

Fostering self-regulated learning

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Impact Chapter

Societal Impact

Teaching students how to learn is more important than giving them knowledge. Likewise, being able to learn and knowing how to learn is important for successful learning. This is particularly relevant for students in higher education who have more information to choose from and more freedom in what, how, and where they study. This is also important throughout life as we all need to be able to learn to adapt to the fast-changing world. This dissertation focuses on “how to learn” and the reported findings will benefit students, teachers, and educational institutes.

Being able to learn involves having self-regulated learning skills and being capable to use effective but effortful learning strategies is an important aspect of these skills. Many students struggle to study effectively by engaging in appropriate learning strategies and do not know how to manage their effort. For example, when they try to memorize a book chapter, they often read the chapter again and again (restudy), but this is an ineffective learning strategy. They rarely opt to use effective but effortful learning strategies, such as self-testing to enhance their memory. Students are sometimes aware of which strategies are effective and which are not (McAndrew, Morrow, Atiyeh, & Pierre, 2016), but still do not always choose effective learning strategies because of the added effort involved. They are not aware that this extra effort is worth it because it greatly improves the learning outcome – in other words, they lack awareness of desirable difficulties. Awareness of these desirable difficulties is important to enhance the use of effective learning strategies. Narratives (stories about personal experiences) that explain how using effective learning strategies is difficult and effortful but worth the effort because of their effectiveness help students become aware of desirable difficulties.

Students may be willing to put in extra effort if it helps them to pass exams or get high scores. They could motivate themselves to use more effective learning strategies by evaluating how these strategies improve their learning – for example by studying with effective but effortful and ineffective but effortless strategies and then comparing their effects on long-term retention. When they see that effective strategies not only require more effort but also lead to higher learning gains they might be inclined to switch to these strategies.

This dissertation also suggests practical regulation strategies that might help students enter a seemingly effortless flow state during learning. First, students should

choose challenging tasks that are not too difficult but not too easy – in other words, these tasks should fall in their “zone of proximal development” (Nakamura & Csikszentmihalyi, 2014). Second, students should establish clear goals for learning these tasks and be persistent about these goals. Third, before studying the chosen tasks, students should choose a learning environment that is not distracting, such as a quiet spot in the library. They should remove all distractions (such as their phone with social media apps) from their learning environment to increase their concentration and focus only on the learning tasks at hand. Fourth, students should actively engage in effective learning strategies, such as self-testing to increase learning, and actively engage in reflection to further direct their learning.

Not only students but also teachers and educational institutes might benefit from the small and simple interventions explored in this dissertation. Teachers and educational institutes often inform students how to learn through intense and in-depth training such as the Study Smart project at Maastricht University (<https://www.studysmartpbl.com/>). Small and simple interventions can also establish new habits (Fogg, 2019) that gradually help students engage in new learning behaviors. Teachers and educational institutes could provide narratives about changing ineffective learning strategies and show how effective but effortful learning strategies can affect learning performance through individual feedback to show students how to learn. This combination of in-depth training with narratives and individual performance feedback may help to promote the use of effective learning strategies.

Teachers and educational institutes typically use one effective learning strategy, testing, as an assessment tool, often without realizing that it is also an effective strategy for learning and long-term retention. Testing enhances long-term knowledge more than restudying does and has attracted the attention of institutes and educational practitioners in recent years. This may be why the “Beoordelingskader Accreditatiestelsel Hoger Onderwijs Nederland 2018” [the Assessment Framework for the Dutch Higher Education Accreditation System 2018] stressed that assessment should support students’ own learning processes. Teachers and educational institutes could introduce more low-stakes tests into their curriculum to make regular testing a part of the learning processes. Moreover, assigning tasks that are balanced with the learners’ current skill level might help regulate effort and optimize self-regulated learning. Teachers and educational institutes could adapt their instructions to each student so the right level of support and



guidance is offered based on the student's knowledge. This is also called differentiated instruction or personalized learning.

Scientific Impact

This dissertation has contributed to our understanding of how students monitor and control their learning (self-regulated learning), especially how they make learning strategy decisions. I developed two experimental paradigms to investigate how to increase the uptake of effective learning strategies: narrative communication and individualized performance feedback on actual learning. Individualized performance feedback addresses the perceived learning versus actual learning paradox (i.e., students perceive that they learn more from ineffective learning strategies than from effective ones, when in fact it is the other way around). These two approaches have enriched our knowledge of self-regulated learning by introducing behavioral change strategies and by focusing on the main reason for low uptake of effective learning strategies. Future studies could apply either one or even combine the two approaches to further investigate how to enhance self-regulated learning skills by increasing the uptake of effective learning strategies.

This dissertation described for the first time that it is the mental effort students perceive during learning a task (perceived mental effort) and not how well they think they learned (perceived learning) that dominates their decisions on which learning strategy to use. If they experience high effort from learning a task, they relapse to a strategy that is less effortful and less effective, such as restudy, and if they experience less effort, they are inclined to use an effortful and effective learning strategy, such as testing themselves. This finding shows the importance of perceived mental effort during self-regulated learning. Although it is the first and only experimental study to reach this conclusion, this finding is supported by two theoretical articles published around the same time (Dunlosky, Badali, Rivers, & Rawson, 2020; van Gog et al., 2020). In these two articles, the authors emphasized the potential importance of perceived mental effort in self-regulated learning. However, one experiment cannot confirm this theory and future studies are needed to further investigate the role of perceived mental effort in self-regulated learning.

Dissemination of Results

Results from this dissertation have been published in international peer-reviewed journals with a broad readership in the field of educational sciences and educational psychology. The results have also been presented at international conferences, including the conferences of the European Association for Research on Learning and Instruction (EARLI) in 2019 and 2021, the International Cognitive Load Theory Conferences in 2019 and 2021, the annual meeting of the American Educational Research Association in 2020, and the EARLI SIG 16 Metacognition in 2021.



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