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Exploring the Impact of External Self-Regulation Tools on Motivation, Distraction and Cognitive Traits in Online Learning: A Case Study

Yintao Kang[1], Yasemin Gulbahar[2]

[1,2]Teachers College, Columbia University, New York, United States

ABSTRACT

This study explores the role of external self-regulation tool, and specifically in this study, the app named *Tomato Clock*, in managing distraction, cognitive load, and motivational factors during online learning tasks. While utilizing a mixed-methods case study design, four university-level students engaged in two video-based learning tasks with and without the intervention. Quantitative measures including cognitive load, metacognition, motivation, and smartphone distraction subscales, were analyzed alongside semistructured interview data. Results indicated that modest reductions are observed in distraction behaviors, particularly in aspects of attention impulsiveness and online vigilance, while metacognitive strategy usage remained stable or improved across participants. Cognitive load and motivational outcomes were more variable, reflecting the individualized nature of tool engagement. Thematic analysis revealed emerging themes such as conditional perceptions of tool usefulness, high metacognitive awareness, discrepancies between perceived and observed benefits, and the influence of pre-existing digital habits. Limitations include the small, high-performing sample, reliance on shortterm measurements, and task simplicity. The findings suggest that while minimal external self-regulation scaffolding can support attentional and reflective processes, its effectiveness is highly context-dependent, shaped by learners' task perceptions and digital behavior patterns. Future research should incorporate larger, more diverse samples, longitudinal tracking, and adaptive intervention designs to better understand how to support personalized self-regulated learning in online environments.

Keywords: Self-regulated Learning, Online Education, Distraction Management, Metacognition, Motivation