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Review of the Concept "Self-Regulated Learning": Defined and Used in Different Educational Contexts

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Abstract

Self-regulation is increasingly needed in education. This article aims to identify (what is) the core of the concept of self-regulated learning (SRL) and to analyse how SRL is used in different contexts. We studied 108 scientific articles published in scientific journals in the period 2016-2020. The keywords to search in the Scopus database were self-regulated learning, higher education and student. SRL deals with the process whereby learners actively take charge of their learning. The researchers share the view that SRL is linked to academic success and that the development from being students to self-regulating professionals does not occur spontaneously. We found that SRL has been studied in six contexts: 1) discussion on contextual change in teaching and learning, 2) the context of e-learning, 3) the development of training in various disciplines, 4) discussion on learning disabilities and anxiety, 5) discussion on personal traits, competencies and different backgrounds and 6) theoretical contexts.

Introduction

Working life and education are in constant change in the 21st century. The population is ageing and polarising, digitalisation is changing the nature of many jobs and globalisation introduces an international dimension to almost all jobs. The rate of change in working life is so high that there is no longer time to think about long-term processes. Solutions and job development occur increasingly at the employee level here and now. The employee is the best expert and developer in his or her job - especially in expert positions. (Martela, 2019) A good employee in the 21st century is critical, active and participatory (for example, see Sinkkonen & Laulainen, 2019). This also requires a change in teaching and learning from a teacher-oriented approach to a more student-oriented approach and individual learning styles. Creativity and human interaction are skills that are increasingly needed in future working life and students should be prepared for the new demands of working life during their studies. The starting point for this article is the change in working life and the fact that educational institutions should prepare their students for these changes. Students or prospective employers should be trained to meet the requirements during their studies. This change should already be considered in teaching methods and ways of learning. In education, there is a need to support self-regulation skills to enable students to become self-regulated and participatory employees. In this article, we consider how self-regulation is defined and used in different higher education contexts. In this article, we are concerned with studies that are connected to education but as education is a way

to working life, we consider teaching styles and understanding learning as crucial in determining what kind of employees we will get. If SRL is supported or its possibilities are recognised during studies, it is much easier for newcomers to act self-regulatedly in working life: to bear their responsibility, do their share and make daily decisions.

In today's world of work and study, self-regulation is something worth fighting for. It has to do with self-efficacy (Bandura, 1977): the more you trust in your abilities, the better you will survive. Positive feedback and encouragement from both peers and communities are needed, and positive experiences and the limitation of stressful elements in various frightening and exciting situations are needed (Bandura, 1977). Self-efficacy and self-regulation seem to work in pairs. Close concepts also include self-management and self-determination. One definition of self-management is that it is a dimension based on the perception of the self as an independent individual (Garcia, Kerekes & Archer, 2012). The theory of self-determination (Ryan & Deci, 2000) deals with the natural psychological needs of competence, relatedness and autonomy. According to SDT theory, when these universal needs are met, people function and grow optimally. In this article we will focus on the concept of self-regulation (SRL) although in some cases the concept overlaps with other concepts. The aim of this article is twofold: first, to identify the core of the concept of SRL and second, to analyse how SRL is used in different contexts.

Scoping Review

Scoping reviews are a method of ascertaining the scope of the literature on a certain topic and of giving a clear indication of the volume of related literature and studies available. Scoping reviews are useful for examining emerging evidence when it is still unclear what other questions may be posed and productively addressed by means of a more precise systematic review. A scoping review is also suitable for clarifying key definitions in the literature and for examining how research is conducted on a certain topic. (Arksey & O'Malley, 2005; Peters, 2015). In 2015, a methodological working group of the JBI produced formal guidance on conducting scoping reviews (Systematic Reviews..., 2008). A scoping review determines the extent and nature of the evidence base on a given topic, which can in turn be used to make recommendations for future primary research. The literature search should be as broad as possible, including a set of relevant databases, manual searching and also attempts to identify unpublished literature (Systematic Reviews... 2008, p.240).

We studied 122 scientific articles published in scientific educational journals in the period 2016-2020. The keywords for the search in the Scopus database articles were self-regulated learning, higher education and student. The search for articles was conducted in January 2021.

Our inclusion criteria were

- Published in the years 2016-2020
- English language
- Open access
- Refereed article

- Our keywords INCLUDED in the title or the abstract or the keywords

We analysed all the abstracts and based on that rejected 14 articles with a focus on learning, education, self-efficacy, assessment, learning by doing, evaluative judgement, academic achievement, computational creativity, learning environments, social network or self-control. One of the articles was in press and in two articles self-regulated learning was not mentioned in the text.

We included in our analysis 108 articles from the Scopus database. To diversify the material, we did some manual searching in Google Scholar and Scopus with the same keywords and there we limited our search to the years 2009-2020. We used these articles to diversify the definitions and meaning in different contexts.

The Concept of Self-Regulated Learning (SRL)

Research on self-regulated learning (SRL) has increased tremendously in recent decades and different models have been developed for conceptualising SRL (Endedijk et al., 2016). In this chapter we present the diversity of the concept. Briefly, the term self-regulation refers to the regulation of personal thinking and actions (Zimmerman & Schunk, 2011). It has become a popular concept since the 1980s, especially in pedagogical research (Zimmerman, 1986, 1989). The main aspects of the concept are that a self-regulated learner uses metacognitive, behavioural and motivational processes to achieve a specific learning and performance goal and an independent learner is responsible for their learning outcomes (Paris & Byrnes, 1989; Zimmerman, 1989; Zimmerman, 2008; Zimmerman, 2011). Self-regulated behaviour that is systematically oriented toward the achievement of learning outcomes is seen as an increasingly important predictor of academic outcomes (Zimmerman, 2010) and self-regulation refers to students' understanding of THE tasks involved in a course (Rovers, Clarebout, Savelberg, de Bruin & van Merriënboer, 2019). In practice, students can think more carefully about how they learn and what strategies they need to succeed in college courses (Wandler & Imbriale, 2017). It relates to students' conceptual understanding of complex topics, especially in the context of computer-assisted learning (Azevedo, 2005; Greene & Azevedo, 2007).

Based in the self-directed process, self-regulated learners transform their mental abilities into academic skills: it is not surprising that SRL is associated with academic success in both online and traditional higher education and is an important skill in understanding and reading texts (Artelt, Schiefele, & Schneider, 2001; Broadbent & Poon, 2015; Dent & Koenka, 2016; Zimmerman, 2002; Zimmerman, 2008). To survive in the information jungle, students must constantly monitor and evaluate their progress towards their learning goals and adjust their behaviour if necessary (Rovers et al., 2019). In the context of education, self-regulated learning (SRL) refers to the process by which learners actively take responsibility for their learning. They actively monitor their learning process and outcomes and can regulate and adjust their behaviour, cognition and motivation as needed to optimise their learning outcomes (Zimmerman, 2000). Pintrich (2000, 453) defined SRL as an

> *"active, constructive process whereby learners set goals for their learning and attempt to monitor, regulate and control their cognition, motivation, and behaviour, guided and constrained by their goals*

and contextual features in the environment".

Due to the increase in available data, SRL has become much more important for students to complete their education, but it is not easy to measure it (Winne, 2010; Veenman, Van Hout-Wolters & Afflerbach, 2006; Rovers et. al., 2019). Winne and Perry (2000) distinguished between instruments that measure the implementation of SRL and instruments that measure SRL as an event. An event instrument describes a self-regulatory activity during a specific task. When the implementation of SRL is measured, a single measurement is used to identify an individual´s capabilities. Van Hout Wolters (2000) showed how instruments are divided into online and offline methods. This difference is related to the moment when SRL is measured. Online methods measure SRL during a learning task, while offline methods measure SRL regardless of or immediately after the learning task. This difference is sometimes seen to overlap with the difference between applicability and event (Endedijk et al., 2016).

Self-regulation is seen as a contextual process. In the context of learning, self-regulated learning (SRL) is defined as students' proactive actions aimed at acquiring and applying knowledge or skills that involve goal setting, self-monitoring, time management and THE regulation of personal efforts towards learning goal fulfilment (Järvelä, Malmberg, & Koivuniemi, 2016; Reimann, Markauskaite, & Bannert, 2014; Tabuenca, Kalz, Drachsler, & Specht, 2015; Zimmerman, 2002). Self-regulated learners can apply learning strategies and adapt their learning behaviour when faced with problems (Zimmerman, 2008). It is also considered a broad framework covering the motivational, affective, metacognitive, cognitive and behavioural aspects of learning (Panadero, 2017).

Winne and Hadwin (1998) proposed that SRL includes four stages: task definition, goal and plan setting, implementation of tactics and adaptation of metacognition. In Zimmerman's SRL model, the functions of the learning process are divided into three cyclical phases: anticipation, performance and self-reflection. Learners begin with a foresight phase, where they engage in task analysis and self-motivation beliefs, set goals and make plans before starting a learning task; self-motivation beliefs influence these goals and plans (Zimmerman & Moylan, 2009). Self-regulated learners are adept at goal setting, self-monitoring, self-direction and self-affirmation (Schraw, Crippen, & Hartley, 2006).

Self-Regulated Learning in Different Contexts

SRL is a process used by students in a variety of settings. Many empirical researchers have explored how various elements of SRL may be different as a result of contextual differences. A comparison of fields of education and SRL levels yielded different results. (Hashemyolia et al., 2014)

In the studies presented in the past five years, we could identify six different categories of how self-regulated learning (SRL) is used and applied: 1) discussion on contextual change in teaching and learning, 2) context of e-learning, 3) development of training in different disciplines, 4) discussion on learning disabilities and anxiety, 5) discussion on personal traits, competencies and different backgrounds 6) theoretical articles (see Table 1).

Table 1. Studies on Self-regulated Learning (SRL)

Categories of the context	Nu	Author and Year of Publication
Theoretical	8	Kesuma, A. T., Harun, Zamroni, Putranta, H., & Kistoro, H. C. A. (2020) Hays, L., & Handler, K. (2020) Andrade, M. S. (2020) Iaconelli, R., & Wolters, C. A. (2020) Rovers, S. F. E., Clarebout, G., Savelberg, H. H. C. M., de Bruin, A. B. H., & van Merriënboer, J. J. G. (2019) Gafaro, B. C. (2019) Vrieling, E., Stijnen, S., & Bastiaens, T. (2018) Jansen, R. S., van Leeuwen, A., Janssen, J., Kester, L., & Kalz, M. (2017)
Change in teaching and learning	55	Dindar, M., Malmberg, J., Järvelä, S., Haataja, E., & Kirschner, P. A. (2020) Code, J. (2020) Bahri, A., Idris, I. S., Muis, H., Arifuddin, M., & Fikri, M. J. N. (2020) van Alten, Phielix, Janssen & Kester (2020) Chou & Zou (2020) Letina (2020) Uka & Uka (2020) Jivet, Scheffel, Schmitz, Robbers, Specht & Drachsler (2020) Panadero, Ruiz, García-Pérez, & Centeno (2020) Salinas & De-Benito (2020) Karlen, Hertel & Hirt (2020) Li, Abrar-ul-Hassan & Gao (2020) Harwood & Koyama (2020) Sulisworo, Fatimah, Sunaryati & Sanidi (2020) Chong, Tam, Yau, & Wong (2020) Zheng & Zhang (2020) Al-Shanfari, Demmans Epp, Baber & Nazir (2020) Al Mulhim (2020) Pravesti, Wiyono, Handarini, Triyono & Atmoko (2020) Zarouk, Olivera & Khaldi (2020) Cervin-Ellqvist, Larsson, Adawi, Stöhr & Negretti (2020) Onah, Pang, & Sinclair (2020) Lim, Jalil, Marof & Saad 2020) Al-Abdullatif (2020) Hariri, Karwan, Haenilah, Rini & Suparman (2020) Zheng, Ward & Stanulis (2020) Zalli, Nordin & Hashim (2020) Ebbert & Dutke (2020) Baldan Babayigit & Guven (2020)

Categories of the context	Nu	Author and Year of Publication
		Järvelä, Järvenoja & Malmberg (2019)
		Simanjuntak, Nawangsari & Ardi (2019)
		Matsuyama, Nakaya, Okazaki, Lebowitz, Leppink & van der Vleuten (2019)
		Harding, English, Nibali, Griffin, Graham, Alom & Zhang (2019)
		Nuankaew, Nuankaew, Teeraputon, Phanniphong & Bussaman (2019)
		Hirsto, Väisänen & Arffman (2019)
		Cerezo, Fernández, Amieiro, Valle, Rosário & Núñez (2019)
		Corte (2019)
		Ganda & Boruchovitch (2018)
		Al-Hatem, Masood & Al-Samarraie (2018)
		Natsis, Papadopoulos & Obwegeser (2018)
		Ngugi & Goosen (2018)
		Sundaramoorthy (2018)
		van Meeuwen, Brand-Gruwel, Kirschner, de Bock, & van Merriënboer, (2018*)*
		Yot-Domínguez & Marcelo (2017)
		Berkhout, Jeunissen, Helmich,van Exel, van der Vleuten & Jaarsma 2017)
		Chaves-Barboza, Trujillo-Torres, López-Núñez & Sola-Martínez (2017)
		Lee, Husman, Green & Brem (2016)
		Endedijk, Brekelmans, Sleegers & Vermunt (2016)
		Aleven, Roll, McLaren & Koedinger (2016)
		Lucieer, van der Geest., Elói-Santos, de Faria, Jonker, Visscher, Rikers, & Themmen (2016)
		Whiteside, Garrett Dikkers & Lewis (2016)
		Abdullah (2016)
		Yıldızlı & Saban (2016)
		Demirören, Turan & Öztuna (2016)
E-learning learning	22	Hartley, K., Bendixen, L. D., Gianoutsos, D., & Shreve, E. (2020)
		Garip, G., Seneviratne, S. R., & Iacovou, S. (2020)
		Buono, S., Zdravkovic, A., Lazic, M., & Woodruff, E. (2020)
		Elkot, M. A., & Ali, R. (2020)
		Almoeather, R. (2020)
		Beek, S. V. D., Bellhäser, H., & Hertel, S. (2020)
		Wong, J., Khalil, M., Baars, M., de Koning, B. B., & Paas, F. (2019)
		ter Beek, M., Opdenakker, M. -., Spijkerboer, A. W., Brummer, L., Ozinga, H. W., & Strijbos, J. -. (2019)
		Hendikawati, P., Zahid, M. Z., & Arifudin, R. (2019)
		Wiyarsi, A., Fitriyana, N., & Ikhsan, J. (2019)
		Santoso, H. B., Hakim, M. L., Nursalamah, R. K., & Putra, P. O. H. (2019)

Categories of the context	Nu	Author and Year of Publication
		Lepp, A., Barkley, J. E., Karpinski, A. C., & Singh, S. (2019)
		Lim, G., Shelley, A., & Heo, D. (2019)
		Schwendimann, B. A., Kappeler, G., Mauroux, L., & Gurtner, J. -. (2018)
		Engelen, J. A. A., Camp, G., van de Pol, J., & de Bruin, A. B. H. (2018)
		Stiller, K. D., & Bachmaier, R. (2018)
		Vaculíková, J. A. (2018)
		Wandler, J. B., & Imbriale, W. J. (2017)
		Lange, C., & Costley, J. (2017)
		Barak, M., Hussein-Farraj, R., & Dori, Y. J. (2016)
		Zheng, L. (2016)
		Yeboah, A. K., & Smith, P. (2016)
Development of training in different substances	8	Medina-Ramírez, R. I., Álamo-Arce, D. D., Rodriguez-Castro, F., Cecilio-Fernandes, D., Sandars, J., & Costa, M. J. (2020).
		Pionera, M., Degeng, I. N. S., Widiati, U., & Setyosari, P. (2020)
		Kartono, & Shora, R. Y. (2020)
		Putri, E. R., Budiyono, & Indriati, D. (2020)
		Goller, M., Harteis, C., Gijbels, D., & Donche, V. (2020)
		Grothérus, A., Jeppsson, F., & Samuelsson, J. (2019)
		Musso, M. F., Boekaerts, M., Segers, M., & Cascallar, E. C. (2019)
		Aminah, M., Kusumah, Y. S., Suryadi, D., & Sumarmo, U. (2018)
Disabilities and anxiety	2	Cerezo, R., Esteban, M., Vallejo, G., Sanchez-Santillan, M., & Nuñez, J. C. (2020) Pelch, M. (2018)
Personal traits competences and different backgrounds	13	Hong, W., Bernacki, M. L., & Perera, H. N. (2020)
		Kryshko, O., Fleischer, J., Waldeyer, J., Wirth, J., & Leutner, D. (2020)
		Tseng, S. -., Kang, H. -., Nguyen, T. S., & Liu, M. -. (2020)
		Antúnez, A., del Henar Pérez-Herrero, M., Rosário, P., Vallejo, G., & Núñez, J. C.
		(2020)
		Hertel, S., & Karlen, Y. (2020)
		Seroussi, D. -., & Yaffe, Y. (2020)
		Zambrano-Matamala, Z. -., Rojas-Díaz, R. -., Díaz-Mujica, D. -., & Perez-Guardado, M. S. R., & González, M. L. G. (2020)
		Palos, R., Magurean, S., & Petrovici, M. C. (2019)
		Ejubović, A., & Puška, A. (2019)
		Stiller, K. D., & Bachmaier, R. (2019)
		Vaculikovà J. (2018)
		Navea Martín, A. (2018) Ergen, B., & Kanadli, S. (2017)
Total number of articles	**108**	

The category of "*discussion on contextual change in teaching and learning*" was the largest containing 55 articles. Contextual change, in other words learning shift, is about flipped classrooms or flipped learning, Project-Based Learning, learner-centred orientation, and students' increased participation in the planning of their content (van Alten, Phielix, Janssen & Kester, 2020 Jdaiwati, 2019; Matsuyama, Nakaya, Okazaki, Lebowitz, Leppink & van der Vleuten, 2019; Zarouk, Olivera & Khaldi, 2020). There is a need for learning-to-learn modules and support for becoming self-regulated (Hedin & Kann, 2019; Letina, 2020; Sitzmann & Ely, 2011). Enabling self-regulation starts with teacher education and assessment policies: teacher educators should encourage their prospective teachers to be more self-regulated in their learning and assessment policies have a lot of potential in optimising student learning and performance (Kickert, Stegers-Jager, Meeuwisse, Prinzie & Arends, 2018; Vrieling, Stijnen, & Bastiaens, 2018). Teachers are the key actors in implementing SRL (Karlen, Hertel & Hirt, 2020) and explicit guidance is needed (Cervin-Ellqvist, Larsson, Adawi, Stöhr & Negretti, 2020).

Individualisation and personalised education are combined with self-regulation: for example, tutoring, mentoring or peer-learning are ways to see learning as a result of interactivity and dialogue and fit well in the paradigm of self-regulated learning and meaning-making processes (Grzegorzyk, 2018; Lim, Jalil, Marof & Saad, 2020; Onah, Pang, & Sinclair, 2020; Sulisworo, Fatimah, Sunaryati & Sanidi, 2020; Zheng & Zhang, 2020). Support is also needed to cope with the stress of failing and SRL educational interventions should be helpful during the first academic years (Panadero, Ruiz, García-Pérez, & Centeno, 2020). Self-regulated learning behaviour may best be supported by regarding individual students' needs or promoting self-assessment and goal setting (Al Mulhim, 2020; Berkhout, Teunissen, Helmich, van Exel, van der Vleuten & Jaarsma, 2017; Chou & Zou, 2020; Jivet, Scheffel, Schmitz, Robbers, Specht & Drachsler, 2020; Li, Abrar-ul-Hassan & Gao, 2020; Salinas & De-Benito, 2020). Digital tools and platforms, e.g., MOOCs, are possibilities for individual self-regulated learning processes (Chaves-Barboza, Trujillo-Torres, López-Núñez & Sola-Martínez, 2017; Zalli, Nordin & Hashim, 2020) and course-specific interventions to promote SRL should be considered as pedagogical tools that foster students' lifelong learning skills (Wandler & Imbriale, 2017).

The *e-learning* studies (N= 22) had to do with technological applications, learning analytics and MOOCs. Semantic technologies of intelligent systems allow students to self-regulate their learning by using e-portfolios in self-regulation and personalisation of their learning path (Romero, Saucedo, Caliusco & Gutiérrez, 2019). Android-based Computer Assisted Instruction was developed to improve students' ability both in statistics and self-regulated learning (Hendikawati, Zahid, & Arifudin, 2019). Technologies are at the core of the concept: the technologies that university students use to self-regulate their learning (Yot-Domínguez & Marcelo, 2017) or the means to foster appropriate strategies in online courses to improve successful academic outcomes (Wandler & Imbriale, 2017). Learning environments such as Second Life add to boost student nurses confidence and motivation and thus contribute to their self-regulation; goal-oriented learning actions that are under students' control and within their capabilities can lead to positive motivation, lower anxiety and better academic performance (Al-Hatem, Masood & Al-Samarraie, 2018; Vaculíková, 2018). Learning analytics is also used to investigate the importance of SRL behaviour: for example, the role of learning design such as flipped learning instruction was revealed as an important aspect for further consideration (Montgomery, Mousavi, Carbonaro, Hayward & Dunn, 2019). MOOCs and related learning processes play a prominent role in this discussion:

learners' ability to set goals and see the benefits of MOOCs are important for self-regulating their learning (Rabin, Kalman & Kalz, 2019). No changes were detected in self-regulated learning when learners' participation and performance were studied to ascertain the effectiveness of MOOC-based flipped learning (Wang & Zhu, 2019). This may be a result of the need to identify and teach self-regulatory strategies specific to online education settings (Lepp, Barkley, Karpinski & Singh, 2019).

The development of training in different disciplines (mathematics, writing, physiotherapy) using self-regulation is one theme of research and included eight articles. One subject of research was the connection between mathematical ability and self-regulated learning (Kartono & Shra, 2020; Putri et.al., 2020). Students with high-grade self-regulated learning have been found to have better mathematical abilities. Pionera et.al. (2020) found that the interaction of self-regulated learning with learning methods affects students' ability to write texts in English. A special but important category for self-regulation studies concerns medical training. In the context of medical education, the importance of training doctors to become self-regulated learners in learning environments that support their development is emphasized (Paes, Leat & Stewart, 2019). Improving self-regulated learning is important so that medical students and trainees efficiently acquire the knowledge and skills necessary for clinical practice (de Bruin, Dunlosky & Cavalcanti, 2017). Sulosaari et al. (2015) in their study on nursing education found that students' learning styleS ARE linked to their competence in pharmacotherapy. There is a need for methods to identify and support students who have difficulties in self-regulating their learning. In order to increase the safety of patient medication, research focusing on the development of effective teaching methods is needed.
Articles dealing with *discussion on learning disabilities* (N= 2) (Alharbi et al. 2015) suggest that self-regulated writing strategies are an effective intervention to support students with learning disabilities. Cerezo et al. (2020) investigated how an Intelligent Tutoring System can help students, both with and without learning difficulties, to regulate their learning processes. Their results show that when students with learning difficulties have tools that help them to apply self-regulated learning strategies, they do so even more than students without learning difficulties. Yerdelen et al. (2016) found that high levels of anxiety and delay were significantly associated with low self-efficacy, while the rate of change in anxiety and delay over time was not predicted at initial levels of student self-efficacy in self-regulation. Also, Pelch (2020) found links between student anxiety, positive and negative academic emotions, self-regulated learning and performance.

We scrutinised 13 articles dealing with *discussion on personal traits, competence, and different backgrounds*. Tio et al. (2016) point out that self-regulated learning is a significant factor in academic performance (see also Ergen & Kanadli 2017; Vaculíková, 2018). Earlier research has shown that cumulative assessment encourages students to work harder and improve their results. However, not all students seem to respond as intended. They examined the effect of students' behavioural traits on their responsiveness to a cumulative assessment strategy and found that behavioural traits seem to influence student reactions to feedback and that students with low self-directedness scores are particularly at risk. They should therefore be identified and given special attention from student counsellors. Hertel & Karlen (2020) found that implicit theories of SRL were more closely related to students' learning strategies, goal achievement and metacognitive knowledge than implicit intelligence theories. In addition, implicit theories of SRL mostly did not relate to students' personality traits and demographics. In this review, we found eight theoretical articles dealing with SRL (Kesuma et al., 2020; Hays & Handler 2020; Andrade 2020;

Iaconelli & Wolters 2020; Rovers etal., 2019; Gafaro 2019; Vrieling etal., 2028; Jansen et al., 2017). WE USED these articles while analysing the concept of SRL earlier in this article.

Discussion and Conclusion

The purpose of this article was twofold: first, to identify the core of the concept of SRL and second, to analyse how SRL is used in different contexts. In the context of education, self-regulated learning (SRL) refers to the process by which the learners actively take charge of their learning. The researchers share the opinion that SRL contributes to academic success and that SRL has become much more important for students to complete their education. The studies examined also showed that students have difficulty regulating their learning and their development from being students to becoming self-regulating professionals does not happen naturally (Evensen et al., 2001). There is a need for students to see the goals of learning but also its benefits (Rabin et. al., 2019). At the core of SRL is the will to achieve learning goals (Zimmerman, 2010) and its ability to help in surviving in the information jungle (Rovers et al., 2019).

In our research, self-regulated learning was studied in six contexts: 1) discussion on contextual change in teaching and learning, 2) the context of e-learning 3) the development of training in different disciplines and 4) discussion on learning disabilities and anxiety 5) discussion on personal traits, competences and different backgrounds 6) theoretically. The concept depends heavily on the context and its measurement has been problematic. This makes it much harder to give general instructions on how to strengthen students' self-regulation. Flipped learning and personalised education call for learning-to-learn skills and competencies (e.g. Hedin & Kann, 2019; Grzegorzyk, 2018). Individualisation fits well with supporting students with learning disabilities, which has a lot to do with self-efficacy support. SRL emphasises technological options and tools as a source for learning (e.g. Yot-Domínguez & Marcelo, 2017). Concerning training in different disciplines, an important aspect is that there is a need to identify and support students with problems in self-regulating their learning (Sulosaari et al., 2015). This connects well with teachers' competencies in individualised learning. Teachers need more and more competencies in counselling because there is an urgent need not to teach all students the same way, but to recognise personalised levels of self-regulation. The discussion on the desired level of self-regulation should consider the ethical viewpoints: one policy document found by the researcher described the desired situation (Hilt, Riese & Søreide, 2019). For future research, what amount of self-regulation is enough, in what contexts and so on is an interesting question.

Teachers have a huge impact on how the process goes on: teachers are needed as coaches or facilitators in learning processes. As mentioned by Sinkkonen and Tapani (2020) in their study in the Finnish teaching context, students can learn to be self-regulated if they have the opportunity to do so. Teachers are needed to guide, or in some cases also to lead, learning processes. As teachers, we may not teach our students to swim by throwing them into cold water. Some equipment is needed to teach swimming skills but also to promote learning and a feeling of safety while learning and becoming an active member of society. As noticed in the different contexts, there are numerous options for using SRL. The main thing is that self-regulation does not mean doing or learning alone: self-regulation skills and competencies need to be supported. As mentioned, measurement is difficult. It should be done in a very

individual way: for some persons, self-regulation is more like an aptitude (see e.g. Winne and Perry, 2000), for others even a slight improvement in independent decision-making is a step towards being more responsible for their life and efficacy.

Our understanding of the SRL framework provides new pathways to investigate and address the quality of learning. What the concept of self-regulated learning allows us to do is to draw together all the different elements that put students at the centre of their learning. This in turn allows us to look differently at student learning (Houtman, 2015) and challenge the ways of being a teacher and a student. There has already been much discussion on new ways of teaching and new ways of being a teacher. Self-regulated learning puts the focus on the student. As observed in extensive discussions with teachers, students are still quite conservative in their expectations: they want to be taught. It is a teacher's competence to make a learning shift: to show and inspire students to be agents in their learning processes. As mentioned, this is not to be achieved by throwing them into the water and hoping for the best. It is achieved through individualised learning paths, learning possibilities and necessary support. Maybe we even have to rethink the schedule of learning and teaching days. We need more research on SRL.

In this review, we only found a few articles about learning disabilities and self-regulated learning in higher education, but many studies were about academic success and SRL. We believe that supporting students' self-regulation is to way to help students with learning disabilities to achieve success in their studies, especially in higher education. We think we should also take the next step to implement these good practices in SRL more and more. We also need longitudinal studies on whether self-regulation makes students into active citizens and self-directed employees. We should remember that self-regulation is not just for studying and learning new things, it is something we need more and more while working as experts in working life. Working life is changing so rapidly that we should be able to adapt to the change in a self-directed way.

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