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An Approach to Evaluating the Role of Reading Map in Supporting Self-Reflection in E-book Environments

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Abstract: This study aims to explore whether features such as reading maps and ßmemo sharing in an E-book system can enhance learners' self-reflection (SR). An experimental design is proposed to examine the impact of these functions, with follow-ßup plans for future research and theoretical development.

Keywords: E-book, self-reflection, reading map, share learning logs

1. Introduction

Education evolves with the times, and e-learning—deeply integrated with online environments—has increasingly adopted emerging technologies and blended teaching methods to enhance learning outcomes. While traditional approaches often emphasize knowledge transmission, the core of education lies in cultivating learners' abilities such as self-regulation, which can significantly improve academic performance and engagement (Chovancová, 2024). In this context, the present study adopts the E-book system developed by Zhou et al. (2024), which not only includes common features like notetaking, highlighting, and knowledge testing but also introduces an innovative reading map (RM) that allows learners to track their reading paths and durations, and observe others' trajectories in real time (figure 1). These interactive features offer distinct advantages over traditional tools, supporting self-regulated learning by enabling learners to discover overlooked content, reduce information avoidance (Zhou et al., 2023), and improve learning outcomes through enhanced peer interaction and self-awareness.

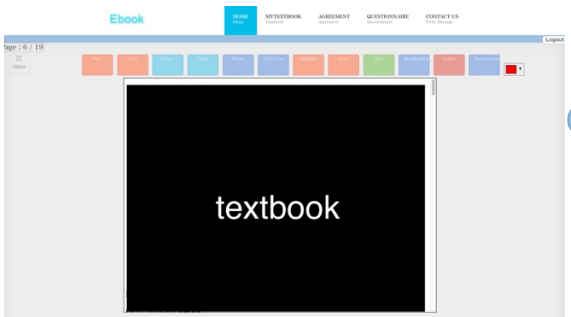

Figure 1. E-book UI Screenshot

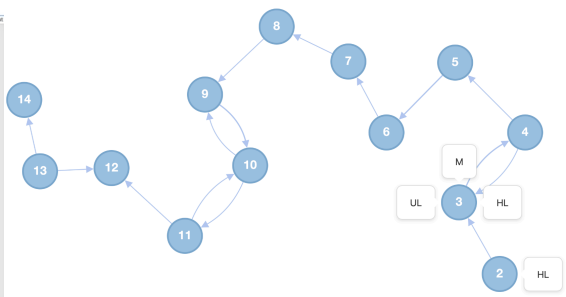

Figure 2. Visual Examples of RM

2. Literature Review

Self-reflection (SR) is a vital capacity for personal growth, and as such, various strategies have been proposed in the field of education to support the development of learners' reflective

abilities. For instance, studies have examined the impact of using reflection journals in both online and offline learning contexts (Wakeling et al., 2018). With the recent rise of generative AI, research on how AI can assist learners in SR has also gained traction (Renze & Guven, 2024). These studies primarily focus on encouraging learners to reflect on past behaviors or events. However, it is not easy for learners to observe their own behavior without distraction while focusing on learning. This highlights the need for a system that can capture and review learning records. The present study introduces the concept of visualized reading paths, which has received limited attention in prior research. Therefore, this study seeks to further investigate the potential of the RM.

3. Research Purpose

Accordingly, this study aims to explore whether the RM feature and other basic functions such as memo sharing, provided by the E-book system, have an impact on learners' SR. Specifically, the study investigates whether these functions enhance students' motivation to engage in SR or influence their levels of need for SR and engagement in SR.

4. Scenario

To assess the effectiveness of the E-book system in promoting students' SR and academic performance, this study adopted an experimental design with participants randomly assigned to an experimental group (using the E-book with RM) or a control group (using the E-book without RM). Before the experiment, students' SR abilities were measured using the validated the Self-Reflection and Insight Scale, and a mixed-format questionnaire assessed their prior knowledge. During the experiment, both groups read the same unmarked materials, with extended reading time to ensure sufficient comprehension and reflection. The experimental group could share annotations and view both their own and peers' reading paths, while the system recorded data such as reading duration and memo usage. The procedure included an introduction (0–5 min), a pre-test (6–15 min), a learning session (16–35 min), and a post-test (41–50 min) with open-ended questions to gauge deeper reflection, followed by a brief teacher explanation and feedback (51–55 min).

5. Limitations and Future Research

This study proposes an e-book system with the RM, aiming to investigate its potential in fostering users' SR abilities. A preliminary research design has been outlined; however, the study remains at the conceptual stage and is currently in the process of implementing the experimental setup. Pre-experimental investigations are being conducted on questionnaire dimensions, instructional materials, and test items. As such, no experimental results or subsequent evaluations are available currently. Therefore, further research is necessary to validate the effectiveness of this system and to identify areas for potential improvement.

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