognising the significant impact of the surrounding environment on students' motivation to participate in mathematics instruction is paramount. The frequent exposure of pupils to negative perspectives on mathematics from their peers, family members, or society is expected to influence them, potentially leading to a decline in their interest and excitement towards the discipline.

Furthermore, upon conducting preliminary observations, it was observed that students needed more comprehension of previously taught topics. Observable behaviours such as frequent joking by students during class times, frequent entry and exit from the classroom while class is in session, casual and non-academic conversations between students, and instances of disruptive noise occurring inside the classroom during class times are examples of this (Arwizet, 2019; Le, 2018). The process of learning occurs. So, the author wants to look at a way of teaching in the field of education—namely, how the Ice Breaker method can be used to teach math—to deal with the problems that come up in school settings. The objective is to foster increased motivation among students in their engagement with the subject matter.

The learning objectives in mathematics necessitate students to possess a comprehensive comprehension and proficient application of mathematical concepts with a notable degree of correctness and precision (Apiyah & Suharsiwi, 2021; Sopa et al., 2022). Nevertheless, many students require assistance comprehending the concepts presented in lecture materials, mainly in courses focused on ALE in mathematics education (Andi Mattoliang et al., 2022; Arjudin, 2020; Sulistiawati & Surgandini, 2019).

The practice of revisiting fundamental mathematical topics is a typical occurrence within courses that centre on the study of mathematics education. These concepts frequently encompass the subsequent themes (Fatimah, 2013; Kusumah, 2013). By studying Linear Algebra, students are equipped with the necessary skills to address and overcome challenging problems, enhancing their accessibility effectively. This entails employing various strategies and approaches to navigate obstacles and maximise problem-solving capabilities. Through the examination of ALE, a mathematical discipline concerned with analysing structure, relationships, and quantitative properties. Algebra is a branch of mathematics that deals with manipulating symbols, variables, and elements of sets and applying rules to perform operations on them. In addition, students are

expected to comprehend fundamental mathematical principles and construct proofs by direct, indirect, or mathematical induction methods. This program encompasses implementing research efforts that primarily focus on mathematics education (Cholily, 2019; Jamaluddin & Faroh, 2020; Muniroh et al., 2019). Hence, it is imperative to develop a revised version of the plan. Present endeavours are focused on advancing research concepts in the field of mathematics education, specifically about modifying results following the use of instructional techniques. The recommendations above will function as project assignments.

One potential strategy for mitigating this disparity is including collaborative practitioner sessions in university mathematics education courses that prioritise instruction and use teaching and learning resources. According to Marsicano (2023), the instructional methods employed in practitioner collaboration classes are distinguished by the active participation of both educators and practitioners in the educational process. Hennessy (2021) and Manohar (2018) highlight the need for meticulous ALE selection in mathematics education, ensuring alignment with the intended learning objectives and instructional resources. Additionally, the experts emphasised the potential of specific Adaptive Learning Environments (ALEs) to enhance student motivation and facilitate more efficient learning outcomes.

Many studies have used collaborative classes with practitioners, including (Untari et al., 2018) and (Ulya et al., 2019). Collaborative practitioner classes improve mathematics instruction by providing engaging learning tools (Agustini, 2016; Purwaningsih et al., 2023). (Suratno, 2013) states that practitioner-collaborative classrooms have increased mathematics education students' practical teaching skills. Unlike previous research, this study aimed to examine experts' collaborative learning to provide an introductory linear algebra (ALE) course. Students who had yet to pass the ALE course, especially in post-secondary mathematics education at PGRI Wiranegara University, were in the repeat class used for the research.

Collaboration, active learning, and mathematics education theories underpin this study (Levesque, 2017; Ridho' i et al., 2023; Sugianto et al., 2023). Multiple studies have indicated that incorporating collaborative classrooms with practitioners improves higher-level mathematics teaching. Previous scientific studies inform our diverse and engaging educational products. Collaborative instruction with professionals will also improve math students' practical pedagogical skills. This study examines how collaborative classrooms help students learn arithmetic, particularly in ALE courses.

This study evaluated professionals' collaborative mathematics class involvement as higher education ALE instructors. This research seeks to identify mathematical education issues, analyse optimal settings for successful mathematics learning, find gaps between present learning practices and desired conditions, and provide solutions.

Research Method

This research employs a qualitative methodology, utilising case studies as the primary research technique. A qualitative approach is seen as more appropriate in research endeavours that necessitate a comprehensive comprehension of the phenomena under investigation. According to Creswell (2014), The methodology employed in this study is illustrated in Figure 1.

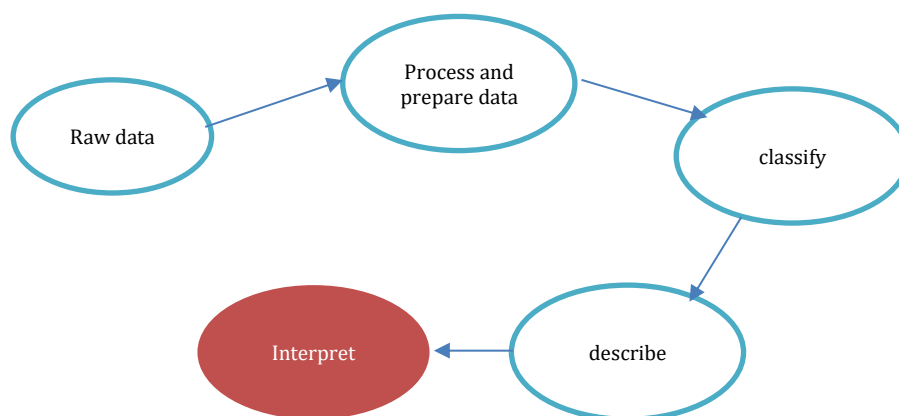


Figure 1. methodology employed in this study professionals' collaborative mathematics class

According to Figure 1, the initial stage involves acquiring unprocessed data. Collaborative classes use raw data, including transcripts, field data, and photographs. The subsequent stage involves the processing and preparation of the acquired data to facilitate its analysis. The third stage involves data classification through the process of codes or coding. The subsequent stage involves presenting the analysis findings as a comprehensive report. The ultimate stage involves the interpretation of the data.

Moreover, the data-gathering methods employed in this study encompassed observation, interviews, questionnaires, and documentation, specifically interviews. The study involved observing the learning activities inside the collaborative classroom setting. Conversely, deliberations were conducted to acquire insights from two practitioners, one of whom was the author, who was actively engaged in the learning process, and the lecturer responsible for instructing the course. Documentation is utilised as a means of acquiring secondary data about the acquisition of knowledge within the context of an ALE course.

The initial method employed for data collection involves the acquisition of primary data. The primary data for this study was collected from a sample of participants who were actively involved in the research, including practitioners, lecturers, and students. The data instrument employed in the study conducted by (Asgafi et al., 2023) was a closed questionnaire that gathered information about opinions, perceptions, knowledge, attitudes, and other essential qualities related to collaboration and ALE material. Figure 1 demonstrates that raw data collection begins. Collaboration classes use transcripts, field data, and photographs. Step two is processing and preparing found data for analysis. Classifying data in codes is step three. Fourth, write a report on the analysis results. The final phase is data interpretation.

This study collected data by observation, interviews, questionnaires, and documentation. Learning activities in the cooperation class were observed. In contrast, two practitioners (one of whom was the author) participated in the learning, and the course presenter was interviewed. Documentation provides supplementary ALE course learning data.

Data collection begins with primary data. Primary data came from research participants (practitioners, lecturers, and students). (Rizki et al., 2022) used a closed questionnaire of opinions, perceptions, knowledge, attitudes, or other traits relevant to collaboration (ALE material). Questionnaires can be distributed via g-form in ample sample research. Questionnaire interviews allow respondents to be honest and open without fear or social pressure by not identifying

them. Survey data can be evaluated statistically.

Practitioners, students, and mathematics learning media course papers were employed in this research. This research involves education experts and ALE learning professionals at PGRI Wiranegara University, Pasuruan. Qualitative thematic data analysis was used. The analysis involves classifying, reducing, presenting, and deriving conclusions from obtained data.

Results and Discussion

The primary aim of this study was to evaluate the extent of teacher engagement in collaborative learning settings when teaching ALE courses in the domain of mathematics education at the tertiary level. The data was obtained through various methodologies, including observation, interviews, and documentation, and subsequently underwent comprehensive analysis.

The existing empirical research indicates that educators play a substantial role in fostering collaborative learning environments in Mathematics Education ALE instruction at the post-secondary level, as depicted in Figure 2.



Figure 2. collaborative nature of teaching in the classroom

The collaborative nature of teaching in the classroom is apparent through the interaction between practitioners and lecturers, as depicted in Figure 2. Practitioners play a pivotal role in cultivating novel and innovative methodologies in mathematics education through their substantial contributions of ideas and knowledge. Professionals have identified an example of innovation in using social media channels, including TikTok, Instagram, and Facebook, to promote ALE courses. The observation is depicted in Figure 3.

Incorporating Adaptive Learning Environments (ALE) into collaborative college mathematics education courses poses several obstacles, as demonstrated by the introduction of Collaborative Classes. The presence of distinct problems becomes evident, with one being associated with the disparity in comprehension between educators and professionals concerning the theoretical framework and methods employed by practitioners and lecturers in mathematics instruction.

This statement aligns with (Partono et al., 2021; Swearingen, 2017) contention that the efficacy of incorporating collaborative learning within the educational setting is contingent upon the proficiency and expertise of educators and professionals in collaboration. Another essential factor that necessitates thorough examination is the accessibility of resources. It is crucial to possess sufficient resources to ensure the successful implementation of collaborative classrooms. Furthermore, the restricted availability of educational resources within classrooms can impede the ability to teach professionals to participate in collaborative endeavours effectively.

A pressing need exists to prioritize the enhancement of lecturers' and practitioners' comprehension and expertise in collaborative practice alongside the endeavour to enhance practitioners' comprehension of learning technologies. The collective endeavour holds significant importance in guaranteeing the seamless execution of collaborative instructional sessions. Hence, it is imperative to implement strategies that enhance practitioner involvement in collaborative educational settings to attain optimal results regarding learning goals. (Brummitt, 2015; Sicker, 2020) believe that establishing collaboration between educators and practitioners can enhance students' abilities and performance, hence facilitating the attainment of planned learning objectives.

Moreover, as emphasized by (Adhikari, 2020; Hariyadi & Darmuki, 2023; Supena, 2021), professionals in the field significantly impact education due to their possession of invaluable practical expertise, which is crucial for facilitating genuine learning encounters. The results of this study offer a basis for higher education institutions and educators to contemplate integrating a collaborative pedagogical approach that involves professionals in teaching the research methodology of mathematics education within the field of mathematics education. The active participation of practitioners plays a crucial role in enhancing the efficacy of mathematics instruction, particularly within the realm of ALE (Adult Learning and Education) courses in mathematical education.

One notable finding in this study pertains to the passion exhibited by students and instructors in collaborative classroom settings. This is evidenced by the observed variability in student grades, which tend to surpass the established completion criteria. Additionally, it has been demonstrated that collaboration and mutual support among teaching lecturers contribute to the successful continuation of the class and the attainment of learning objectives, ultimately leading to students achieving optimal grades. Implementing a psychological method involves providing moral support, motivation, factual information about the topic, and elucidating the significance of studying this subject matter. Develop a diverse ambiance to avoid the establishment of a persistent state of tension. Establishing a hospitable environment through proximity to students, even if solely for photographic purposes, and offering a designated area for students to visit the practitioner/lecturer's location. In this manner, students will also experience assistance through the provision of moral support and inspiration. Consequently, upon the conclusion of each instructional session, practitioners and lecturers convene to capture a collective photograph while extending an invitation to students to engage in recreational activities at the practitioner's residence, as depicted in the

accompanying image.



Figure 6. provision of moral support and inspiration

Conclusion

The available empirical evidence indicates that practitioner groups significantly influence the effectiveness of collaborative learning arrangements in mathematics education ALE courses at the postsecondary level. Educators assume a crucial role in helping the learning process through their active contribution of ideas, guidance in discussions, and provision of explanations, empowering students to participate in educational endeavours actively. Despite encountering numerous obstacles, utilizing collaborative learning methodologies remains a subject of scholarly fascination. The consideration of cooperation and mutual support in selecting teaching methods within collaborative classrooms involving practitioners and lecturers is also crucial.

This study provides empirical evidence to substantiate the claim that integrating collaborative practices within classroom contexts can be a realistic strategy for enhancing instructional effectiveness in higher education.

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