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Abstract:

Due to the coronavirus disease of 2019 (COVID-19) pandemic, many lecturers in higher education institutions suddenly had to switch from on campus to online teaching. An online learning environment demands more from students' self-regulation skills. Self-regulation skills allow students to achieve their goals and continue to develop cognitively and personally. In order to achieve effective learning in an online environment, we argue that increasing students' self-regulatory skills must be a central tenet in designing online education. Based on students' and lecturers' experience, we identify three issues regarding self-regulated learning in an online environment: 1) disrupted curriculum structure and study rhythm, 2) less feedback, and 3) fewer opportunities to reflect together. Subsequently, we make recommendations to provide a solid online environment in which self-regulation can occur. Each recommendation empowers students to enhance their self-regulation skills by going through the self-regulated learning cycle. The different recommendations reinforce each other in achieving effective learning in an online environment.

Keywords: Self-regulation, Online Education, Educational Design, Student Engagement.

1   Introduction

Self-regulation skills constitute essential skills that students develop during their academic education (OECD, 2016; SER, 2015). These skills enable students to systematically achieve their goals and to keep developing cognitively and personally. Self-regulation skills enhance the degree to which students develop metacognition: the ability to consciously think about their own thinking and learning processes (Tanner, 2012; Zimmerman, 2002). Students require self-regulation skills not only to obtain a bachelor's or master's degree but also flourish in the future knowledge society.

Zimmerman (2002) describes self-regulation as a cyclic process that contains three different phases (planning, performance, and reflection) that interact with each other (illustrated by Boor et al., 2018c). During the planning phase of the self-regulated learning cycle, students set goals and choose strategies that they can use to achieve them. During the performance phase, students perform tasks and monitor their progress. After they perform these tasks, they reflect on their learning and determine what went well, what went wrong, and why. Subsequently, they use results from their previous performances to guide them through the next cycle. By repeatedly going through the cycle, students can reach their goals and take responsibility for their own learning.

Researchers consider self-regulation among the most important qualities for effective learning (Tanner, 2012). The degree to which students master self-regulated learning's various aspects, such as goal setting and planning, positively correlates with academic performance (Alotaibi, 2017; Nota, Soresi, & Zimmerman, 2004). In online courses, poor self-regulation skills are an important reason for student dropout (Lee & Choi, 2011). Online courses demand more from students' self-regulated learning skills because students have more autonomy (Jansen, 2019). Thus, during a transition period from on-campus to online education, directors, course coordinators, and lecturers (whom we collectively refer to as educators henceforth) lecturers need to consider the difference in the degree of self-regulation skills that online and offline education require.

In order to help students effectively learn in an online environment, we argue that educators need to make the enhancement of students' self-regulatory skills a central tenet in online education. In this paper, we first outline our insights in self-regulation during online education based on students' and lecturers' experience. Subsequently, we provide recommendations to stimulate self-regulated learning in online education and to provide a solid foundation on which self-regulation can occur.

2   Insights in Self-regulation Online During the COVID-19 Pandemic

The switch from on campus to online education occurred abruptly. Both students and lecturers had not prepared for this transition; yet, in many cases, lecturers covered all lectures, tutorials, and exams to online variants in one or two weeks (VSNU, 2020). In the current academic year, much education will also take place online. Therefore, we have entered a transition period where we can reflect on how the past period has affected student self-regulation, what we need to preserve, and what we could do differently.

In our role as lecturers, coaches, and educational advisors at the Teaching and Learning Center at the University of Amsterdam (UvA), we have spoken to more than 300 lecturers and students at different faculties about the switch to online education. In Section 3, we share their experiences and discuss our insights into the effects that the coronavirus disease of 2019 (COVID-19) pandemic has had on students' self-regulation.

One lecturer we spoke to from the Faculty of Science at the UvA mentioned:

I notice that students are less engaged during my online course, because they decreasingly visit the optional Q&A sessions and postpone self-study in which they work on an assignment. Instead of studying regularly and taking advantage of these hours, they ask their questions by email on Sunday afternoon just before the deadline. So apparently there are questions, but they just do not visit question hours to ask them.

Other lecturers from various study programs supported these comments in noting that few students attended and/or participated actively in online Q&A sessions. Furthermore, students indicated that they found it difficult to maintain their study rhythm. They mentioned that, due to COVID-19 measures, universities scheduled fewer educational activities, they could not study together in the library, or they had problems concentrating in their homes. In addition, students indicated that the shift to online instruction disrupted the normal rhythm in which they conducted social activities, side jobs, and sports and that they

had trouble finding a new study rhythm. Lecturers also noticed that students missed mutual interactions and the possibility to ask questions such as "How was your weekend?", "Have you already started the assignment?", "How many pages have you written?", and "How did you tackle this assignment?". Besides, students seemed less confident about their performance. For example, a lecturer at the UvA Faculty of Social and Behavioral Sciences noted that "students indicate that they do not want to hand in assignments, because they think their work does not meet the standard, while when I look at it, it is far above the standard". Apparently, when having mutual interactions on campus, students receive implicit feedback from each other about where they stand and they can mirror their work to others' work and reflect together. However, they could not easily continue to do so due to the COVID pandemic.

In conclusion, we found that the transition to online education during the COVID-19 pandemic affected students' self-regulation in three ways: it 1) disrupted curriculum structure and study rhythm, 2) gave students less feedback, and 3) provided students with fewer opportunities to reflect together.

3   Recommendations

We have used the best practices and experiences from this transition period to formulate recommendations that contribute to solving one or more of these issues. With these recommendations, we focus on showing how educators can strengthen students' self-regulation skills online and how they can provide a solid foundation on which self-regulation can occur. Each recommendation empowers students to enhance their self-regulation skills by going through the self-regulated learning cycle.

3.1   Recommendation 1: Provide a Solid Foundation on which Self-regulation can Occur

In an online situation, students need a solid foundation to work on their self-regulation skills. Educators can facilitate this foundation creating an online context that provides curriculum structure and autonomy to students (Jang, Reeve, & Deci, 2010). Providing structure may seem contradicting with increasing self-regulation, but the abrupt shift to online education has not changed students' self-regulation skills, yet online instruction places greater demands on them. Therefore, we recommend that educators minimalize the difference in how much self-regulation they expect from students when shifting to online instruction. In addition, we recommend that they help students increase their self-regulation step-by-step throughout the curriculum (van de Pol, Volman, & Beishuizen, 2010) by aligning courses so students can gradually learn to learn in a self-regulated manner.

Educators can take several steps to create an online context that provides structure and autonomy. First, scheduling online meetings in which small groups of students can collaborate on assignments in a self-regulated manner can help them find a new study rhythm. Additionally, first-year students might need more guidance that lecturers can provide by planning feedback moments. Second, educators can schedule weekly Q&A sessions or wrap-up meetings to provide structure. Between these meetings, lecturers should encourage students to learn in a self-regulated way, and they maintain their autonomy by determining for themselves when they work on which study material. To make these meetings as useful and meaningful as possible, lecturers can ask students to prepare the Q&A sessions and discuss their preparations in an online discussion forum. The lecturer can then use the forum as input for the Q&A session. During wrap-up meetings, the instructor can, for example, practice exams via online quizzes (e.g., via https://www.sendsteps.com/, https://www.socrative.com/, https://kahoot.com/, or https://www.mentimeter.com/).

3.2   Recommendation 2: Planning Phase: Insight in Goals and Learning Strategies

As students go through the self-regulation cycle's planning phase, they set goals and devise strategies to achieve them. Lecturers can encourage students to reflect on strategies that fit online education. Subsequently, students can convert these strategies into a realistic study schedule. Lecturers can encourage students to use it and refer to it regularly. For students to achieve their goals, they need to gain insight into the intended learning outcomes and assessment criteria (Ting Wang & Li, 2011). If lecturers predefine a course's intended learning outcomes, they should provide students with optimal support during the planning phase by 1) communicating them at the start of the course and 2) describing the expected level of knowledge and/or skills that students should attain (e.g., by using the Bloom taxonomy) (Boor, Cornelisse, van Hooff, & Spyropoulou, 2019a, 2019b, 2019c). Alternatively, students can (partly) formulate intended learning outcomes themselves and, thereby, gain an optimal basis for self-regulation.

Lecturers can clarify assessment criteria by explicitly clarifying what they consider high quality at the start of the course. They can achieve such clarity by describing the criteria in rubrics and/or answer models embedded in an electronic learning environment (e.g., CANVAS or BlackBoard). To gain further insight in the assessment criteria, students can discuss examples of good and poor performances in break out rooms and explain why.

3.3   Recommendation 3: Performance Phase: Sufficient feedback

Students need sufficient feedback on where they stand in relation to their goals to track their progress during the self-regulatory learning cycle's performance phase. Lecturers often provide this ongoing feedback via formative assessment. Formative assessment helps students to identify their strengths and weaknesses and gives lecturers information about where students struggle. Students themselves can provide the feedback or it can come from their peers and/or lecturers.

Online education has brought about two changes in the self-regulated learning cycle's performance phase. First, students do not find it as natural to receive feedback from their peers online as on campus, yet they have a greater need for such feedback online. Therefore, we recommend that students regularly provide feedback on one another's work (e.g., via https://pitch2peer.com or https://feedbackfruits.com). In this way, students can learn from one another and gain more insight into where their work stands in relation to their peers and to the assessment criteria. Such feedback contributes to students' self-regulation skills. To help students get the most out of online peer feedback, we recommend that lecturers: 1) have students use assessment criteria for peer feedback (i.e., a rubric) and give them clear instructions on how to use the assessment model (Boor et al., 2018a) and 2) have students provide mutual feedback within their group rather than randomly and anonymously allocate students with feedback peers as often happens in an online environment. Thus, lecturers should make sure that each student gives and receives feedback from multiple students in a group that contains three to four students. If students know who they should give feedback to, they gain more responsibility and can also consult one another about the feedback. The second change that online education has brought about in relation to the performance phase concerns the way in which lecturers assess students. Thus, to help students gain self-confidence, lecturers should familiarize students with the assessment procedure. They can do so via using the same online assessment program (https:// www.ans.app/ or https://www.testvision.nl/) or rubric for formative assessment and summative assessment.

3.4   Recommendation 4: Reflection Phase: Reflect Together

Reflection plays a key role during the self-regulated learning cycle's evaluation phase. Students do not find it as natural to reflect together online as on campus, while reflection becomes stronger through interaction with others (Rodgers, 2002). By interacting, students can ask each other questions that they would not ask themselves, help affirm their experience, or encourage one another to elaborate or see things in a new way. In doing so, they aid the reflective process and creates more depth. As a starting point for online reflection, lecturers can ask students to use the (peer) feedback from the performance phase. Subsequently, students can share what went well or what went wrong. They can discuss in break-out rooms in groups that contain three to five students whether they have made progress and why and what adjustments they plan to make. Lecturers can have students maintain a digital portfolio (e.g., via https://www.ejournal.app/) where they can record answers to reflective questions at different times during the course or curriculum. We recommend that lecturers also ask reflective questions about online learning strategies that students formulated in the self-regulated learning cycle's planning phase so that they can make timely adjustments. Reflective questions that lecturers can use include "What advantages and challenges did you encounter with regard to online education?", "How did you approach online education so far?", and "What strategies would you like to retain in the coming period and what would you like to do or try differently and why?". In addition, students can reflect on their learning strategies using metacognitive questions (i.e., questions that Tanner (2012) or Boor et al. (2018b) present).

4   Conclusions

By empowering students to continuously go through the self-regulated learning cycle, they can systematically achieve their goals, learn optimally in an online environment, and keep developing cognitively and personally. The recommendations we provide to help directors, course coordinators, and lecturers to empower students are important in any educational situation but especially in an online

environment. The different recommendations reinforce one another in achieving effective learning in an online environment.

Program directors, course coordinators, and lecturers play an important role in strengthening students' self-regulation skills, and each recommendation contributes to one or more of the issues we identify in Section 2. To solve the first issue we identify (i.e., disturbed curriculum structure and study rhythm), we recommend that educators create an online environment that offers structure and autonomy. In this way, program directors and course coordinators can plan online meetings and teachers can give substance to the meetings and guide students. To solve the second issue we identify (i.e., students receiving less (implicit) feedback from each other), educators need to support the planning phase by clarifying learning objectives and assessment criteria at the start of the course and support the performance phase by ensuring that students receive sufficient and timely feedback. To solve the third and final issue we identify (that student have fewer opportunities to reflect together), we recommend that educators use (peer) feedback from the implementation phase as a starting point for online reflection to help students learn more effectively. Finally, we emphasize that strengthening self-regulation skills also requires cooperation between lecturers so that courses in a curriculum align and build up to equip students with self-regulation skills to flourish in the future society.

Acknowledgments

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Sandra Cornelisse is a senior lecturer in the bachelor program Psychobiology and advisor, educational innovator and coach of lecturers at the Teaching and Learning Centre of the Faculty of Science of the University of Amsterdam. She completed her PhD in 2013 at Utrecht University. She is honors program coordinator of the Faculty of Science and co-leads several projects that convert evidence-based didactic principles into educational innovations at curriculum level. For example, together with Ilja Boor, she has developed a program to guide teacher teams in innovating teaching and assessment methods at curriculum level. The central theme of her education (innovations) is self-regulation and personal skills development.