

Chapter 9

Classifying Student Sentiments in Learning on Video-Conference Platforms: Human-AI Synergistic Approach Through Machine Learning and Self-Determination Theory

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ABSTRACT

This study analyzes learner sentiments on video-conference platforms (VCPs) in online education, contributing to discourse on “Creative Approaches to Human-AI Synergy in Classroom Instruction” by showing how AI/ML tools can evaluate

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student feedback to enhance VCPs and AI-powered instruction. Using a mixed-methods design, it integrated Azure Machine Learning (AML) with a multidimensional sentiment model and mapped findings to Self-Determination Theory (SDT). Feedback from 264 students was analyzed via AML's three-category sentiment system (positive, neutral, negative) and a five-category qualitative model (positive, negative, neutral, insightful, confused). Sentiments were linked to SDT's autonomy, competence, and relatedness. While learners valued VCP flexibility (autonomy), they reported issues like limited interaction and technical barriers (competence and relatedness). Sentiment patterns varied by demographics. The study highlights the benefit of hybrid analytical models and recommends improving VCP design to support diverse learner needs and enhance all three SDT dimensions.

INTRODUCTION

The proliferation of online learning, particularly following the COVID-19 pandemic, has positioned video-conferencing platforms (VCPs) like Zoom, Microsoft Teams, and Webex at the core of digital education. These platforms facilitate real-time communication and flexible learning but also pose challenges including reduced social presence, technical disruptions, and learner disengagement. Understanding how students perceive their experiences on VCPs is critical for enhancing user satisfaction and learning outcomes. This study applies machine learning and sentiment analysis to explore learners' experiences in VCP environments, offering a framework that integrates Azure Machine Learning (AML) and a multidimensional sentiment classification model within the scope of Self-Determination Theory (SDT).

PROBLEM BACKGROUND AND OBJECTIVES

The adoption of video-conference platforms (VCPs) for online learning surged dramatically during the COVID-19 pandemic and has since become a staple in digital education. However, while these platforms offer significant advantages, such as flexible scheduling, asynchronous access to materials, and real-time interaction, students' experiences with VCPs remain highly varied. Learners have reported challenges ranging from lack of motivation and distractions to technical difficulties and limited peer interaction. These factors contribute to uneven learning outcomes and reduced satisfaction in online environments.

Current research in the field of online learning has often prioritized asynchronous tools or focused on surface-level evaluations of sentiment using binary or three-category classification systems. Such models are unable to capture the rich

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