Self-Regulated Learning Nudges

Miloš Kravčík, Ralf Klamma

Advanced Community Information Systems (ACIS), Informatik 5,
RWTH Aachen University, Germany
{kravcik, klamma}@dbis.rwth-aachen.de

Abstract Self-Regulated Learning increases the effectiveness of education and self-control has a high impact on the successful life generally. Cognitive biases heavily influence the decision making process, often against interests of those who make them. Therefore technological solutions that would support meta-cognitive scaffolding of learners may be very helpful. Our approach is based on Personal Learning Environments that provide both reflection and recommendation facilities. Preliminary results suggest that it can be a promising solution. Nevertheless, there are still challenges to be addressed, especially regarding the evaluation of this type of learning and supporting tools.

Keywords: Self-Regulated Learning, Personal Learning Environments.

1 Motivation and Problem

Self-regulation has a high impact on successful learning and life [1]. Evidence has shown that Self-Regulated Learning (SRL) enhances student performance in courses, the amount and depth of student thinking, students' conscious focus on their learning, as well as the development of reflective and responsible professionalism [2]. SRL includes the control over meta-cognitive processes. The freedom of choice can raise the motivation of learners. On the other side, suitable guidance can increase the effectiveness of the learning process. Therefore to support efficiency of learning, it is crucial to find the right balance between guidance and freedom of learners. As the ultimate goal of SRL is learning without instructors (for lifelong learning purposes they are often not available), meta-cognitive scaffolding becomes highly important. This was one of the main challenges in the ROLE project [3], aiming to allow flexible configuration and design of learning environments, including more traditional learning management systems and newer Personal Learning Environments (PLE), which enable customization and personalization of the whole learning environment. The main problem remains the same – it is the degree of the learner control, which can be considered at various levels (e.g. design of learning environment, selection of learning processes and resources). Generally, a self-regulated learner should have a full control over his or her learning. Nevertheless, as we know it from other areas, due to information overload and various missing competences, people often delegate a part of their control to other subjects – either human experts or technological solutions. Actually, their recommendations do not have to be blindly followed – these can just inform learners in order to make up their own mind.

2 Proposed Solution and Implications

Psychological research has shown that humans are not well described by the rational-agent model and often need help to make good decisions [4]. Their long-term aims are often in conflict with immediate emotional incentives. In addtion, various cognitive biases shape their decision making process. The framing effect emphasizes the importance of the context, as the way how the same information is presented can influence the decision. Moreover, user preferences can change very quickly and may be difficult to recognize. People often do not consciously know their preferences [5] and their actions alter them – when they select something, they will value it more [6]. A lot of information with various level of relevancy may need to be considered and therefore competent recommendations from an expert or an algorithm can be very helpful. Also choice architecture, which describes the way alternative items are presented to the chooser, can have massive effects on people's behaviour. Options and their implementations provide the mechanism to facilitate various degrees of guidance and freedom. Libertarian paternalism approach has been proposed [7] to preserve liberty and to influence choices in a way that will make choosers better off, as judged by them. This can be realized via suitable nudges, which should alert people's behaviour in a predictable way and at the same time should be easy and cheap to avoid. The golden rule of libertarian paternalism states: offer nudges that are most likely to help and least likely to inflict harm. These principles suggest that a suitable way to support SRL is by means of flexible and adaptable learning environments that provide enough freedom as well as context-dependent recommendations. Their right balance depends on the context, including the learner, the subject domain, and the current constraints. From our perspective this means the freedom to organize and control one's own learning process, design the PLE, and choose learning resources, as well as an opportunity to receive suitable, context-dependent guidance in the form of recommendations, together with the opportunity to select or avoid the provided offers.

A cyclic model of SRL as a process of meta-cognitive activities was proposed by Zimmerman [8]. It has been adjusted for the ROLE purposes [9], resulting in a model with 4 phases: planning, preparing, learning, and reflecting. Moreover, ontology of learning activities was created in ROLE, which can be used for contextual recommendations. From the technological perspective our solution was based on PLE [10]. It is assumed that learners define their own learning goals and manage their learning environment, contents or processes with a high degree of autonomy [11]. The ROLE Software Developer Kit [12] enables creation of PLEs that should facilitate SRL. They consist of widgets, which can support both cognitive and meta-cognitive learning processes. In the ROLE Widget Store one can find tools for planning (including goal setting), learning (nudges in form of contextual recommendations) and reflection (learning analytics). A good SRL solution should be customizable, providing a right balance between the learner's freedom and guidance, and motivating the learner. Evaluation of the effectiveness and usefulness of our approach has been undertaken in different settings, involving both students and teachers. The overall findings suggest that this is a promising direction, but behavioural changes in this field have also limits and require long term research. We further build on the ROLE results in newer projects: Learning Layers [13] and BOOST [14].

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