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Beyond content delivery: Integrating Microsoft teams and Reflect for affective feedback and enhanced learning readiness

Aris Defiana[1], Bagus Setiawan[2], Dedy Agustriyono[3], Ratih Puspitasari[4], and Dian Ariani[5]

[1-5] Pendidikan Kejuruan, Universitas Negeri Malang, Malang, Indonesia
Corresponding Author. e-mail: aris.defiana.2405518@students.um.ac.id

Abstract
This study explores the integration of Microsoft Teams and its Reflect feature as an innovative learning medium in informatics education, focusing on how real-time emotion visualization can enhance understanding of students' learning readiness. While digital platforms are widely used for content delivery and collaboration, there remains a significant gap in leveraging real-time affective data to adaptively respond to students' emotional states during online learning. Using a qualitative descriptive approach, this research employed participant observation, in-depth interviews, and documentation with 30 Year 11 students and an informatics teacher at SMA Negeri 1 Boyolangu. Findings indicate that emotion visualization via Reflect enables teachers to dynamically adjust instructional strategies based on students' expressed emotional states, thereby increasing engagement, motivation, and perceived learning readiness. This study contributes to the emerging field of affective-aware digital learning environments and underscores the pedagogical value of integrating emotional feedback into technology-enhanced instruction. For future implementation, we recommend broader adoption, teacher training in affective pedagogy, and the exploration of automated emotion-detection technologies to further personalize and responsive learning experiences.
Keywords: Microsoft Teams; Reflect; learning readiness; affective learning; informatics education

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INTRODUCTION

In the current digital era, innovation in learning has become increasingly important, driven by the 2020 pandemic, which compelled the education system to adopt online learning models. Microsoft Teams has emerged as one of the platforms widely used to support the learning process, whereas Reflect, a JavaScript framework, offers an attractive solution for developing interactive applications. The combination of these two tools can help in understanding students' learning readiness, which is a key factor in determining educational success. This study aims to explore how the integration of Microsoft Teams and Reflect can contribute to enhancing students' learning readiness and understanding.

Microsoft Teams provides various features that effectively support interaction and collaboration between students and teachers. Features such as video conferencing, chat, and

task management allow students to be more actively involved in the learning process. According to Rahmasari (2022), the use of Microsoft Teams in English language learning shows a significant increase in student motivation and engagement. With better collaboration, students can be more prepared to receive the instructional material delivered.

Reflect, as a JavaScript framework, allows for the development of responsive and interactive user interfaces. The use of Reflect in education, especially in the context of online learning, can provide clear visualisations of data related to students' learning readiness. For instance, a platform built with Reflect can collect data on student activities, participation levels, and feedback from students on their understanding of the presented material. A study by Salsabila and Panjaitan (2023) and Nafisah and Fitrayati (2021) showed that the use of information technology in learning can improve students' understanding of the taught material.

Integrating Microsoft Teams with Reflect in the context of informatics learning has great potential to support the teaching and learning process. Reflect (used here as part of the Reflect feature in Microsoft Teams) enables teachers to access real-time visual summaries of students' emotional states. Through this feature, teachers obtain immediate feedback on students' learning readiness, allowing them to adjust their teaching strategies more responsively. For example, Microsoft Teams can be used to deliver interactive quizzes that not only assess understanding of the material but also provide an emotional snapshot of students during the learning process.

The implementation of this feature in Microsoft Teams can also be combined with active learning methods, where students learn by solving real-world problems. In this way, students not only learn theory but also the direct application of informatics knowledge, enhancing both their conceptual understanding and their readiness to engage in subsequent learning. Although this integration is promising, there are challenges that must be addressed. Teacher preparedness in mastering the various features of these tools is crucial to ensuring effective learning. Cahyanto et al. (2021) emphasised the importance of training for teachers in utilising technology so that the teaching and learning process can run effectively (Salsabila & Panjaitan, 2023). Therefore, appropriate and continuous training for educators will enhance their ability to implement this learning innovation.

The integration of Microsoft Teams and Reflect as an informatics learning media to understand students' learning readiness offers an innovative approach in education. By utilising the features of these platforms, teachers can more easily measure and understand students' readiness to learn, as well as create a more responsive and interactive learning environment. The success of implementing this method is highly dependent on the readiness of both teachers and students to optimally leverage technology, which in turn drives improvements in the quality of education in the digital era.

METHODS

This research used a qualitative descriptive approach with the aim of detailing the process of integrating Microsoft Teams and Reflect in informatics learning, particularly for understanding students' learning readiness through the visualisation of their emotions. A qualitative approach was chosen to explore phenomena in a real-world context in depth and holistically, consistent with the fundamental tenet of qualitative research, namely to understand meaning from the subject's perspective (Fadli, 2021). This research design is appropriate because it can answer questions regarding the effectiveness of technology implementation and how visualisation of students' emotions can assist teachers in understanding student learning readiness.

The research subjects consisted of Year 11 (Grade XI) students at SMA Negeri 1 Boyolangu who were actively participating in informatics lessons, as well as the class's informatics teacher. The subjects were selected using purposive sampling, i.e., based on specific considerations relevant to the research objectives (Olla & Abdullah, 2021). The study site was chosen because the school has a strong commitment to using Microsoft Teams routinely for

learning activities in several subjects, allowing the researchers to collect authentic and valid data on the implementation of this technology (Mufida & Salamah, 2021).

The data collection techniques in this study included participant observation, in-depth interviews, and documentation. Participant observations were conducted during the lessons to record interactions between the teacher and students when using Microsoft Teams and Reflect for visualising student emotions. The observation instrument was structured around indicators of student engagement, usage of Microsoft Teams features, and students' emotional responses. As stated by Villegas et al. (2025), the use of appropriate instruments will greatly contribute to the success of data collection.

In-depth interviews were conducted to gain deeper information about the experiences of teachers and students in using the integrated Microsoft Teams and Reflect platform. The interview instrument was a semi-structured guide containing questions about impressions, challenges, benefits, and suggestions for using the platform. The documentation technique was used to collect data in the form of screenshots of students' emotion visualisations, records of interactions on Microsoft Teams, learning activity logs, as well as reflective documents from teachers and students about their experiences (Wirza & Ofianto, 2021).

Technically, the study utilised Microsoft Teams' integration feature with a third-party web-based application designed using Reflect. Reflect was chosen as a JavaScript library to present data interactively in visual form, such as dynamic graphs representing students' emotional states in real time. The primary equipment used in this study included computers, the Microsoft Teams software, a React-based emotion visualisation application, as well as screen and audio recording devices for additional documentation.

The research procedure consisted of several stages. The initial stage included observations, use of the Reflect feature, instrument development, and coordination with the teacher. Next was the implementation stage, in which the Reflect feature had been integrated into Microsoft Teams over several learning sessions. In this stage, observations and interviews were carried out intensively. The final stage was data analysis, where the data from observations, interviews, and documentation were examined using thematic analysis (Kartini, 2021).

Data analysis was conducted based on the thematic method developed by Miles & Huberman (1994), encompassing three steps: data reduction, data display, and conclusion drawing. Relevant data were organised into specific themes regarding students' interaction with the technology and their emotional responses, so that the results could be presented in a comprehensive descriptive narrative, supplemented with visualisations if necessary (Hunaidah et al., 2022).

To ensure data validity, this study employed source triangulation by comparing findings from observations, interviews, and documentation. This approach was undertaken to guarantee that the collected data were consistent, accurate, and could be substantiated (Kartini, 2021). Thus, the research methods were designed systematically to allow replication by other researchers, with clearly ordered procedures and carefully prepared instruments.

RESULTS AND DISCUSSION

Results

The results of this study indicate that the integration of Microsoft Teams and Reflect in informatics learning had a significant impact on the understanding of students' learning readiness. The research was conducted at SMA Negeri 1 Boyolangu, involving Year 11 students who were active participants in the lessons and the informatics teacher of that class. A total of 30 Year 11 students participated in this study. They were observed over several online learning sessions conducted using Microsoft Teams. From the observations, it was found that student interaction on the Microsoft Teams platform increased markedly. Most students showed active engagement when using the available features, such as video conferencing, group discussions, and project collaboration (Almodaires et al., 2021). Previous research has shown that Microsoft Teams can enhance interaction between students, contributing to a better learning experience

(Purnomo, 2022).

The development of a Reflect-based application integrated with Microsoft Teams enabled real-time visualisation of students' emotions during the learning process. The data obtained showed that the use of emojis and dynamic graphs to represent students' emotional states helped teachers understand their learning readiness. Students reported that they felt more comfortable expressing their emotions through this application, allowing teachers to take more appropriate actions to support their learning process. The study affirmed that data visualisation in the learning context greatly helps teachers in evaluating student participation and understanding (Zamora-antuñano et al., 2021).

The results of in-depth interviews with students also implied that they felt more motivated by the learning conducted with this method. Students reported that the clear visual support through Reflect added clarity to the material presented and made them more enthusiastic about learning. Purnomo (2022) found that utilising interactive features in applications like Microsoft Teams increases students' learning motivation. In this case, most students perceived that the integration of learning technology succeeded in creating a more enjoyable and engaging learning atmosphere.

While this study's results show many benefits, there were some challenges encountered during implementation. Some students expressed difficulties in adapting to the new technology, especially those less familiar with Microsoft Teams and Reflect. This is in line with previous research, which showed that advances in educational technology are often accompanied by the need for user training (Uzunboylu et al., 2022). Therefore, it is suggested that teachers provide more thorough training and guidance before implementing this new technology to facilitate a smoother transition for students (Shangguan et al., 2020).

The visualisation of students' emotions during the learning process using Microsoft Teams integrated with a Reflect-based application provided real-time information that could be observed directly by the teacher. Figure 1 and Figure 2 illustrate these student emotion visualisations from the Reflect feature.

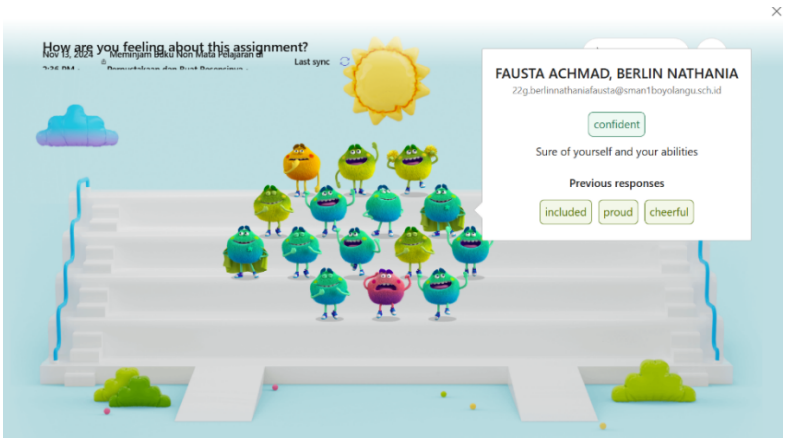

Figure 1. Microsoft Teams interface with Reflect

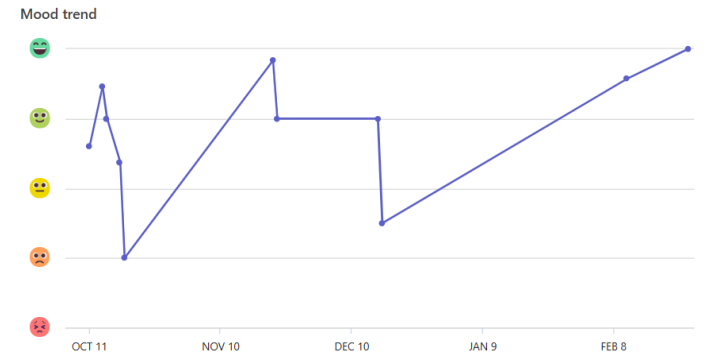

Figure 2. Reflect graph in Microsoft Teams displaying trends in students' emotions

Discussion

The findings indicate that the integration of Microsoft Teams and Reflect can significantly improve the effectiveness of the informatics learning process. The real-time display of students' emotions functions as an important tool for teachers to monitor psychological changes in learners during lessons. Students' emotional responses recorded through the Reflect platform showed variations that closely correlated with their understanding of the material and their engagement in class activities. These findings support the fundamental assumption of this study that directly monitoring students' emotions can serve as a valid indicator of learning readiness.

This technological integration not only enriches the learning media but also provides opportunities for a more personalised and responsive teaching approach to students' emotional needs. This approach aligns with humanistic learning principles that place students at the centre of the educational process (Mastropasqua et al., 2020). This study reinforces the findings of Eka et al. (2022), who found that Microsoft Teams is effective as a digital learning platform supporting student interaction and collaboration. However, the present study goes further by introducing a deeper approach through the integration of emotion visualisation, which has not been extensively discussed in prior research. Although Pal & Vanijja (2020) stated that Reflect has great potential in developing interactive data visualisations, but that study did not specifically address its application in an educational context. The current research fills that gap by applying Reflect in an educational setting, particularly in detecting student emotions as an effort to understand learning readiness.

These findings are also in line with Saki et al. (2024), that emotional expression is strongly related to the level of student engagement and understanding of lesson material. Accordingly, the integration of Microsoft Teams and Reflect in informatics instruction offers a novel contribution by combining technology, educational psychology, and an emotion-based learning approach. Practically, these findings guide teachers in designing adaptive learning strategies based on students' emotional data. Through the use of emotion visualisation, teachers can immediately monitor whether students feel happy, confused, bored, or enthusiastic about the material being delivered. These responses can serve as signals to adjust teaching style, delivery pace, or even to provide individualised attention if needed (Mukhtar et al., 2020). From a theoretical perspective, this study opens new horizons in the use of digital media as a non-cognitive assessment tool. Previously, assessment was mostly focused on cognitive aspects or student learning outcomes, but now the integration of affective data as part of holistic evaluation is possible. This enriches constructivist and humanistic learning theories by adding an emotional element as a determining factor in the success of the learning process (Uzunboylu et al., 2022).

Like other research, this study has several limitations. First, the limited number of participants, only one class in a single school, means the results may not be generalisable to a broader population (Rahmasari, 2022). Second, although the Reflect application functioned well, there were technical obstacles such as inconsistent internet connections and the varying specifications of students' devices. Third, the display of student emotions still relied on students' manual input through the visual interface, so subjectivity in reporting remains an issue. The visualisation is not yet fully based on automatic detection, which would surely yield more accurate and objective data (Mufida & Salamah, 2021).

Based on these results and limitations, several suggestions emerge for future research. First, follow-up studies could broaden the sample scope by involving multiple schools in different regions to obtain more general patterns. Second, the technology integration should be further developed by utilising facial or voice detection technology to automatically capture more accurate emotional data. Third, quantitative approaches or mixed methods could be employed to statistically measure more specific relationships between students' emotional states and their learning outcomes (Silva et al., 2022). Fourth, it is necessary to develop training for teachers so that they have the competence to interpret and respond to emotional visualisations

appropriately. Research can also be directed towards developing adaptive curricula that continuously take students' emotional data into account (Rudhumbu, 2022).

CONCLUSION

This study demonstrates that integrating Microsoft Teams and Reflect as informatics learning media provides an effective and innovative approach to understanding students' learning readiness through real-time emotion visualisation. The findings reveal that emotional data displayed through Reflect enables teachers to identify students' engagement levels and psychological responses during learning, thereby allowing more adaptive and responsive instructional strategies. This integration not only enhances student participation and motivation but also promotes a more humanistic learning environment where emotional readiness becomes an essential component of the teaching–learning process.

From a theoretical perspective, this research contributes to the development of affective-data-driven learning media by extending the use of digital platforms beyond cognitive assessment toward emotional and behavioural dimensions of learning readiness. Practically, the results offer insights for educators in utilising emotion visualisation to design personalised learning interventions and improve classroom interaction in digital learning environments.

Despite its promising outcomes, this study is limited by its small sample scope, reliance on self-reported emotional input, and technical constraints. Therefore, future research is recommended to involve broader participant groups, integrate automatic emotion-detection technologies, and employ mixed-method approaches to examine the quantitative relationship between emotional readiness and learning outcomes. Overall, the integration of Microsoft Teams and Reflect holds strong potential to advance technology-enhanced learning practices and support more holistic, data-informed educational decision-making in the digital era..

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