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# Examining Mind Wandering and Student Learning Behaviours while Engaging with Online Video Learning

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# The Challenge of Online Learning

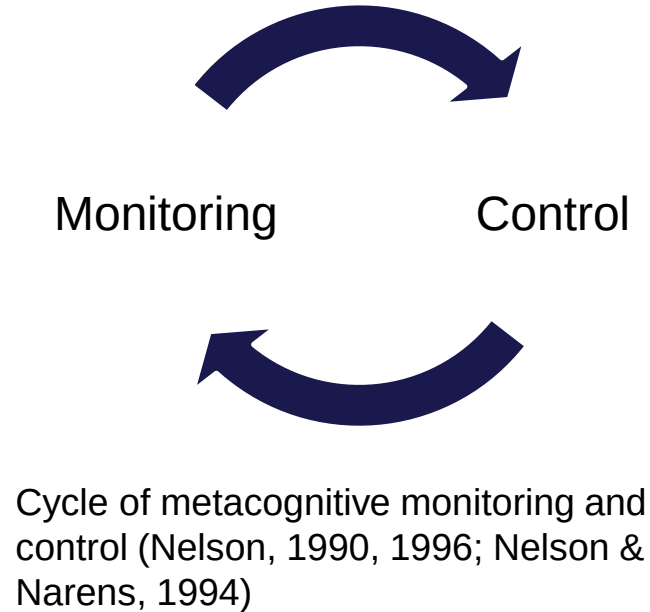
- Video-based learning is increasingly prevalent in higher education
- Students face challenges in maintaining focus and engagement
- Mind wandering = task-unrelated thoughts
- Mind wandering occurs ~30% of the time during learning activities (Wong et al., 2022)
- Mind wandering negatively impacts learning outcomes (Wong et al., 2022)

# Research Significance

- Understanding mind wandering is important for improving online learning
- Self-regulated learning strategies may help mitigate negative effects
- Limited research on how learners react to their mind wandering
- Potential to inform instructional design and learner support strategies

# Metacognition

- Meta = About
- Cognition = Thinking
- Metacognition = Thinking about one's thinking (Flavell, 1979; Schooler & Smallwood, 2009)



# Meta-Awareness

- Meta-awareness means the conscious recognition of one's current thoughts (Schooler et al., 2011)
- Someone who is meta-aware might be aware of their mind wandering
- Meta-awareness is a part of metacognitive monitoring (Schooler & Smallwood, 2009)

# Self-regulated Learning

- Learners actively manage their own learning process through planning, monitoring, and reflection (Panadero, 2017)
- COPEs model chosen as theoretical framework due to its strong grounding in metacognition (Winne, 1997; Winne & Hadwin, 1998)
- Model describes how learners adapt to tasks through iterative metacognitive monitoring and control (Winne & Azevedo, 2022)

# Stages of the COPES Model

1. Task Definition
2. Goal Setting and Planning
3. Enacting Study Tactics and Strategies
4. Metacognitively Adaptive Studying

# Previous Work

- No previous work on self-regulated learning and mind wandering
- Most previous work on mind wandering during video-based learning limited interaction with the video player
- Pause, Play, Rewind, and Seek were not possible
- Learners could not react to their mind wandering
- Learners might take the chance to react following their mind wandering

# Rationale & Research Questions

- Metacognitive monitoring is a part of self-regulated learning and underpins meta-awareness
  - **RQ1:** Is there a relationship between self-regulated learning and meta-awareness during video watching?
- Rewinding the video after mind wandering would be an act of self-regulated learning
  - **RQ2:** Do self-regulated learners rewind the video they are learning from after they realize they are mind wandering?

# Design

## Procedure

- Cooperation with lecturers in 8 courses across 2 semesters at UniSA
- Requested students to report their mind wandering while learning from course videos

## Data gathered (n = 53)

- SRL-O questionnaire (Broadbent et al., 2022)
- Self-caught thought reports
- Video player tracking data

# Analysis

## RQ1

- Fitted a zero-intercept general linear model (GLM) with a negative binomial distribution
  - SRL-O subscales as fixed effects
  - Video duration as offset

## RQ2

- Filtering video player tracking data to identify decreases in video time following a thought report

# RQ1 Results

Result of Zero-Intercept Generalized Linear Model using a Negative Binomial Distribution Predicting Total Number of Thought Reports from SRL-O Subscales

| SRL-O Subscale               | Estimate (SE)  | z      | p     | IRR [95% CI]      |
|------------------------------|----------------|--------|-------|-------------------|
| Planning and Time Management | -0.387 (0.155) | -2.495 | .013* | 0.68 [0.47, 1.01] |
| Study Environment            | -0.194 (0.161) | -1.205 | .228  | 0.82 [0.60, 1.13] |
| Metacognition                | -0.105 (0.182) | -0.576 | .565  | 0.90 [0.60, 1.33] |
| Online Effort Regulation     | -0.433 (0.180) | -2.400 | .016* | 0.65 [0.43, 0.96] |
| Online Task Strategies       | 0.097 (0.169)  | 0.572  | .567  | 1.10 [0.78, 1.54] |

# RQ1 Results - Interpretation

- Self-regulated learning scores of *Planning and Time Management* and *Effort Regulation* negatively predictive of number of thought reports written
- An increase in *Planning and Time Management* and *Effort Regulation* leads to a decrease in the number of thought reports written

# RQ2 Results

- 10 participants rewound a video following a thought report
- 15 rewind reaction cases
- Average duration: 87 seconds

# RQ2 Results

## **Intent to Rewind**

- Two cases with intent to rewind
- No rewinding occurred

# Findings

- Self-regulated learning scores of *Planning and Time Management* and *Effort Regulation* negatively predictive of number of thought reports written
- Only 15 reactions to mind wandering

# Discussion

- *Planning and Time Management* corresponds to Stage 2 of the COPES model (Goal Setting and Planning)
- *Effort Regulation* corresponds to Stage 3 of the COPES model (Enacting Study Tactics and Strategies)
- Learners who plan out their study sessions also regulate how much efforts to assert to get back on task
- Metacognition scale was not predictive of meta-awareness, even though it is part of self-regulated learning
- Learners do not commonly react to their mind wandering

# Limitations

- Small sample
  - Could be overcome with another study with a bigger sample
- Meta-awareness is measured as the number of thought reports, not the proportion of mind wandering a learner was aware of
  - Could be overcome by using multiple measures of mind wandering at the same time, e.g. eye-tracking and thought reports

# Conclusion

- Limited evidence of self-regulated learning adaptation following mind wandering
- Reacting to mind wandering needs to be taught

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