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Tackling Mind Wandering in Video Learning Environments: A Study Comparing Interpolated Testing and Self-Explanation Strategies

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Abstract

Mind wandering is a common experience for students. About 30% of the time, while learning, they will think about something unrelated, such as what they have planned for dinner. These off-task thoughts negatively impact their learning outcomes (Wong et al., 2022). Previous research has been conducted in video-based learning to assert whether including interpolated testing at pauses in a video leads to reduced mind wandering and improved learning outcomes (Jing et al., 2016; Szpunar et al., 2013; Welhaf et al., 2022). The results of these studies have been mixed and do not clearly show that interpolated testing at pauses in a video has the desired effect. Therefore, it has been suggested that interpolated testing only has limited practical effect on reducing mind wandering (Welhaf et al., 2022). In this study, we aim to determine if writing self-explanations at pauses in a video has a stronger effect on reducing mind wandering and increasing learning outcomes than interpolated testing.

For this study, we recruited 138 participants, distributed across three groups. The participants were asked to watch the same video called "Why is blue so rare in nature?" across all three groups (see https://youtu.be/3g246c6Bv58). The difference between the three groups was in the interaction the participants were asked to engage in at pauses in the video. The pause times were identical across groups. The first group, the control group (n = 47), was only asked about their thoughts. The second group, the interpolated testing group (n = 51), answered multiple-choice questions. The third group, the self-explanation group (n = 40), was asked to write an explanation to themselves about what they learned. Knowledge gain was measured using a knowledge test before and after the video. Additionally, all participants were instructed to monitor their thoughts and click on a button whenever they realized they were mind wandering. This way of measuring mind wandering deviates from previous studies investigating mind wandering while learning from video. In previous research, mind wandering was measured using probe-caught thought reports. When using this method, the participants are interrupted periodically and instructed to report whether they were mind wandering. We deviate from this measurement method because we expect, based on generative learning theory (Fiorella & Mayer, 2015), that the expectation of having to write a self-explanation will lead the participants to be more aware of their thoughts. To test this hypothesis, we used self-caught thought reports and asked the participants to self-report their mind wandering once they realized they were mind wandering.

The results of our analysis using a Kruskal-Wallis test show no significant difference between the groups in their knowledge gain ($H(2) = 1.9$, $p = .38$) or the number of thought reports written ($H(2) = 3.45$, $p = .18$). However, the number of thought reports written correlates with knowledge gain ($\tau = .15$, $H(1) = 2.33$, $p = .01$). This result indicates that participants who were more aware of their mind wandering performed better on a knowledge test after the video. While it is inevitable that mind wandering will occur, the deciding factor on whether this mind wandering negatively influences the learning outcomes could be how aware the students are of their thoughts while learning. Consequently, further research should be conducted into how this awareness of mind wandering can be increased.

References

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