

# Accepted Manuscript

An in-depth analysis of adult students in blended environments: Do they regulate their learning in an 'old school' way?

Silke Vanslambrouck, Chang Zhu, Bram Pynoo, Valerie Thomas, Koen Lombaerts, Jo Tondeur



PII: S0360-1315(18)30244-6

DOI: [10.1016/j.compedu.2018.09.008](https://doi.org/10.1016/j.compedu.2018.09.008)

Reference: CAE 3451

To appear in: *Computers & Education*

Received Date: 13 April 2018

Revised Date: 13 September 2018

Accepted Date: 16 September 2018

Please cite this article as: Vanslambrouck S., Zhu C., Pynoo B., Thomas V., Lombaerts K. & Tondeur J., An in-depth analysis of adult students in blended environments: Do they regulate their learning in an 'old school' way?, *Computers & Education* (2018), doi: <https://doi.org/10.1016/j.compedu.2018.09.008>.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Silke Vanslambrouck<sup>1</sup>, Chang Zhu<sup>1</sup>, Bram Pynoo<sup>1</sup>, Valerie Thomas<sup>1</sup>, Koen Lombaerts<sup>1</sup>, Jo  
Tondeur<sup>2</sup>

Author Note

<sup>1</sup>Department of Educational Sciences, Faculty of Psychology and Educational Sciences, Vrije  
Universiteit Brussel, Brussels, Belgium

<sup>2</sup>Interfaculty Department of Teacher Education, Vrije Universiteit Brussel, Brussels, Belgium

Pleinlaan 2

1050 Brussels

Belgium

Contact: [silke.vanslambrouck@vub.ac.be](mailto:silke.vanslambrouck@vub.ac.be)

## Acknowledgements

We would like to acknowledge the project “Adult Learners Online!”, financed by the Institute for Science and Technology (Project Number: SBO 140029), which made this research possible.

ACCEPTED MANUSCRIPT

ACCEPTED MANUSCRIPT

**An in-depth analysis of adult students in blended environments: Do they regulate their learning in an ‘old school’ way?**

**Abstract**

Separation in time and place during the learning process reduces the ability of teachers to observe their students’ learning behaviours and provide tailored support. This occurs in blended adult education, which challenges students to learn independently. Possessing self-regulation skills is crucial for success in this context. Therefore, the current study aims to address the self-regulation strategies used by adult students in blended environments. A qualitative study that included framework analysis with 16 semi-structured interviews was conducted to explore how students regulated their cognition, behaviour, context and motivation. Results show that they 1) learn by using organising and rehearsal strategies; 2) are flexible regarding time, effort and environment and; 3) report diverse help-seeking strategies. Nevertheless, they preferred offline learning materials and applied few self-motivation strategies. The findings provide tips for teachers to support and promote the students’ self-regulation skills and includes tactics such as being an involved role model on forums to facilitate help-seeking processes.

**Keywords:** Adult learning, distance education, learning strategies, lifelong learning

## 1 Introduction

Online, distance learning moments – which are supplemented with face-to-face learning moments to provide blended education – provide a level of autonomy that requires self-regulated learning (SRL) skills to succeed (e.g., Kirmizi, 2015; Rowe & Rafferty, 2013). Adult students who need blended education to be able to (re)educate themselves and who have multiple responsibilities in addition to their education (e.g. a family and a job) are especially vulnerable to learning difficulties in autonomous environments. These students need effective SRL skills and should be offered tailored support. Having a clear view on their SRL strategy use is necessary for teachers to be able to provide individualised support. However, information on the SRL strategy use of blended adult students is lacking because (1) teachers and students in blended environments are frequently involved in the learning process at different times and in separate locations, which makes it challenging for teachers to observe their students; and (2) scientific research is lacking, which is a problem since SRL strategy use is context dependent, and thus studies with younger, traditional students is not generalisable (Broadbent, 2017). Providing suitable support enhances the development of students' SRL, which keeps them motivated and persistent and is associated with higher educational outcomes (e.g. Rowe & Rafferty, 2013). Therefore, using a qualitative approach, the current study explores the use of SRL strategies of adult students in blended learning environments during their online, distance learning moments. This study will generate information that can be used as a basis to develop tailored support.

The study starts with explaining the concept of SRL in blended environments, its different phases and areas, and the diverse strategies that can be found in earlier literature. Next, the method and procedure are discussed, and the instruments, sample and context, and data-analysis are explained in section four. Afterwards, findings are described for each SRL area of functioning to make clear how adult students learned by using the computer and online

learning material and tools. Finally, the results are discussed, which raises diverse contradictions, practical implications for teachers and institutions, and research limitations that provide possibilities for future studies.

## 2 Self-regulated blended learning

In blended learning education, courses are divided into face-to-face moments in class with teachers and peers and online, distance moments at a place, time and learning pace of choice. This approach makes education more accessible for adults because the convenience (Owston & York, 2018) and flexibility allows students to partly customise their learning processes to fit with their personal situations (Broadbent, 2017; Zhu, Au & Yates, 2016). However, the blended approach also poses challenges regarding responsibility and independent learning. Because teacher regulation of the learning process in blended environments is reduced (Fryer & Bovee, 2016; Zhu et al., 2016), there are higher requirements for students to manage their self-regulation and engagement in the course (Gedik, Kiraz & Özden, 2012; Kizilcec, Pérez-Sanagustín & Maldonado, 2017). More specifically, completing tasks at home without the structure or social pressure that is present in face-to-face classes, could cause difficulties for students who do not regulate their learning efficiently (Wolters, Pintrich & Karabenick, 2005).

Self-regulating students are active and constructive, and try to master the learning process by using strategies in different phases and areas of functioning to succeed in their education (Wolters et al., 2005; Zimmerman, 2015). Previous research has demonstrated that self-regulation is a critical variable in education since it relates to student performance and success (e.g. Saba, 2012; Zhu et al., 2016). More specifically, higher achievers use more self-regulation strategies during their education (Zimmerman & Martinez-Ponz, 1986).

Self-regulation is in this study defined according to Pintrich and Zusho (2007) in terms of four learning phases, which occur before, during and after students' efforts to learn. First,

the activation phase includes processes that occur to anticipate efforts to learn. Second, in the monitoring phase, students monitor their learning processes to become metacognitively aware of the self, the task and the context. Third, the regulation phase optimises learning efforts by controlling and regulating the self, task and context with the aim to get closer to the learning goals by using diverse learning strategies (Pintrich & Zusho, 2007). Fourth, processes in the reflection phase follow the students' efforts to learn by reflecting upon the self, task and context (Pintrich, 2000; Zimmerman, 2015).

Although these phases are presented in a linear way, they do not necessarily occur in an orderly progression. For example, results from performing a certain strategy in a certain phase can reactivate a previous phase when a student realises the strategy is not assisting with the learning process. Furthermore, the four phases occur in four areas of functioning: cognition, behaviour, context and motivation. In each area and phase, students can apply strategies to learn efficiently and process their education as presented in Table 1 which is adopted from the study of Pintrich and Zusho (2007).

-----Insert Table 1 here -----

## **2.1 Regulation of cognition**

In the cognitive area, students use their strategic knowledge to select and implement diverse (meta)cognitive strategies to enhance their content knowledge and performance (Wolters et al., 2005). The regulation of cognition can be hard in a blended environment when compared to more traditional, face-to-face environments. This because students are more isolated in blended environments and thus learn fewer diverse strategies from peers. Students need to rely on themselves to become metacognitively aware of the effectiveness of their



learning strategies, detect weaknesses and act upon these weaknesses by deciding whether to keep, stop using or implement another strategy (Goulão & Cerezo Menedez, 2015).

Regarding the activation phase in the cognition area, several authors have claimed that when students work together to set goals and to reflect upon these aims, this behaviour has a positive impact on their learning efforts, a process which can be challenging in autonomous blended environments (Lazowski & Hulleman, 2016; Schwinger & Otterpohl, 2017). Furthermore, the tactics that are conducted during the task - including rehearsal, elaboration, organisation and critical thinking strategies - can probably be executed differently in blended environments in comparison to traditional, face-to-face education. For example, since a significant amount of education occurs via technology, organisation strategies such as taking notes or marking content will happen differently. Moreover, results related to the influences of the aforementioned strategies on student success in blended environments is contradictory. While Broadbent (2017) has indicated that critical thinking strategies do not influence the successes of students, the review of Broadbent and Poon (2015) did shows significant associations between critical thinking strategies in regard to academic achievement. Examples of strategies that can be performed in the reflection phase of the cognitive area are making cognitive judgements (e.g. good or bad scores) and attributions (e.g. time restrictions are the cause of bad scores) for scores attained on a task. In blended environments, attributions could also be more related to technical issues or advances.

More research on the use of cognitive strategies is needed due to the influences that the type of learning environment can have on students. In her comparison study between fully online and blended students, Broadbent (2017) found diversity in strategy use between the groups. Online students used more critical thinking and rehearsal strategies, while both groups frequently utilised the elaboration strategy. Furthermore, Wolters et al. (2005) have encouraged research in different educational populations since they noticed varied strategies

between college and middle school students. More specifically, college students use all cognitive strategies while middle school students only use a selection of them. Since research on the cognitive self-regulation of adult learners in blended environments is lacking, the current study focuses on this context.

## **2.2 Regulation of learning behaviour**

In this area, students will make efforts to observe, monitor, control and regulate their own overt behaviour to learn as efficiently as possible (Wolters et al., 2005). As seen in Table 1, students will plan and regulate the time and effort spent on their tasks, become aware of their behaviour and if needed, use help-seeking strategies. Eventually, they will decide to persist or give up on their task and will make choices about future behaviour in order to proficiently process possible upcoming tasks. For example, students will plan and regulate their time or effort in a different way based on their current experiences. Regulating time and effort is found to be significantly associated with academic achievements (Broadbent, 2017; Broadbent & Poon, 2015) and is especially important in blended environments since students are partly in control of when, where and at what pace the learning takes place.

Within the autonomous blended learning environment, teachers are less able to observe when students need help. Therefore, being able to use help-seeking strategies is crucial for students in blended environments, but results are inconsistent. While Sun, Xie and Anderman (2018) have stated that help-seeking strategies enhance student achievement and promote their motivation, Kizilcec et al. (2017) found a negative relationship between help-seeking strategies and success in education. Since individuals who seek help need an active community of students who support each other, this inconsistent findings in the research could be due to the environment, which needs to provide adequate assistance (Kizilcec et al., 2017). Students must be supported in seeking help and interacting with peers so they learn how to be confident and more easily ask for aid when needed (Xia, Fielder & Siragusa, 2013).

While in the behaviour area time and effort regulation are the most used strategies for both online and blended students (Broadbent, 2017), help-seeking strategies are under-utilised (Puzziferro, 2008). Broadbent (2017) has added that blended students still seek help more than online students. However, research regarding adult students in blended environments is lacking, especially in reference to how their outside commitments might make help-seeking behaviours necessary.

### **2.3 Regulation of the context**

Blended learning environments' autonomy and flexibility creates more opportunities for students to influence their context compared to traditional face-to-face education. The context is no longer a fixed entity but one that can be manipulated by students to favor their learning processes. Based on their perceptions of the tasks and context, students will use strategies such as managing the environment and peer learning to regulate their context (Wolters et al., 2005). In their review on the effects of SRL strategies for academic achievement, Broadbent and Poon (2015) found that peer learning strategies had the strongest effect. Participating in online peer interaction seems important for the achievement of students (Broadbent & Poon, 2015) but the effect depends on the role of the student in the interaction (Xie, Fielder & Siragusa, 2013). Being actively involved and staying active has more benefits than participating more passively. Although peer learning has been found to be important, it is still under-utilised in both online and blended student groups (Yang, Quadir, Chen & Miao, 2016). However blended students still use peer learning more than fully online students (Broadbent, 2017).

### **2.4 Regulation of motivation**

The limited structure and social pressure during online, distance moments (Wolters et al., 2005) and the multiple responsibilities that adults face could create obstacles to completing tasks at home. Motivation is then important because it influences the choice, effort

and persistence of students to perform. It is formed by beliefs and processes like task values, interest and self-efficacy and is a critical determinant regarding students' use of self-regulation strategies and of their educational achievement (Lazowski & Hulleman, 2016). Thus, to make students persist and perform, motivation-regulation should be used to influence and optimise the motivational beliefs and processes of students (Smit, de Brabander, Boekaerts & Martens, 2017; Wolters 2003).

In blended environments, motivational scaffolds could be incorporated in online courses to facilitate a positive learning climate. For example, to activate and become aware of students' motivational beliefs and processes, teachers could incorporate an online task at the beginning of a course in which students have to talk about their self-efficacy and interests and the values attributed to their education. Another example is to anticipate the values that students attribute to their education by providing online content that is relevant and useful to students so that their interests are stimulated (Authors, 2018; Kim & Frick, 2011, Smit et al., 2017). During a task or course, students use diverse motivational strategies to enhance their own motivation (see Table 1) and in this way, indirectly influence their academic performances through their efforts and engagement (Schwinger & Otterpohl, 2017; Smit et al., 2017). Schwinger and Stiensmeiser-Pelster (2012) have indicated that students who use the mastery or performance approach self-talk strategy scored best on their exams. Mastery self-talk, proximal goal setting and self-consequating strategies were the most effective, while situational and personal enhancement strategies proved to be rather ineffective (Schwinger & Otterpohl, 2017; Smit et al., 2017).

Research on motivation-regulation is limited, but the importance is increasingly being acknowledged by researchers and practitioners (Broadbent & Poon, 2015). Motivation-regulation is an indispensable aspect to the learning process since it relates to other areas of self-regulation. Wolters, Pintrich and Karabenick (2005) have indicated that students who use

a great number of motivation-regulation strategies and thus are more motivated, tend to utilise more cognitive, time management and help-seeking strategies. More specifically, as motivation is formed by self-efficacy, values and interests, students who believe they are capable and who value and are interested in their schoolwork use more (meta)cognitive strategies. In this way, they are also able to know when, where and with whom to seek-help. Since literature on motivation-regulation is scarce and especially lacking in the context of blended adult education, the current study is interested in expanding the scientific literature on self-regulation.

### **3 Present research**

Although teachers are considered important in providing tailored support to activate, train and develop self-regulation skills (e.g. Dörrenbächer & Perels, 2016; Smit et al., 2017), the blended learning context makes it challenging to gain insights into the students' SRL needed to appropriately support individuals. Since students differ in the strategies they use, numerous authors (e.g. Wolters & Benzon, 2013) have indicated the importance of research in different contexts. However, the descriptive literature regarding use of self-regulation strategies in the blended adult learning context is scarce and mostly limited to investigating effects by using quantitative self-reporting questionnaires, which limits the amount of strategies under analysis (Smit et al., 2017). More qualitative research is needed to explore the used strategies (Schwinger & Otterpohl, 2017). As a result, the purpose of the current study is to explore the use of self-regulation strategies of blended adult students, and the following research questions are considered:

RQ1: What cognitive regulation strategies do adult students in blended learning environments use?

RQ2: What behavioural regulation strategies do adult students in blended learning environments use?

RQ3: What context regulation strategies do adult students in blended learning environments use?

RQ4: What motivation regulation strategies do adult students in blended learning environments use?

## 4 Methods

### 4.1 Method, procedure and instruments

The current study uses a basic qualitative research method that includes collecting quotes from adult students, verifying the quotes and contemplating what the students meant with the purpose of discovering truth and generating knowledge as an end in itself. The qualitative inquiry describes and interprets adult learners' experiences and perceptions of their use of SRL strategies during the learning process in online, distance moments. To answer the research questions, in-depth, semi-structured interviews were conducted by the first author. The interviews lasted about 60 minutes and covered different aspects of the participants' self-regulation; the researcher began with asking the students to think about a moment that the students were learning their course content. They needed to describe the place where they learn and how they approached their course content. If needed, the researcher intervened by asking more specific question related to SRL strategies. For example, the question: 'If a part of the course content is not clear, what do you do to make it clear? Who and how do you ask for help?' Furthermore, a question was asked to explore the self-motivation of the students, namely, 'When encountering difficulties during the learning process that maybe decrease your motivation, what do you do to stay motivated and persist?' The motivated strategies for learning questionnaire (Pintrich, Smith, Garcia, & McKeachie, 1991; MSLQ) was used to support the interviewer in preparing and conducting the interviews.

### 4.2 Participants and context

Participants in the current study were gathered via the data of a previous study (Authors, 2018). This previous study contacted all centres for adult education in Flanders, Belgium and used surveys and a voluntary sampling technique to reach adult students who were enrolled in a blended course. The survey offered the opportunity for students to disclose their names, email addresses and telephone numbers if they ever wanted to participate in another study. The authors (2018) developed motivational profiles of the adult students in blended education, which were used as a starting point for the current study to conduct a stratified sampling technique. More specifically, to capture the diversity of adult students and to represent a general view of adult students' use of self-regulation strategies, stratification variables were related to the motivational profile. At least one student from every educational level, namely secondary adult education (SAE), higher vocational adult education (HVAE) and teacher education (TE), within each profile was sought for an interview. Students were randomly contacted until one of the educational levels had no students left to contact. We then made sure we had approximately the same number of students for every educational level. This resulted in a sample of 16 adults who were enrolled in a blended course at the time of the interviews. In Flanders, Belgium, a course is considered blended when an institution offers minimally 5% and maximally 95% of education hours in online, distance moments. The rest of the time has to be offered in face-to-face, in-class moments. The current study includes students who were enrolled in different kinds of blends. Six students were enrolled in TE (Jessie, Saar, Karel, Katia, Lina and Imke), another six students were enrolled in HVAE (Ilse, Noor, Mona, Kristel, Kobe and Morgan), and four students were enrolled in SAE (Alex, Wout, Fran and Emma). The sample consisted of 12 females and 4 males, whose ages ranged from 24 to 56 years. Regarding the personal situations for participants, there was diversity concerning their current jobs (unemployed, part-time jobs or full-time jobs) and marital status

(single or having a partner and with or without children). Pseudo names were used to quote the students to ensure anonymity.

### **4.3 Data-analysis**

Data from the interviews was transcribed and analysed with MAXQDA12. The framework analysis methodology (Pope, Ziebland & Mays, 2000) was used as a form of thematic analysis for semi-structured interviews (Gale, Heath, Cameron, Rahid, & Redwood, 2013). To display how the adults approached their courses and the difficulties they experienced while doing so, the researchers first familiarised themselves with the data by listening to the interview recordings, reading the transcripts and thinking about the general issues that emerged from the data, including: practical information about where and when the adult students learned (behaviour and context area), how the adult students processed their course content (cognitive area), what difficulties they encountered and how they motivated themselves to overcome these barriers (motivation area), and what types of support students thought could be offered for in these processes. Second, by using the SRL framework of Pintrich and Zusho (2001) (see Table 1) as pre-selected themes and codes for analysing the interviews, the researchers utilised a top-down approach and thus deductively selected the themes to manage the data (Gale, Heath, Cameron, Rahid, & Redwood, 2013). The codes consisted of the different strategies students could implement, divided by the phase the strategies belonged to (e.g. activation, monitoring, regulation and control) in each of the four SRL areas (e.g. cognition, behaviour, context and motivation). Third, an inductive stage with four interviews – in which themes for codes were generated from the data - was completed to find possible important additional codes (Gale, Heath, Cameron, Rahid, & Redwood, 2013). Two additional codes were added in the motivation area, namely ‘undergoing’ and ‘other’. Fourth, an interrater reliability analysis that used Cohen’s Kappa statistic was performed to determine consistency among raters and identify imprecise code definitions of overlapping



meanings in the codebook. To ensure coding reliability, replicability and scientifically valid results, 25% of the data was coded by a co-author (MacPhail, Khoza, Abler & Ranganathan, 2015); the interrater reliability had a substantial agreement, Kappa = 0.71,  $p < 0.001$  (e.g., Hallgren, 2012; McHugh, 2012). Afterwards, a discussion between the researchers was held to assess disagreements, to help refine the codebook. Fifth, we organised the coded data into a more manageable format to facilitate the mapping and interpretation of the information.

## 5 Results

Findings from the interviews are presented in relation to each area of functioning. For every area, Tables 2-5 gives an overview of the strategies used for all students separately. Additionally, more qualitative, detailed explanations of the strategy used are provided by giving student quotes for each phase.

### 5.1 Regulation of cognition

As can be seen in Table 2, most students mention to judge their learning. The qualitative findings shows that this strategy takes three forms. First, the students primarily mentioned self-evaluation tactics such as writing bullet points of what they remembered for their learned course content. They asked themselves questions like ‘What have I remembered?’ or ‘What did I just read?’ to answer for themselves or an ‘imaginary person who does not know anything about the course content’ for comparison with their syllabus. Second, following self-evaluation, the students judged their cognition by making statements about their level of knowledge, including, ‘I know the content’, ‘It is not clear’ or even ‘I need to revise it’. Third, students assessed their cognition specifically regarding the online, distance moments. While learning the course content, students became aware that they ‘do not get it that much as in face-to-face courses’, ‘remember it less longer because it does not stick into their minds’ and ‘forget it a lot faster’.

In the regulation phase, the main recurring strategy among the respondents was the use of organisation strategies (e.g. making notes or highlighting words in the syllabus), which were either followed by or simultaneously occurring with rehearsal strategies. Regarding rehearsal strategies, the majority of the students read repeatedly until they felt like they had mastered the content. As Noor stated, 'I keep on repeating the course content until it gets boring'. Others went a step further and tried to memorise the course content while repetitively writing it down, creating sentences with key words, visualising the content tables or memorising the titles in the syllabus. Only Alex stated that he did not memorise because 'the content is something you need to understand rather than not memorise'. Summarising the course content or as Kristel stated, 'I make my own syllabus' was also performed as an organisation strategy. The students who did this reworked the different sources and formats of their course content (e.g. PowerPoint, learning paths, or an online syllabus) to one document, which was supported by their notes from face-to-face sessions. Kristel explained that she did this because her syllabus was in pdf format and 'you cannot make notes in pdf easily and furthermore, I did not have typing lessons when I was young, so I write faster than I type'. Only Noor stated that she did not summarise the syllabus. In addition, almost all students mentioned some organisation strategies regarding editing of their paper syllabus. They put important items in a specific color, underlined keywords or wrote them in the margin, drew exclamation marks in different shades, used interleaves or made the syllabus more visual by creating schemes or tables of contents. The students stated that editing was more easily done on paper, and, as Alex said, the students 'need a paper syllabus'. Only Jessie tried to learn and work entirely on the computer. The others indicated that they printed their syllabuses and learned on paper, or they studied with support from the online learning paths if they had them. Ilse claimed that learning on paper was more interesting because 'it is different to look on a screen than on paper, the cohesion is easier on paper and you can easier go back. You can do

it online too, but it is different'. Elaboration strategies were conducted by using the Internet, the library and their adult work and life experiences to make connections between different sources of information with the aim of understanding and processing the course content more easily. When students thought about their strategies and noticed that approaches were not efficient, some of them used a metacognitive strategy to adjust their current learning strategy. For example, Noor explained that she used to write a great deal but she noticed that it was time consuming because she is left-handed and was thinking more about writing neatly than processing the course content. She decided not to write anymore as a learning strategy but uses organisation strategies now such as drawing exclamation marks in different colors. The opposite example is of Kristel, who experienced that her learning strategy was working well for her. She explained, 'I studied law and thus I needed to memorise a lot of my course content. Now, I still notice that memorising things works for me'. Examples of critical thinking strategies came from Mona, who mentioned that she thought critically about what she read online because 'you find a lot on the Internet, and I sometimes doubt if it is right'. Another example was from Noor, who was curious about other views or ways of handling tasks and wanted to know alternative answers.

Finally, for the reflection phase, Table 2 shows that half of the students used strategies to reflect on their scores and cognition. However, the reflection was quite shallow and limited to statements about their scores, which included 'not ok', 'pretty good', 'very good' or 'bad'. Regarding the attributions, students attributed their bad scores to low effort, not enough time or the circumstances at that moment such as the death of a relative. Noor even thought that there was perhaps something in her brain that caused her not to do well. Katia stressed that it was important to understand the reasons for bad performances.

-----Insert Table 2 here -----

## 5.2 Regulation of behaviour

In the behaviour area, an overall theme from the interviews was the learning time and effort. Table 3 displays that the activation phase is mainly about time and effort planning. For example, some mentioned setting a personal deadline, including Karel who indicated that he begins to learn considerably ahead of the exam. In contrast, Wout claimed to work when pressure was high, frequently in the evening before a test. Regarding the use of the effort planning strategy, the results demonstrate three different strategies. First, most students tried to set a minimum amount of course content they would process. For example, Wout stated, 'I try to do as little as possible', while Alex settled on 15 pages of the syllabus a day. Second, some students built in regularity in their planning. They learned, for example, every week so they had to do less when the exam came closer. Third, some students decided to reduce their effort by splitting their course into three years instead of two or by choosing two chapters of their syllabus that they would not learn. Furthermore, students with children often indicated that they learned in the evening when their children were in bed, from around 8 to 10 p.m. or longer if they had a deadline. People such as Fran, who was 'not an evening person', tried to learn and make all her assignments on the weekends. Kristel stated that she was too tired in the evening because of her work, so she needed to find time during the day. Students without children more often indicated that, on the weekend, they started learning in the morning, some at 9:30, others at 7, for one or two hours and then took a break to do housework. In the afternoon, they did the same thing but stopped in the evening. The length of their learning time fluctuated between a maximum of approximately 4 hours to 7 hours a day.

For the monitoring phase, half of the participants indicated that they at least once became aware of a shortcoming in their behaviours during their learning. The shortcomings mostly referred to the key theme of time and effort. As Noor stated, 'you can seriously miss out on some tasks, it sometimes turns out that instead of taking 4 hours, it takes 8 hours'. However, although students mentioned to be aware of shortcoming at least once, this

awareness was still not extensively discussed and no causes that refer to the use of a computer were mentioned.

Information from the previous phase was used as a starting point in the regulation phase. Here, most students indicated that they intervened in their learning process to overcome their shortcomings by using time-regulation strategies. A small number of students explained that they spontaneously decided to stop, pause or begin to learn regardless of what their planning had been. Additionally, results of the analysis show that time-regulation strategies frequently occurred simultaneously with effort regulation strategies. This was because, for adults, the amount they studied depended on the time they had next to their other responsibilities. For some students, time adjustments automatically brought adaptations of the task effort. The example of Emma illustrates this:

Most of the time, when I am learning and I feel that it is going well, then I want to proceed. Then it can be that it is suddenly 11 pm, and my task is ready. But it also can be that I begin a task and I think to myself, 'It is more difficult than I thought I will proceed tomorrow'.

Some students were quite flexible and learned every free minute they had. For example, Alex said, 'If it is calm at work, then I take my syllabus and I learn.' Another strategy in the regulation phase is help-seeking, which was a major theme in the interviews. Most of the students tried to find answers to their questions by searching on the Internet before they 'harass people' as Alex explained. If they still had questions, they asked their teachers and peers, preferably face-to-face but also online if needed. Asking questions on an online forum was often their second option because it 'is rarely used', 'takes too long before I get an answer', 'is a waste of time' and 'is confusing'. How they asked their questions depended on the situation and group atmosphere. For example, when a face-to-face moment was considerably far in the future, students emailed the teacher; otherwise, they would wait to

ask their questions personally. Another example was mentioned by Kobe, who said, 'If no one reacts on the forum, then I wait and ask it to the teacher face-to-face'. Regarding the group atmosphere, a minority of students indicated that they used the forum or Facebook group, that there was 'a lot of interaction' and that they even shared phone numbers and e-mail addresses. Others stated, 'We have the possibility [to ask each other questions on a forum], but it is not being used'. In addition, using other sources like experts, alumni students, libraries and other courses are also mentioned.

-----Insert Table 3 here -----

### **5.3 Regulation of context**

Table 4 shows that in the monitoring phase students becoming aware of their task expectancies, content and the instructors' teaching styles during their courses. Qualitative findings show that Kristel agreed with Noor that blended learning could be confusing because 'you read something of her and then from the other and everyone interprets it in his own way so maybe it is more interesting to put it clearly in a mail'. Regarding the task, Noor indicated that once she misinterpreted the task, saying, 'That task was not clear because I started with the guidelines from the syllabus but eventually we had to do a lot less than that'. Furthermore, the students noticed different teaching styles during the course and subsequently evaluated their context during the reflection phase. They thought the class group was nice but also had the feeling that the teachers were 'mainly busy with other courses and the online, distance education, yeah, it seems to be something extra'.

In the regulation phase, all participants mentioned the strategy of managing the learning environment to promote learning and to achieve goals. However, no one indicated managing their environment while considering the use of a computer to learn. Some students consciously chose an environment, while others sat wherever they felt like (e.g. in the living room, on the couch or outside). To illustrate, Kobe and Noor indicated that they chose a room

with a good deal of space to place their belongings, and Morgan learned in the living room except when she had to write and, sat in the kitchen instead. Kristel went to her sea-side house because there was nothing to do and it was quiet there. Half of the students indicated that there could not be any distractions, while the other half did not mind if the television or radio was turned on. Morgan even stated, 'I like to have music otherwise it has no use. There always has to be music'. Furthermore, as Table 4 shows, the students acknowledged the importance of peer learning strategies. Peer learning already occurred in the form of peer-evaluation, group work, classroom discussions or presentations of tasks, and teachers who shared examples of other students, which was appreciated. As Alex stated, 'It was actually very good because for once, you saw how your peers did it and in this way learned other ways to do it'. Furthermore, four students mentioned that they learned from peers by sharing experiences, information and ideas through Facebook or email. This peer learning was described by Ilse in the following way:

It is a very good thing, especially in adult education because you have people with different backgrounds. It is an opportunity to get in touch with people with different experiences. It is a big benefit because you appreciate others their skills like if we needed to give a presentation. I am not good in using the smartboard, but there was someone who was really good at it, and he showed it in front of the class and eventually we were more competent.

However, some students indicated that they would still like more peer learning opportunities. For example, Noor stated, 'In the task, they ask how we would deal with a certain situation but there is not one answer. Everyone could answer something else but what is the right one then? I missed to see what my peers would do'.

Finally, in the reflection phase of the context area students clearly talk about their blended education and role of the computer in this context. However, they do not talk about

the use of computers in their learning but more about the practical benefits and challenges of working with the computer. They indicated positive aspects such as when Kobe said, 'It obliges you to be engaged with the course content'. Four students mentioned flexibility in time and place as a benefit, and they liked the reduced travel time and the opportunity that it provided to care for a family and learn when the children were asleep. Overall, the students stated that online and blended learning was 'a nice principle'. Only Noor said she would not do it again and that blended learning was presented too euphorically by the institution.

Regarding the different teaching styles that became clear during the monitoring phase, the students reflected on their teachers in both negative and positive ways but mostly only about the face-to-face instruction moments and less about the online, distance instruction moments. Some teachers taught 'as if they teach secondary students' or 'only talk about themselves', which was not conducive for personal relations. The students preferred a teacher who told anecdotes, was an expert in the content, placed effort into the given tasks, instructed in an engaging way and treated the students in a humane manner when they arrived too late or did not meet a deadline. Overall, the students reflected on their education as fun and sometimes relaxing. Based on the collected evidence, students also reflected some dissatisfactions regarding the blended context and teacher behaviour. First, technical problems and issues were frequently mentioned. Uploading and downloading seemed to be difficult for some students, who called the online learning environment chaotic, amateurish and a maze. They indicated that not everyone is technically skilled and that the online environment should be more user friendly. Alex showed this incompetence by giving an example, stating, 'Once, a student wanted to upload her task and she deleted all tasks by accident'. Second, the students mentioned that they would like the teachers to be more 'human'. For example, if a student hands in a task after the deadline, they wanted to be heard and did not want the teacher to simply refuse to correct the task. As Emma said, 'I think there can always happen something



that you miss the deadline and thus they should be a little human'. Furthermore, students would have appreciated timely and more positively articulated feedback, evaluations and answers to e-mails. As Emma said, 'I will not say we never get negative feedback, but they [the teachers] try to articulate it in a positive way. When you leave, you always have the feeling that we are doing fine'. Katia agreed by saying, 'I just want to get credit for my work, I want to hear that I am doing good'. Third, the students would have liked to receive a better structured syllabus instead of PowerPoints, which lacked order and the 'story' of the course content. Fourth, at the institutional level, the majority of students advocated retaining some amount of face-to-face moments. This was because they valued the social contacts and peer learning opportunities that face-to-face moments brought. In line with this, Alex preferred a fixed order of courses so the peers were always the same and had the same level of expertise to help facilitate a good atmosphere.

-----Insert Table 4 here -----

#### **5.4 Regulation of motivation**

Results of the analysis shown in Table 5 indicate that for the activation and monitoring phase, most student are or become aware of their interests, personal values or expected competences regarding their task or course. However, nothing had to do with the use of computers. The students stated that their education was like a hobby, that they were interested in it and that they were intrinsically motivated to engage in their education. However, at the beginning of a course, Emma would tell herself that 'I am going to be happy when it is over'. Additionally, some students also experienced more negative feelings such as wondering if education was really useful, finding some courses not interesting and not wanting to go to school just to sit there. Furthermore, some students referred to their competence by saying, 'I am not nervous for a task or an exam because I know I can do it'. For two other students, pursuing education had personal value. More specifically, Mona could not partake in

education when she was young so being able to learn now was personally valuable to her. Another example is from Kristel who indicated that the education functioned as a kind of therapy, stating, 'That course is absolutely necessary to compensate for my current job. I think that if I did not have this course I would be having problems at my job regarding a burnout'. Noor valued that she could show others her abilities. Nine students mentioned one of the two goal orientations, namely mastery or performance oriented. There was no prevalence for one of the two goals.

It is clear from the evidence in nearly all interviews that, for the regulation phase, self-motivation strategies were hardly used. The most popular strategies used to persist and stay motivated included are thinking about one's goal to obtain high scores or to learn skills and making the task more interesting by thinking how the assignment could be personally intriguing to them. For example, for Morgan, it was personally interesting to follow her education because if she passed, she could help her daughter with her business. Another example was Alex, who persisted in a boring module because he needed to succeed in order to progress to a module that he really wanted to complete. However, the motivation that kept the students going was because they simply had to. As Ilse explained, 'Just pulling through. There is no other option, so do it'. Other diverse strategies that encouraged their motivation were, for example of Fran and Emma who indicated that they set up a calendar so they could count down to the last day or to an exam, which motivated them. When she lacked motivation during the learning process, Mona stated that taking a break, reading the news, breathing and resting helped her to find new energy and motivation.

The majority of participants mentioned a reaction or reflection on their motivations. They had positive emotional reactions to their scores, tasks and education. They thought that high scores were encouraging and motivating and experienced a nice feeling when they understood the course content; it was also good to feel that they could still learn at their age.

Fran was proud of herself if she had concentrated a whole day, while Emma and Saar mentioned that the amount of work related to pursuing an education in addition to a job and a family could be very frustrating and stressful. Regarding the attribution to scores, Katia said that it was interesting to know what one did well or poorly, and she liked that the teacher was available to discuss the scores. Alex admitted that there was one module that he thought was particularly boring. He stated that this 'resulted in lower scores', and Wout claimed that he would have higher scores when he would put more effort into his tasks. In addition, Morgan linked motivation to performance, saying 'It was the only module that I was not motivated to participate, which resulted in scores that dropped'. Finally, students reflected that their teachers should be motivators and perform such actions as giving bonus exercises; varying in how they teach; being involved and interested by emailing, calling or personally asking if there were problems or if the students had already begun the task and how far they had progressed in the assignment, taking time by Skyping with the group or individually when there were problems; and occasionally providing experiences of success. The students also thought that teachers should promote a group atmosphere and involvement and make sure the group atmosphere was relaxed and motivating. According to the learners, creating a group atmosphere could be done in instances such as when someone was sick, the teachers could ask another student to keep the individual updated about what happened in class. This would encourage students to take care of each other.

-----Insert Table 5 here-----

## 6 Discussion

The current study aimed to examine adult students' use of SRL strategies in blended environments. Altogether, the interviews showed that SRL is a complex process. The use of one strategy can influence the use of other strategies. For example, when students were using the motivational strategy of 'self-handicapping', they were protecting their self-worth against

low scores by decreasing their task effort, which in its turn was a behavioural strategy. Furthermore, different strategies were alike, happened at the same time or complemented each other. For instance, the students sought help on the Internet and linked the information they found to their syllabus to learn more efficiently, which meant they applied the elaboration strategy at the same time as the help-seeking strategy (Broadbent, 2017). Overall, the adult students did not frequently discuss using the computer to learn during their online, distance moments. This shows that there is a need to teach students how to use the computer and inform them about its benefits. The results of the adults using SRL strategies in diverse areas have created controversies that warrant further discussion.

In the cognitive area (RQ1), the students indicated they would rather learn on paper because organisation strategies were more easily applied and physical complaints of looking at a screen for long periods were absent. While organisation strategies were beneficial for success in blended environments (Broadbent, 2017), working on paper could be characterising adults who were perhaps less familiar with computers and Internet-based education and the editing possibilities on a computer. They preferred to use 'old school' ways of learning. This corresponds with the study of Ke (2010) who found that adult students' learning activities happened more offline than online. However, in a blended environment, one would think that students learn as much as possible by using the computer. In addition, the students invested a great deal of time organising and creating their own paper versions of the syllabus. Like Rowe and Rafferty (2013), the students proposed that teachers support them by offering a structured paper version of the syllabus or provide a printer-friendly version in the online learning environment. However, administratively, institutions need log files that prove that students are online. This creates a conflict between generating log files versus offering students the opportunity to learn their preferred way, namely offline and on paper.

Another result was that most of the students indicated that they were aware of a strategy's efficacy, but not everyone mentioned that they did something with this information. In other words, they significantly monitored their learning by being metacognitively aware, but not all of them (see Table 2) regulated their learning by applying the metacognitive strategy, which was important for success (Broadbent, 2017). Being adults, they had experiences from when they were younger to compare the effectiveness of their current learning strategies. However, perhaps they did not know enough strategies or possess the skills to have changed strategies if necessary.

As seen in Table 3, planning and regulating time and effort dominated the behavioural area (RQ2). Like Broadbent (2017), the students stated that time and effort regulation was a factor for success in blended education. This was because their multiple responsibilities made planning their time and effort critical, and they needed to be flexible to deal with sudden changes and setbacks. For adult students, the risk of disruptions is higher; therefore, students asked to be treated in a humane way by having their personal situations taken into account when, for example, someone was too late with something. However, teachers face the conflict of considering the situation versus being consistent with agreed-upon rules.

Next, help-seeking was frequently used (see Table 3). Similar to what Whipp and Chiarelli (2004) found, when students face difficulties, they first try to figure the solution out themselves by searching the Internet before approaching someone. Like Kizilcec et al. (2017), we found that online discussion fora are rarely used because students often do not receive timely answers. As such, they preferred personal help from the teacher, and although they did not ask their peers for help, they indicated that they would like more peer learning and that they valued the face-to-face moments. The next area is the context area (RQ3) in which the students were aware of their diversity in backgrounds, found it interesting to learn from each other and knew working together could enhance their performance (Kizilcec & Schneider,

2015). This raises the controversy between teachers who provide help on time (Sun et al., 2018) versus leaving room for peers to assist each other to promote peer learning (Xie, Lan & Osland Panton, 2013). The students asked for timely and positively formulated feedback, which according to Tello (2007), has a beneficial influence on students' attitudes and persistence. Furthermore, while the students wanted more peer learning, they argued against group work because of the difficulty in organising. For issues regarding help-seeking and peer learning, the students, who were in agreement with Sun et al. (2018), indicated that teachers should act as role models by being active and present on online fora in order to promote online group discussions and not by giving personal e-mails and telephone numbers. The teachers should encourage students to be active and take on a role as connector (Xie, Lan & Osland Panton, 2013). This is in contrast with Owston and York (2018), who have stated that in education with a high blend the quality of interaction is high because teachers already put significant effort in keeping up interactions.

In the motivation area (RQ4), few motivational strategies were used. Since Engelschalk, Steuer and Dresel (2016) have stated that motivation-regulation depends on the kind of motivational problem, one could think that the students in the current study did not have motivational problems. However, this was not the case considering the students mentioned issues and difficulties that frustrated them such as when the teacher asked them in front of the class to explain something. Seeing that their motivation was that they 'just have to' can make us aware that adult students need self-motivation skills. Motivational problems can result from contextual problems, which are difficult for students to deal with (Engelschalk et al., 2016). In the current study, the online learning environment that was perceived as chaotic and difficult is an example of a contextual problem. Working with computers was not indicated as something that motivated the students. Results demonstrate that the students relied on external sources such as peers, teachers, significant others or course content to

motivate them. For example, significant others who said supportive things were considered motivating; peers or class groups were motivating if they helped each other and there was a good atmosphere; and teachers who were involved, understanding, accessible and competent also helped learners motivation. That motivation depends on others could cause problems since online interactions with teachers and especially peers was difficult and sometimes absent. The students indicated that teachers should be motivators who enhance student confidence (Sun et al., 2018). Low motivation is a risk for learning attrition (Kim & Frick, 2011), and in this study, motivation depended on external factors instead of the students themselves. This created a conflict between the need for self-motivation rather than relying on inspiration from external sources.

### **6.1 Limitations and future research**

Although the current study is relevant for practice and research, it also entails some limitations. First, it does not necessarily mean that the students did not use unmentioned strategies, but rather, the students were perhaps unaware of using those strategies (Karabenick & Zusho, 2015) or unable to articulate that they were using particular approaches because they happened automatically and unconsciously such as activation of prior knowledge. Furthermore, the timing of the study could also be a factor in not mentioning particular strategies. Since the students were enrolled and pursuing their education at the time of the interview, the behavioural strategy of persisting or giving up was less relevant. Therefore, future research could compare drop-out and persisting students regarding their use of SRL. Second, the research was conducted at one moment in time, which could affect the information retrieved during the interviews. When the interviews took place, the students were particularly active in the monitoring and regulation phases. The activation phase was mainly over, which made talking about that phase difficult. Longitudinal research with interviews and observations would be relevant to grasp all SRL phases and strategies. Third,

as Schwinger and Stiensmeier-Pelster (2012) have indicated, SRL is task and context specific, and students will use diverse SRL strategies for different kinds of tasks, course contents and contexts. Since there are many different kinds of blends, future research should consider the type of blend, course content and type of tasks to enhance comparability. Fourth, due to the small sample and the Cohen's kappa of .71 that suggests tentative conclusions should be made, we suggest replication of the study is needed to validate our findings. Results should be interpreted carefully and should not be generalised. Finally, future research is needed that focusses on the impact of the different strategies used by adults in blended environments. The quote of a student in this study 'if you are older, you learn differently' emphasises the relevance of expanding the scarce literature on adult students' use of SRL strategies.

## **6.2 Implications for practice**

Overall, findings can be utilised by teachers to coach and train their students in using strategies to regulate learning and especially to include the computer more in the learning of adults in blended learning environments. On the one hand, this could be done by introducing the basic concepts of SRL during face-to-face moments and by moving students to reflect on their thought and actions. On the other hand, in blended environments, teachers could utilise the benefits of online learning and integrate prompts in the online environment to trigger student use of SRL strategies (Barnard-Brak, Lan & Paton, 2010; Broadbent & Poon, 2015; Rowe & Rafferty, 2013). However, findings could also raise the awareness of students about what they can do to enhance their self-regulation. Overall, activities should be targeted at improving the interaction between the students themselves and between the students and teachers (Owston & York, 2018).

More specifically, as motivation relates to all areas of SRL, an overlapping implication is that students, as Kizilcec et al. (2017) have found, considered their teachers to be motivators. Self-motivation strategies should be promoted by teachers to make student



motivation independent of the teacher. However, since motivation enhances SRL strategy use and students mostly let their motivation depend on others, it is important for teachers to anticipate the students' motivation or for learners to motivate each other.

Teachers can motivate their students in different ways in, for the diverse areas of SRL. First, motivation can decline when facing technical difficulties (Kim & Frick, 2011). Therefore, students agreed with Xie, Lan and Osland Panton (2013) that an online environment needs to be easy to navigate, that technical and organisational support is crucial and that there should be more consistency among teachers in the use of the online environment. Students could find technical help from each other when they actively use the online interaction tools. Second, students found it important and motivating that teachers were involved and took their personal situations into account. As Zhu et al. (2016) have proposed, teachers could help their students make (online) transparent schedules that fit their individual circumstances, deal with changes and be flexible. Here, students could also help each other by communicating online with peers who also have time restrictions due to factors such as work and family life. Furthermore, teachers could be involved by being active role models in online communication and interaction. By doing this, help-seeking strategies could be stimulated (Sun et al., 2018). Private emails should be avoided by both students and teachers, which would create a collegial atmosphere and lower the threshold to ask questions in public. Rules on how long a teacher will wait to answer public questions should encourage learners to assist each other. It can be helpful when teachers provide positive feedback if peers answer each other's questions. Third, not only is the component of online moments important, balance between the amount of online and face-to-face sessions is also crucial. Owston and York (2018) have indicated that students perform better when there are more online moments. However, this is in contrast to what students in this study indicated. Teachers should discuss with their students what they find pleasant and feasible. Getting to know each other personally

creates trust and reassurance, which fosters a bond between students that promotes peer learning and help-seeking. Therefore, institutions should think about the order of modules so students stay together through the entire program and are able to build trust and friendship during face-to-face moments. Fourth, teachers should encourage students to think about attributions for low scores as well as high scores (Lazowski, 2016). Making attributions to for high scores makes them become aware of effective learning strategies and motivates them. However, fifth, enhancing the motivation(-regulation) of students is not sufficient. While motivation-regulation leads to a increased effort, it does not necessarily lead to more qualitative effort. Therefore, students also have to be able to correctly use, for example, (meta)cognitive strategies (Smit et al., 2017). In the cognition area, the students already use efficient organisation strategies on a printed syllabus. Because organisation strategies are beneficial for success in blended environments (Broadbent, 2017) and being online is necessary for administrative affairs, it is favoured that teachers demonstrate multiple strategies on how to work efficiently online and how to organise, make notes and mark things in their online syllabus. Teachers should encourage their students to work online by making it attractive and necessary and by using tools such as learning paths. Again, when students talk to each other online, they can share good practices related to learning strategies.

### **6.3 Conclusion**

The aim of the current study was to explore the use of SRL for students in blended adult education. Separation in time and place during the learning process makes it challenging for teachers to observe their students. However, self-regulation is a crucial factor for academic success and previous scientific literature on blended adult education is scarce. Therefore, the current study is relevant since it gives insight into the self-regulation of blended adult students. The present study found interesting results for each of the four SRL areas. First, the cognitive area showed that adult learners in blended environments preferred to use 'old school' ways of

organising and rehearsing their course content. Second, due to their adult situations, time and effort planning and regulation was most important in the behavioural area. Furthermore, even though they were in blended education, they preferred personal face-to-face contacts or private online interactions before online group interactions. Third, in the context area, the learners appreciated the blended learning environment, but it was sometimes thwarted by technological issues. Fourth, regarding motivation, the adult students 'just do it' without using self-motivation strategies and thus allowed their motivations to depend on external regulations. The results serve as a starting point to enhance and support students' SRL in which online interaction is clearly an overall crucial aspect. Enhancing students' SRL requires effort of both teachers and students to modernise and technologize their more 'old school' ways of learning.

## References

Authors (2018).

Barnard-Brak, L., Lan, W.Y., & Paton, V.O. (2010). Profiles in Self-Regulated Learning in the Online Learning Environment. *International Review of Research in Open and Distance Learning*, 11(1).

Broadbent, J. (2017). Comparing online and blended learner's self-regulated learning strategies and academic performance. *Internet and Higher Education*, 33, 24–32.  
<https://doi.org/10.1016/j.iheduc.2017.01.004>

Broadbent, J., & Poon, W. L. (2015). Self-regulated learning strategies & academic achievement in online higher education learning environments: A systematic review. *Internet and Higher Education*, 27, 1–13.

Dörrenbächer, L., & Perels, F. (2016). Self-regulated learning profiles in college students: Their relationship to achievement, personality, and the effectiveness of an intervention to foster self-regulated learning. *Learning and Individual Differences*, 51, 229–241.  
<https://doi.org/10.1016/j.lindif.2016.09.015>

Engelschalk, T., Steuer, G., & Dresel, M. (2016). Effectiveness of motivational regulation: Dependence on specific motivational problems. *Learning and Individual Differences*, 52, 72–78. <https://doi.org/10.1016/j.lindif.2016.10.011>

Fryer, L., & Bovee, N. (2016). Supporting students' motivation for e-learning: teachers matter on and offline. *Internet and Higher Education*, 30.

Gale, N.K., Heath, G., Cameron, E., Rashid, S., Redwood, S. (2013). Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Medical Research Methodology*, 13. Retrieved from:  
<http://www.biomedcentral.com/1471-2288/13/117>

- Kiraz, E., & Özden, M. Y. (2012). The optimum blend: affordances and challenges of blended learning for students. *Turkish Online Journal of Qualitative Inquiry*, 3(3), 102–117.
- Goulão, M. F., & Cerezo Menedez, R. (2015). Learner autonomy and self-regulation in eLearning. *Procedia - Social and Behavioral Sciences*, 174, 1900–1907.  
<https://doi.org/10.1016/j.sbspro.2015.01.853>
- Hallgren, K.A. (2012). *Computing inter-rater reliability for observational data: An overview and tutorial*. *Tutor Quant Methods Psychol*, 8(1), 23-24.
- Karabenick, S.A. & Zusho, A. (2015). Examining approaches to research on self-regulated learning: conceptual and methodological considerations. *Metacognition Learning*, 10, 151-163. <https://doi.org/10.1007/s11409-015-9137-3>
- Ke, F. (2010). Examining online teaching, cognitive, and social presence for adult students. *Computers & Education*, 55, 808 – 820.
- Kim, J-Y. (2012). A study on learners' perceptual typology and relationships among the learner's types, characteristics, and academic achievement in a blended e-Education environment. *Computers & Education*, 59, 304-315.
- Kim, K., & Frick, T. W. (2011). Changes in student motivation during online learning. *J. Educational Computing Research*, 44(1), 1–23. <https://doi.org/10.2190/EC.44.1.a>
- Kirmizi, Ö. (2015). The influence of learner readiness on student satisfaction and academic achievement in an online program at higher education. *The Turkish Online Journal of Educational Technology*, 14(1), 133-142.
- Kizilcec, R. F., & Schneider, E. (2015). Motivation as a lens to understand online Learners: Toward data-driven design with the OLEI scale. *Transactions on Computer-Human Interactions (TOCHI)*, 22(2). <http://dx.doi.org/10.1145/2699735>.
- Kizilcec, R. F., Pérez-Sanagustín, M., & Maldonado, J. J. (2017). Self-regulated learning strategies predict learner behavior and goal attainment in Massive Open Online Courses.

- Computers & Education*, 104, 18–33.  
<https://doi.org/http://dx.doi.org/10.1016/j.compedu.2016.10.001>
- Lazowski, R. A., & Hulleman, C. S. (2016). Motivation interventions in education: A meta-analytic review. *Review of Educational Research*, 86(2), 602–640.
- MacPhail, C., Khoza, N., Abler, L., & Ranganathan, M. (2015). Process guidelines for establishing Intercoder Reliability in qualitative studies. *Qualitative Research*, 1–15.  
<https://doi.org/10.1177/1468794115577012>
- McHugh, M.L. (2012). Interrater reliability: the kappa statistic. *Biochemia Medica*, 22(3), 276-282.
- Owston, R., & York, D. N. (2018). The nagging question when designing blended courses: Does the proportion of time devoted to online activities matter? *The Internet and Higher Education*, 36, 22–32. <https://doi.org/http://dx.doi.org/10.1016/j.iheduc.2017.09.001>
- Pintrich, P. R. (2000). Multiple goals, multiple pathways: The role of goal orientation in learning and achievement. *Journal of Educational Psychology*, 92(3), 544–555.  
<https://doi.org/10.1037//0022-0663.92.3.544>
- Pintrich, P. R., & Zusho, A. (2007). Student motivation and self-regulated learning in the college classroom. In Perry, R.P., & Smart, J.C. (Eds.), *The scholarship of teaching and learning in higher education: an evidence-based perspective* (pp. 731–810). Dordrecht, The Netherlands: Springer.
- Pintrich, P.R. (2004). A conceptual framework for assessing motivation and self-regulated learning in college students. *Educational Psychology Review*, 16(4), 385-407.
- Pope, S., Ziebland, S. & Mays, N. (2000). Qualitative research in health care: analysis of qualitative data. *British Medical Journal*, 320, 114–116.

- Puzziferro, M. (2008). Online technologies self-efficacy and self-regulated learning as predictors of final grade and satisfaction in college-level online courses. *American Journal of Distance Education*, 22(2), 72–89.
- Rowe, F. A., & Rafferty, J. A. (2013). Instructional design interventions for supporting self-regulated learning: Enhancing academic outcomes in postsecondary e-learning environments. *MERLOT Journal of Online Learning and Teaching*, 9(4), 590–601.
- Saba, T. (2012). Implications of E-learning systems and self-efficiency on student outcomes: a model approach. *Human-centric Computing and Information Sciences*, 2(6). Retrieved from <http://www.hcis-journal.com/content/2/1/6>
- Schwinger, M., & Otterpohl, N. (2017). Which one works best? Considering the relative importance of motivational regulation strategies. *Learning and Individual Differences*, 53, 122–132. <https://doi.org/http://dx.doi.org/10.1016/j.lindif.2016.12.003>
- Schwinger, M., & Stiensmeier-Pelster, J. (2012). Effects of motivational regulation on effort and achievement: A mediation model. *International Journal of Educational Research*, 56, 35–47. <https://doi.org/http://dx.doi.org/10.1016/j.ijer.2012.07.005>
- Smit, K., de Brabander, C., Boekaerts, M., & Martens, R. L. (2017). The self-regulation of motivation: Motivational strategies as mediator between motivational beliefs and engagement for learning. *International Journal of Educational Research*, 82, 124–134. <https://doi.org/http://dx.doi.org/10.1016/j.ijer.2017.01.006>
- strategies for the self-regulation of motivation. *The Journal of Experimental*
- Sun, Z., Xie, K., & Anderman, L. H. (2018). The role of self-regulated learning in students' success in flipped undergraduate math courses. *The Internet and Higher Education*, 36, 41–53. <https://doi.org/http://dx.doi.org/10.1016/j.iheduc.2017.09.003>
- Tello, S. F. (2007). An analysis of student persistence in online education. *Journal of Information and Communication Technology Education*, 3(3), 47–62.

- Whipp, J. L., & Chiarelli, S. (2004). Self-regulation in a web-based course: A case study. *Educational Technology Research and Development*, *52*(4), 5–21.
- Wolters, C. A., & Bizon, M. B. (2013). Assessing and predicting college students' use of strategies for the self-regulation of motivation. *The Journal of Experimental Education*, *81* (2), 199-221. <https://doi.org/10.1080/00220973.2012.699901>
- Wolters, C. A., Pintrich, P. R., & Karabenick, S. A. (2005). Assessing academic self-regulated learning. In *What do children need to flourish? Conceptualizing and measuring indicators of positive development*. (pp. 251–270). New York, NY: Springer.
- Wolters, C.A. (2003). Regulation of motivation: Evaluating an underemphasized aspect of self-regulated learning. *Educational Psychologist*, *38*(4), 189-205.
- Xia, J., Fielder, J., & Siragusa, L. (2013). Achieving better peer interaction in online discussion forums: A reflective practitioner case study. *Issues in Educational Research*, *23*(1), 97–113.
- Yang, J.C.; Quadir, B.; Chen, N-S. & Miao, Q. (2016). Effects of online presence on learning performance in a blog-based online course. *Internet and Higher Education*, *30*, 11-20.
- Zhu, Y., Au, W., & Yates, G. (2016). University students' self-control and self-regulated learning in a blended course. *Internet and Higher Education*, *30*, 54–62.
- Zimmerman, B.J. (2015). Self-regulated learning: Theories, measures, and outcomes. *International Encyclopedia of the Social & Behavioral Sciences (second edition)*, *21*, 541-546.
- Zimmerman, B. J. (2008). Investigating self-regulation and motivation: Historical background, methodological developments, and future prospects. *American Educational Research Journal*, *45*, 166–183.



**Table 1:** Strategies of self-regulation

	<i>Cognition area</i>	<i>Behavior area</i>	<i>Context area</i>	<i>Motivation area</i>
<b>Activation phase</b>	<ul style="list-style-type: none"> <li>- Target goal setting</li> <li>- Prior knowledge activation</li> <li>- Metacognitive knowledge activation</li> </ul>	<ul style="list-style-type: none"> <li>- Effort planning</li> <li>- Time planning</li> <li>- Planning for observations of behavior</li> </ul>	<ul style="list-style-type: none"> <li>- Perception of task and context</li> </ul>	<ul style="list-style-type: none"> <li>- Judgement of competence, value and interest</li> <li>- Goal orientation adoption</li> </ul>
<b>Monitoring phase</b>	<ul style="list-style-type: none"> <li>- Judgement of learning (metacognitive awareness)</li> </ul>	<ul style="list-style-type: none"> <li>- Awareness and monitoring of effort, time use, need for help</li> </ul>	<ul style="list-style-type: none"> <li>- Awareness of task and context</li> </ul>	<ul style="list-style-type: none"> <li>- Awareness and activation of self-efficacy, value, interest and competences</li> </ul>
<b>Regulation phase</b>	<ul style="list-style-type: none"> <li>- Rehearsal</li> <li>- Elaboration</li> <li>- Organization</li> <li>- Critical thinking</li> <li>- Metacognition</li> </ul>	<ul style="list-style-type: none"> <li>- Effort regulation</li> <li>- Time-regulation</li> <li>- Persist or give up</li> <li>- Help-seeking</li> </ul>	<ul style="list-style-type: none"> <li>- Peer learning</li> <li>- Environment management</li> </ul>	<ul style="list-style-type: none"> <li>- Self-talk (positive self-talk, ability self-talk, self-talk to control negative affect)</li> <li>- Staying mastery oriented</li> <li>- Staying performance oriented</li> <li>- Self-consequating</li> <li>- Interest enhancement (situational or personal)</li> <li>- Self-affirmation</li> <li>- Invoke negative affects</li> <li>- Defensive pessimism</li> <li>- Self-handicapping</li> </ul>
<b>Reflection phase</b>	<ul style="list-style-type: none"> <li>- Cognitive judgements</li> <li>- Attributions</li> </ul>	<ul style="list-style-type: none"> <li>- Choice behavior</li> </ul>	<ul style="list-style-type: none"> <li>- Evaluation of task and context</li> </ul>	<ul style="list-style-type: none"> <li>- Reaction and reflection on motivations</li> </ul>

*Note:* Adapted from: “*Student motivation and self-regulated learning in the college classroom* (p. 745)” by Pintrich, P. R., and Zusho, A., 2007. In Perry, R.P., & Smart, J.C. (Eds.), *The scholarship of teaching and learning in higher education: an evidence-based perspective* (pp. 731–810). Dordrecht, The Netherlands: Springer.

**Table 2:** detailed overview of the use of self-regulation strategies in the cognition area.

		Activation		Monitoring	Regulation			Reflection			
		TGS	APK	JOL	Re	El	Or	CT	Me	CJ	At
HVAE	Noor										
	Ilse										
	Kristel										
	Morgan										
	Kobe										
TE	Mona										
	Karel										
	Katia										
	Jessie										
	Saar										
SVAE	Imke										
	Lina										
	Fran										
	Alex										
	Wout										
	Emma										

*Note:* TGS (target goal setting); APK (activation of prior knowledge); JOL (judgement of learning); Re (rehearsal); El (elaboration); Or (organization); CT (critical thinking); Me (metacognition); CJ (cognitive judgement); At (attribution).

**Table 3:** detailed overview of the use of self-regulation strategies in the behaviour area.

		Activation		Monitoring	Regulation				Reflection	
		POB	EP	TP	AMB	HS	TR	ER	PGU	CB
HVAE	Noor									
	Ilse									
	Kristel									
	Morgan									
	Kobe									
TE	Mona									
	Karel									
	Katia									
	Jessie									
	Saar									
SVAE	Imke									
	Lina									
	Fran									
	Alex									
	Wout									
	Emma									

*Note:* POB (Planning to observe behavior); EP (effort planning); TP (time planning); AMB (awareness and monitoring behavior); HS (help-seeking); TR (time-regulation); ER (effort regulation); PGU (persist or give up); CB (choice behavior)

**Table 4:** detailed overview of the use of self-regulation strategies in the context area.

		Activation PTC	Monitoring ATC	Regulation EM	PL	Reflection ETC
HVAE	Noor					
	Ilse					
	Kristel					
	Morgan					
	Kobe					
TE	Mona					
	Karel					
	Katia					
	Jessie					
	Saar					
SVAE	Imke					
	Lina					
	Fran					
	Alex					
	Wout					
	Emma					

*Note:* PTC (perception of task and context); ATC (awareness of task and context); EM (environment management); PL (peer learning); ETC (evaluation task and context)

**Table 5:** detailed overview of the use of self-regulation strategies in the motivation area.

		Activation		Monitoring	Regulation								Reflection	
		JCIV	GOA	ACIV	PE	AST	PST	SH	SPO	SMO	SC	Un	Ot	RRM
HVAE	Noor													
	Ilse													
	Kristel													
	Morgan													
	Kobe													
	Mona													
TE	Karel													
	Katia													
	Jessie													
	Saar													
	Imke													
	Lina													
SAE	Fran													
	Alex													
	Wout													
	Emma													

*Note:* JCIV (judgement of competences, interests and values); GOA (goal orientation adoption); ACIV (awareness of competences, interests and values); PE (personal enhancement); AST (ability self-talk); PST (positive self-talk); SH (self-handicapping); SPO (staying performance oriented); SMO (staying mastery oriented); SC (self-consequencing); Un (undergoing); Ot (Other); RRM (reflection and reaction on motivation)

## Highlights

- External people influence student motivation rather than self-motivation strategies
- Adult students prefer offline learning materials (e.g. paper syllabus)
- Organisational and rehearsal strategies are mostly used to learn
- Adult students are flexible regarding time, effort and environment
- Students use diverse help-seeking strategies and prefer personal, offline help