



Empowering teachers through co-creation: Developing a toolbox for supporting self-regulated learning through researcher-teacher co-creation in Flemish higher education

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ABSTRACT

Self-regulated learning (SRL) is increasingly recognised as essential for student success in higher education, yet many first-year students enter their programmes with limited regulatory and cognitive skills. However, freshmen students seem to frequently rely on external regulation and surface-level strategies. This disconnect between institutional expectations and student preparedness underscores the need for explicit SRL support in higher education. In the Flemish context, additional challenges arise from the fact that many teachers in universities of applied sciences transition directly from professional fields without formal pedagogical training. While they possess strong disciplinary expertise, they often lack the time, tools, and pedagogical frameworks needed to translate SRL theory into practice. As a result, SRL support is not implemented consistently.

To address this gap, a practice-oriented research project was conducted at AP University of Applied Sciences and Arts to design and co-create an SRL toolbox with teachers, researchers, and educational developers, using educational Design Research as a methodological framework. The LEarning strategies and MOTivation instrument (LEMO) served as the theoretical and practical foundation, offering structured insight into students' use of cognitive, metacognitive strategies, and motivational regulations. A needs analysis, based on a survey of 238 lecturers and five focus groups, revealed a strong demand for accessible, context-sensitive, and time-efficient materials, as well as differing perceptions of teachers' roles in supporting SRL.

Guided by these findings, design principles were formulated and implemented to develop a prototype. The toolbox included background literature, instructional sheets, and examples of SRL-enhancing activities, all tagged for context and SRL components. Evaluation by internal and external stakeholders highlighted the toolbox's practical relevance, clarity, and motivational value, alongside constructive feedback regarding navigation, terminology, and filtering functions. These insights informed subsequent refinements, demonstrating how structured co-creation and EDR can strengthen teachers' pedagogical agency and support the systematic development of SRL in professionally oriented higher education.

Keywords: self-regulated learning, co-creation, educational design research, educational support, teacher engagement, higher education

The need for supporting self-regulated learning in Higher Education

Self-regulated learning (SRL) refers to the process whereby learners proactively engage in their own learning through the strategic use of cognitive, metacognitive, motivational, and behavioural mechanisms. According to Zimmerman (2000), SRL is a cyclical process composed of three interrelated phases:

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forethought, performance, and self-reflection. In each phase, learners set goals, monitor their progress, employ strategies, and evaluate outcomes to enhance learning effectiveness and autonomy. As Zimmerman (1989) noted: “Self-regulated learners are metacognitively, motivationally, and behaviourally active participants in their own learning process” (Zimmerman, 1989, p.329).

SRL has become a focal point in higher education, particularly within the broader ambition of preparing students for lifelong (Cornford, 2002). Within the context of higher education, research systematically shows strong self-regulatory skills to be associated with increased academic success, persistence, and well-being (Richardson et al., 2012). However, a significant part of students enrol in a program lacking these competencies (Bjork et al., 2013; Nugent et al., 2018). This is also evidenced by our own research on first-year students, using the L_Earning strategies and study M_Otivation questionnaire (LEMO), a self-report questionnaire mapping motivational, cognitive and metacognitive aspects of SRL (Vanthournout et al., 2016)(See Figure 1). Freshmen students in our research generally show a low amount of regulatory skills and lack adequate cognitive skills such as critical processing. Instead, they rely on external regulation, memorizing, and systematically working through content as primary learning strategies (Vanthournout et al., 2016; Vermunt & Donche, 2017).

Learning	<p>Cognitive processing strategies</p> <ul style="list-style-type: none"> - Relating & structuring - Critical processing - Concrete processing - Analysing - Cooperative learning 	<p>Metacognitive regulation strategies</p> <ul style="list-style-type: none"> - Self-regulation - Lack of regulation - Planning & time management
	Motivation	<p>Motivational regulation</p> <ul style="list-style-type: none"> - Autonomous motivation - Controlled motivation - Lack of motivation

Figure 1 Components and scales in the LEMO-instrument. Based on Vanthournout and colleagues (2016)

The gap between theory and practice

This gap between institutional and societal demands on the one hand and students’ actual preparedness on the other highlights the need for higher education to explicitly support the development of autonomy (Admiraal et al., 2024), cognitive strategies, as well as metacognitive and self-regulatory strategies (Liu et al., 2014; Rivas et al., 2022). Research recommends that teachers provide explicit instruction in SRL as well

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as opportunities for students to actively develop their skills (Brydges & Butler, 2012; Nugent et al., 2018). Yet, despite broad consensus on the value of supporting SRL and a wealth of books, curated toolboxes, workshops, and other professional development materials (Alvarez et al., 2022), many teachers fail to consistently integrate this support into their learning environment (Eekelen et al., 2005). *Therefore, the question remains as to what impedes teachers from designing instruction and materials that support SRL and how this can be overcome?* (Zimmerman, 2002)

The Flemish situation: the professional-to-pedagogical transition

A part of the problem in the Flemish context (Dutch speaking part of Belgium) arises from the fact that a significant part of the teachers in universities of applied science transition directly from professional fields into academic roles. Although these teachers possess elaborate domain expertise, they lack formal pedagogical training and experience in designing learning environments. This contrasts with patterns in other regions, such as the UK, where lecturers typically design their own teaching materials or rarely make use of pre-provided materials or regular developer support. In addition, teachers in the Flemish context frequently combine a job in a professional setting with teaching at the university of applied science and therefore lack time to acquire pedagogical knowledge and skill in a self-directed way or translate complex pedagogical concepts into adequate practical interventions. Teachers thus need inspiration on how to implement SRL (or other pedagogical concepts) in their specific context and their specific demands, questions and expectations.

With the project *Supporting Self-Regulated Learning via LEMO and a Toolbox*, the research group on Lifelong Learning and Innovation at AP University of Applied Sciences and Arts in Antwerp (AP) aimed to develop a toolbox for SRL interventions tailor-made to the needs and challenges of our teacher. The research group therefore opted to design and develop the toolbox using Educational Design Research (McKenney & Reeves, 2018).

Educational Design Research as methodological framework

Educational Design Research (EDR) is a methodological framework that bridges the gap between research and educational development (Jacobsen & McKenney, 2024). EDR provides a systematic approach that aims to create *user-centered innovations* while advancing scientific knowledge (McKenney & Reeves, 2018). It involves iterative design cycles: identifying user needs, co-developing solutions with future users, testing in authentic contexts, and refining based on feedback from future users. This process fosters continuous improvement and enhances the relevance and impact of interventions. Through reflection on design and outcomes, researchers can generate new insights and contribute to educational theory. EDR's dual emphasis on practical relevance and methodological rigor is its defining feature (McKenney & Reeves, 2025).

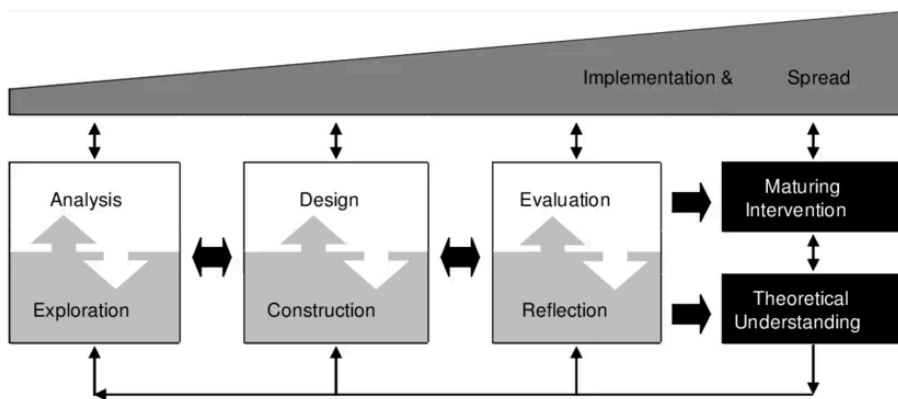


Figure 2 Generic model for conducting educational design research. Reprinted from *Conducting Educational Design Research* (p. 77/159), by S. McKenney & T. C. Reeves, 2018, Routledge. Copyright 2018 Routledge.

User involvement and co-creation is at the heart of EDR. In this case, co-creation is conceived as active, multistakeholder collaboration across all phases of an initiative (Messiha et al., 2025). In the current project, the cocreation process involved multiple stakeholders, primarily higher education teachers and researchers, and, where relevant, educational developers who contributed their pedagogical and design expertise.

LEMO as theoretical backbone

From the outset, the research group decided the toolbox would be grounded on the LEMO-instrument for several reasons.

First, the instrument uses well-established scientific models, including self-determination theory (Ryan & Deci, 2017) the learning pattern model (Vermunt & Donche, 2017) and Self-Regulated Learning (B. J. Zimmerman, 2008) providing the researchers and educational developers with a wealth of information and inspiration regarding possible interventions. However, these needed to be translated and adapted to questions and needs of the teachers.

Moreover, the instrument was developed in a cooperation between the University of Antwerp and AP over a decade ago (Vanthournout et al., 2016). For the last five years, the instrument has been administered institution wide to all freshmen students. Professional development activities on SRL (with voluntary participation) organised by the institution also centre around the instrument. Consequently, there was at least some familiarity with the instrument at the start of the project.

Finally, the LEMO-instrument provides a feedback report at the group-level to teachers, thus providing teachers with information on what learning strategies or motivational regulation to target to support the development of SRL in students. In summary, the LEMO-instrument provided a scientifically proven, practical and relatable framework for the toolbox.

Needs analysis and focus groups

As a starting point for the development, the research group needed a clear idea on teachers' questions, needs and expectations regarding the implementation of SRL interventions. We started with a needs analysis involving a *survey* of all lecturers at AP (n=238). The results were telling: over 70% expressed interest in SRL support materials, yet only a small fraction actively used LEMO data in their teaching. Many felt familiar with SRL but lacked clarity on how to foster it effectively.

Five *focus groups interviews* with seventeen teachers deepened this understanding, revealing practical needs for flexibility to tailor resources to various classroom settings, learner profiles, and contextual relevance. These conversations also highlighted underlying perceptions: some teachers did not see supporting SRL as part of their instructional responsibilities, while others doubted its impact. These insights were invaluable for understanding the cultural and emotional dimensions of educational change.

Design principles and prototype development

Guided by these insights, the research group formulated design principles: accessibility, time-efficiency, user-friendliness, variety, ownership, interactivity, contextual relevance, and transferability. Researchers and educational developers built a prototype on the Learning Management System (LMS) that is being used by AP (Moodle). The LMS was preferred because it is already part of teachers' normal workflow, because teachers have easy access and because teachers are familiar with the environment, reducing technological barriers in using the toolbox.

The toolbox included background literature, instructional sheets, and examples of SRL-promoting activities. Instructional sheets provide a summary of an educational intervention and include advice on implementation. Materials were tagged for different contexts (e.g., lecture halls vs. small groups) and linked to the three components of SRL (cognitive, metacognitive and motivational) and to specific learning strategies or motivational regulations included in the LEMO-instrument. At several points in the development of the toolbox informal input, advice and feedback was sought from teachers and educational developers.

Evaluation: "The proof of the pudding"

The tool was evaluated with both internal and external stakeholders (Teachers, educational developers and researchers). Teachers (N=10) interested in the toolbox were asked to keep a journal when consulting the toolbox when designing interventions. They participated in an individual interview, discussing salient features in the journal. Additionally, the toolbox was presented at multiple occasions: (1) to the educational programs at AP, (2) to educational developers at conferences (e.g. EFYE) and (3) to researchers also at a conference (e.g. EAPRIL). Feedback was actively sought after with participants. Interested (external) stakeholders were provided with free access to the toolbox in exchange for detailed feedback. All feedback was inventoried in a journal as a basis for further development and refinement.

Feedback was largely positive, with teachers describing the tool as "well-suited to educational practice," "motivating," and "inspiring". They particularly valued the clarity of instructional sheets and the relevance of examples. However, the testing also revealed areas for improvement, such as difficulties with navigation, filter functions, and confusion regarding terminology. These critiques were treated as constructive input for targeted revisions to enhance usability and conceptual coherence.

Initial findings and broader implications

What have we learned from this 'On the Horizon' project?

1. The value of co-creation: Tools developed without direct teacher input or contextual alignment lack resonance. Engaging teachers ensures tools are theoretically sound and practically applicable; co-creation is a necessity, not a luxury.
2. EDR as a bridge: In a sector that struggles to connect theory with classroom realities, EDR offers a pragmatic and inclusive alternative.
3. Challenging assumptions: Support initiatives often treat teachers as passive implementers, but when given the opportunity, they are eager to contribute and innovate.

Although situated in Flanders, these implications are relevant to a wider audience, as higher education institutions globally face similar challenges in supporting SRL and engaging teachers. Co-creation fosters ownership, builds trust, and ensures support materials reflect reality.

Conclusion and future work

This contribution describes a work-in-progress project that is currently situated at an early stage of implementation. Our goal is to further disseminate this current work to teachers and educational developers, while at the same time refining and expanding. Ultimately, the success of any educational tool depends on its connection to practice. By designing *with* teachers rather than *for* them, we shift from prescription to partnership. Co-creation is not just a method; it is a mindset that institutions must embrace to truly support self-regulated learning.

Biographies

Astrid Koelman is a researcher at the Research Centre for Lifelong Learning and Innovation as well as an educational development advisor at AP University of Applied Sciences and Arts. She contributed to the project 'Designing a toolbox to support Self-Regulated Learning as measured by LEMO'.

Dr. Gert Vanthournout is a researcher and coordinates the Research Centre for Lifelong Learning and Innovation at AP University of Applied Sciences and Arts. His interests focus, among other things, on motivation and self-regulated learning in higher education. His research contributed to the (further) development of the LEMO-instrument.

Sabrina Govaerts is a researcher at the Research Centre for Lifelong Learning and Innovation at AP University of Applied Sciences and Arts. She coordinates the research domain on learning and innovation in higher education and contributed to the project 'Designing a toolbox to support Self-Regulated Learning as measured by LEMO'.

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