

Using Persuasive Design and Social Learning to Support Adult Learners' Metacognitive Development

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Abstract: Adult learners with strong metacognitive awareness and strategies are more likely to achieve their goals and effectively perform in school and the workplace. However, research is limited on how to support their metacognitive development, so we designed and piloted a sociotechnical system informed by theories of metacognitive development, persuasive design, and social learning. Learners who used the intervention, which involved weekly prompts for reflection on their metacognitive awareness and discussion of their development with their peers online, showed stronger metacognitive development, particularly in their awareness of strategies and tools as well as planning and goal setting. This pilot is part of ongoing research into a new persuasive-social approach to supporting metacognitive development.

Keywords: metacognition, social learning, design

Introduction

Metacognition, or awareness of and implementation of one's strategies for thinking and learning, is a requirement for 21st century adult learners to be effective in any context (Bransford et al., 2000), but further research is needed on how to better support adult learners in their metacognitive development (Justice & Dornan, 2001). Metacognitive support tools exist but are primarily tested on younger learners in specific domains rather than with older adult learners across multiple contexts (Veenman et al., 2006). Thus, our main research questions are: (1) How can we better support adult learners in developing metacognition? and (2) What specific design elements and features aid in supporting metacognitive development for adult learners?

To begin answering these questions, we created and piloted a web-based application, ReflectCoach, with adult learners enrolled in an introductory college course. Persuasive design (e.g. Consolvo et al., 2009) and social learning principles (e.g. Huang, 2002) informed the design of ReflectCoach, which emphasizes the intersection of behavior, identity, and social influence to help users make changes with respect to their metacognition. These elements aid adult learners in understanding how their stories of metacognitive development, which are rich with prior learning and varied experiences, are part of a bigger community and shared story; through reflection on this, learners better understand their metacognition and begin to improve it.

The intervention

ReflectCoach is a responsive web application built using a combination of three key persuasive and social design features to facilitate the metacognitive development of adult learners: (1) Classroom wiki that facilitates social learning through membership and participation in weekly reflection forums with other learners through prompts like, "Share a time you were successful or unsuccessful at using a strategy to achieve a goal."; (2) Weekly self-scoring questionnaires based on Schraw's (1994) Metacognitive Awareness Inventory (MAI) with prompts like "How often do you check that your goals are met?" The results appear on a public scoreboard so learners benefit from iterative weekly self-assessment (persuasive) and competitive group identification as "Rookie, Pro, or All-Star" (both social and persuasive); (3) An automated email agent that reminds learners of weekly progress and recent activity in the system. This encourages a persuasive "habit" of reflection on metacognitive strategies each week and supports continued participation. Learners tell their learning stories and begin to identify with the concept of metacognition in these assessments and discussion forums while tracking and monitoring their own and others' progress via the scoreboard and discussion forums.

Methods

The eight adult learners who participated in this study were enrolled in a section of a required introductory-level 10-week online composition course in a four-year bachelor's degree program for adult learners (age 24 and older). Four learners used ReflectCoach during the course and four learners did not. The average age across both groups was 38. The instructor of the course was aware of the study, but did not know who agreed to participate and who did not. She taught the course as usual. To measure metacognitive development, we implemented: (1) A pre/post test based on Schraw's (1994) Metacognitive Awareness Inventory (MAI), which was analyzed with

descriptive statistics; (2) participants' learning portfolios (a standard course requirement), which were scored by external raters on three metacognitive criteria: awareness of strategies and tools, self-evaluation, and planning; and (3) 30-minute interviews with participants, which were analyzed using descriptive coding (Saldana, 2012).

Findings

The control group's pre-/post-course MAI scores showed only a 6% average increase, while the treatment group showed a 16% average increase. While the sample is too small to generalize to a larger population, it suggests that there may be a difference between the groups with a larger sample size. To further support these findings, the portfolio scorers found that treatment groups' learning portfolios demonstrated stronger metacognition across all criteria than the control group: the overall metacognition score was 80.5% for the treatment group and 55.5% for the control group. The treatment group also more often exceeded expectations in their awareness of strategies and tools and planning/goal setting.

Learners' interview responses showed that both groups grasped the concept of metacognition and understood its value. However, the control group tended to simply *define* metacognition while the treatment group *internalized and applied* the concept of metacognition and ways to improve: "Sometimes I get so stuck in work and school and family responsibilities that I don't recognize why I'm doing well or poorly. [...] There are actually ways I could make it better, by setting goals and planning stuff out more. And knowing when and how to ask for help." When describing their experience with ReflectCoach, the participants valued the weekly updates and preferred personalized information. Additionally, the questionnaires and scoreboard invoked a competitive spirit for one of the participants: "There was a point where I started looking at everyone else's scores and was like hey, I'm doing okay, but I want to be an All-Star." The public scoreboard was also helpful for self-assessment in a social context: "I liked being able to see everyone's scores and see where I fell on the chart." Finally, some participants were active in the quizzes and assessments, but found value simply lurking in the discussions without actively participating.

Conclusions and future research

While this pilot was conducted with only eight participants, the results suggest that (1) introducing the concept of metacognition to adult learners helps them to internalize it and understand its relevance in the learning process and (2) persuasive-social design elements provide opportunities for metacognitive "habits of mind" in a learner-centered, low-stakes, and informal manner. We will continue to iteratively test ReflectCoach using the methods described above with a larger population. We will also conduct an analysis of the ReflectCoach peer forums to learn more about the ways adult learners characterize and interact with each other about their metacognitive strategies. This research will provide educators, trainers, and other adult learning practitioners with learning design principles that encourage metacognitive habits for adult learners. Additionally, since persuasive-social design is a combination of two existing design principles in the eLearning and app-development industry, we are confident that it can be smoothly integrated into various learning settings.

References

- Consolvo, S., McDonald, D. W., & Landay, J. A. (2009, April). Theory-driven design strategies for technologies that support behavior change in everyday life. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 405-414). ACM.
- Huang, H. M. (2002). Toward constructivism for adult learners in online learning environments. *British Journal of Educational Technology*, *33*(1), 27-37.
- Justice, E. M., & Dornan, T. M. (2001). Metacognitive differences between traditional-age and nontraditional-age college students. *Adult Education Quarterly*, *51*(3), 236-249.
- Saldana, J. (2009). *The coding manual for qualitative researchers*. Los Angeles, CA: SAGE.
- Schraw, G., & Dennison, R. S. (1994). Assessing metacognitive awareness. *Contemporary educational psychology*, *19*(4), 460-475.
- Veenman, M. V., Van Hout-Wolters, B. H., & Afflerbach, P. (2006). Metacognition and learning: Conceptual and methodological considerations. *Metacognition and learning*, *1*(1), 3-14.
- Wozniak, K. & Zagal, J. (2013). Finding Evidence of Metacognition through Content Analysis of an ePortfolio Community: Beyond Text, Across New Media. Conference on Computer Supported Collaborative Learning, ICLS 2013. Madison, WI.

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