

# Interface Interactions and Mathematics Performance in a Personal Instructing Agent Exhibiting Synthetic Facial Expressions

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This study determined the interface interactions of Grade 8 students within a virtual learning environment and the impact of this environment on their mathematics performance. In this learning environment, a Personal Instructing Agent (PIA) assisted students in solving algebraic linear equations. The first version of PIA exhibited synthetic facial expressions (SFE), such as neutral, happy, sad, surprised, and angry, while the second version only displayed neutral SFE. Students were randomly assigned to either version, with 26 using the first version and 27 using the second. It was demonstrated that students in the first version had higher interface interactions in terms of number of problems solved, hints provided by the PIA, time spent using the system, and completion rate. Furthermore, it was revealed that students using the first version explored higher-difficulty mathematics problem levels than those using the second version. While students in both versions improved their mathematics performance, there was a 15-point gap in their average post-test scores in favor of the facial expression group. It was inferred that both versions contributed to promoting persistence, but the first version emerged as the more preferred educational tool. Recommendations are also included in this paper.

# Shaping the Future of Education with UBD's Innovative Lifelong Learning and Bachelor of Digital Science Programmes

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This paper explores the transformative role of technology in education, spotlighting Universiti Brunei Darussalam's (UBD) innovative approaches through its Lifelong Learning programmes, micro-credentials, and the Bachelor of Digital Science programme. In an era where the landscape of education is continually evolving, UBD has positioned itself at the forefront of this change by integrating technology-driven solutions that cater to diverse learner needs and industry demands. Our Lifelong Learning programmes are designed to provide flexible, accessible education pathways for learners at various stages of their life and careers, leveraging micro-credentials as a means to recognize and accumulate expertise in specific skill sets. Meanwhile, the Bachelor of Digital Science programme is tailored to produce graduates and researchers who can contribute to technological innovations and technology-based economic development. This paper discusses the development and implementation of these programmes, drawing on data and feedback from stakeholders to evaluate their effectiveness. Through these innovative programmes, we aim to contribute to the broader discourse on technology innovations for education, offering insights and best practices that can inspire similar initiatives worldwide.

## Virtual Tracer of Students' Connection to Science Ideas of Social-Scientific Issues in Biochemistry Class

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In the digital era 4.0, people easily receive and disseminate information through social media platforms, including socio-scientific issues (SSI). However, many students were challenged to explain SSI, which potentially caused them misleading. Teachers need strategies to tracer students' connection with SSI. This study aims to develop a virtual tracer of students' connection to SSI (VTC-SSI). The IDM (Instructional Development Model) model consists of 6 stages, namely: 1) needs analysis, 2) design and development of the VTC-SSI prototype, 3) validation of VTC-SSI, 4) Testing of the VTC-SSI prototype, 5) evaluation of VTC-SSI, and 6) revision of VTC-SSI was applied in this study. A total of 88 science education students from a university in Surabaya were involved voluntarily in the tryout of the VTC-SSI. Content analysis shows that the connection to SSI can be traced by assessing students' ability to identify, define, describe, and explain science aspects of SSI. In addition, the context of the SSI should be explained microscopically. VTC-SSI tracer is valid and can be used to trace students' connection to the science ideas of SSI. Prior relevant knowledge is essential to recognize and construct the science aspects of SSI and the microscopically described of SSI context.