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Cognitive optimism of distinctive initiatives to foster self-directed and self-regulated learning skills: A comparative analysis of conventional and blended-learning in undergraduate studies

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Abstract

Independent learning in massive open online courses (MOOCs) requires considerable effort from the learners themselves. Blended-learning has been recognised to foster independent learning among undergraduate students. With the popularity of the blended-learning approach to teach in traditional educational settings, little has been mentioned on how cohesive this approach is in fostering self-directed learning and self-regulation among university students. This study hopes to explore undergraduate learners in their distinctive study patterns. The study was conducted to investigate a comparative study between students from two departments; Science and Social Science. The aim was to explore the students' self-directed and self-regulated learning skills in conventional classrooms and aspects of blended-learning embedded in a MOOC platform in two academic years for undergraduates at a top UK university. This study encompasses two case studies; firstly, a combine blended-learning seminar and a conventional seminar classes and a study undertaken with a student of English as a second language (ESL). The blended-learning students were participants who registered in a conventional university and took an optional module in computer security. The second group of students participated in a core module of logic and verification. The second case study was with a final year undergraduate student in Education Studies. The students studied and engaged with the course content using their initiative and directing their learning approaches.

Keywords Cognitive initiative · Independent learning · Self-regulated learning · MOOC · Conventional learning · Blended-learning · Motivation · Strategies of self-regulation

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1 Introduction

We present literature that shows the implication of self-directed (SDL) and self-regulated learning (SRL) from different perspectives and relate this to their similarities and differences. In blended-learning environments, few institutional concepts have been seen to motivate independent learning among undergraduate students (Pardo et al. 2017). Some of the undergraduate students in this study have not really participated in a blended-learning course before. This study provides the opportunity for the students to prepare and study independently before the blended-classroom seminars. Our study further explores the challenges of undergraduates self-directing their studies. We compare the findings from the blended-learning seminars and conventional classroom seminars between different cohorts of undergraduate students. The students in blended-learning course were supported to direct their choice of path with the functionalities of the online course platform. In the case of the traditional setting, students study in a classroom lecture format where they are instructed and interact in group discussions, class exercises and competitions to support them.

The third part of the study focused on a case study of an English as a second language (ESL) learner studying an undergraduate degree in Education. The student is an international student in the 3rd year of a Bachelor of Arts in Education programme. She has taken modules on education and leadership as well as an optional module of French. The study explored the learner's beliefs and perceptions of self-regulated learning (SRL) skills in her previous learning experiences as well as new experiences and SRL skills employed while studying in an immersion programme in another culture and country. This study presents an exploratory theoretical framework on different learner groups from two different disciplines. The result section presented the various aspects of motivation practice by the students during their independent learning. The results demonstrated the need for continuous improvement within some of the individual student's dimensions in the study. However, the learners in this study (blended-learning) shows distinctive learning skills in directing and self-regulating their learning. In the conventional class settings, learners study in-groups and interact together, to resolve challenges. This behaviour shows that the students learning in a traditional mode tend to seek help from one another as they interacted more in face-to-face study as compared to the findings of the blended-learning students.

In this study, mixed methods were used in the form of an exploratory case study, which prioritised the quantitative and qualitative approaches for the data collection process. In the first case study, we emphasized and present findings on the aspects of qualitative methods of data collection. The qualitative results obtained from this study reveal how undergraduate students self-directed their learning. The students organised and strategised their learning patterns and derived satisfaction in their distinctive learning behaviour in order to motivate and enhance their study approaches. Initial data collected included an open-ended and closed-ended semi-structured focus group interview questions. The research was based on a semi-structure interview, because of the questions that was asked during the focus group interviews from the selected cohorts of students. As this study is part of a Doctorate research, there was no intention to follow-up on the students for more questions as these cohorts of students have graduated at the time this research was concluded. The paper applied both open and

closed-ended questions; further questions were asked the students in the focus group interview while the discussions was in session in a synergistic manner.

A total of 25 items were used to measure the SRL dimensions of goal setting, task strategies, time management, environment structuring, help seeking and self-evaluation and 11 general questions of blended-learning classroom seminars.

Initial data collected online included a 37 items survey of which 17 respondents completed the survey items in the blended-learning study.

The findings from the ESL case study revealed the learner's thoughts, feelings and planned actions adapted to the attainment of personal goals as well as independence in pursuing academic goals in an effective manner. In addition, the data revealed the ESL learner's cognitive and metacognitive strategies for learning in a second language in the UK. The findings revealed the learner's strategies for the regulation of academic cognition using rehearsal strategies, elaboration strategies, organisation strategies and metacognitive self-regulation (Wolters et al. 2005).

We further present the distinctive learning behaviours of students from the case studies, a general discussion on the significant of the study and provide aspects for future research direction.

2 Related work

2.1 Self-directed and self-regulated learning

Research has shown the importance of self-directed learning (SDL) and self-regulated learning (SRL) in learning. These terms are increasingly being used in both online learning and traditional settings. However, the similarities and differences have not been fully harnessed. The most renowned definition of SDL comes from Knowles (Knowles 1975) who described the term as a process from which an individual takes initiative with or without help in autonomously controlling their learning with regard to needs, setting learning goals, identifying resources for learning, deciding on appropriate learning strategies, and self-evaluating their learning outcomes. This SDL process is said to be a personality trait and construct (Brockett and Hiemstra 1991). Brockett and Hiemstra (1991) proposed a term called 'self-direction in learning', which referred to external characteristics of an instructional process and internal characteristics of the learners assuming the primary responsibilities of directing their learning experience. Similarly, to SDL, SRL 'has been considered students' independence in learning' (Saks and Leijen 2014, p. 191).

Moreover, SRL is said to be an active process whereby learners set goals during their learning process and attempt to regulate, monitor, and control their cognition, behaviours, and motivation and are guided by their goals and environments (Pintrich 2000; Boekaerts et al. 2005). Furthermore, SRL is perceived as a learning and motivational processes that underpins learners' assumption of individual responsibility to learn with or without an instructor (Zimmerman 2000). The SDL and SRL concepts activate metacognitive skills and intrinsic motivation, which are the key components in both cases (Loyens et al. 2008). Both these terms are featured as a combination of internal and external factors. Motivation, metacognition, and cognition factors represent SDL, while SRL involves traditional learning processes, which involves human collaboration

(Cho and Jonassen 2009). Some reasons that these terms are being used synonymously are that 'the personality perspective being the overlapping part of both constructs' (Saks and Leijen 2014, p. 192).

2.2 Contrast between self-directed and self-regulated learning

In contrast between the two terms (SDL and SRL), the first concept originated from adult education in the 1970s to 1980s, whereas the second originated within the 21 century from educational psychology and cognitive psychology. Additionally, SDL is mostly used to describe learning activities outside of the traditional educational setting and involves aspects of designing learning environments (Saks and Leijen 2014). While SRL, in this case, is mostly studied in a school environment, it should not exclude the possibility of designing a personal learning environment (Loyens et al. 2008). Moreover, SRL has been considered a broader construct, encompassing concepts that are specific to a narrow area. Furthermore, SDL is also seen as a broader concept in the sense of exhibiting control and freedom by learners to manage their learning activities to a degree. In SDL, the learners decide and define their learning tasks, but in SRL, the instructor may also define the learning tasks (Robertson 2011; Loyens et al. 2008). Jossberger et al. (2010) mentioned that SDL is situated as a macro-level concept and that SRL is a micro-level concept (as seen in Fig. 1).

A self-directed learner is actively ready and willing to prepare, execute, and complete a given task independently and on time. The ability of the learners to learn
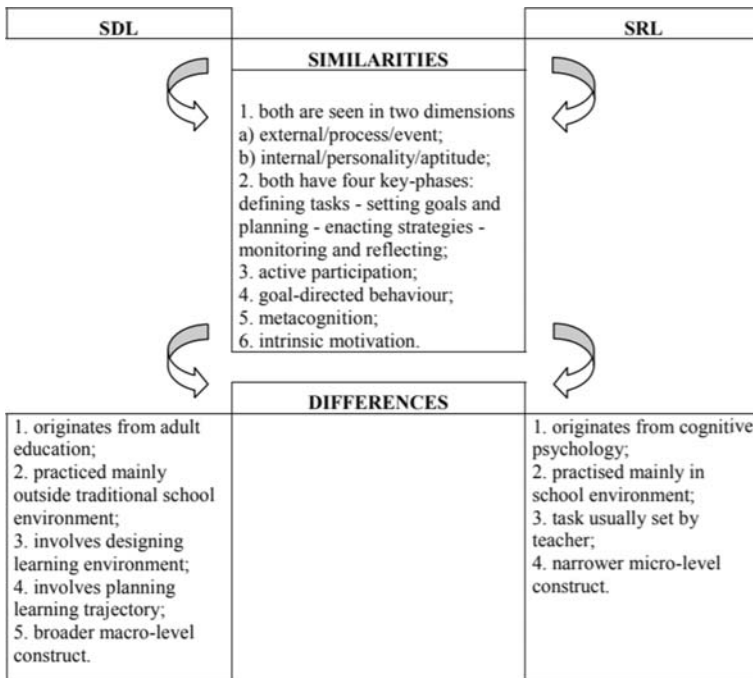

SDL		SRL
	SIMILARITIES	
	1. both are seen in two dimensions a) external/process/event; b) internal/personality/aptitude; 2. both have four key-phases: defining tasks - setting goals and planning - enacting strategies - monitoring and reflecting; 3. active participation; 4. goal-directed behaviour; 5. metacognition; 6. intrinsic motivation.	
	DIFFERENCES	
1. originates from adult education; 2. practiced mainly outside traditional school environment; 3. involves designing learning environment; 4. involves planning learning trajectory; 5. broader macro-level construct.		1. originates from cognitive psychology; 2. practised mainly in school environment; 3. task usually set by teacher; 4. narrower micro-level construct.

Fig. 1 Similarities and differences between SDL and SRL, adapted from Saks and Leijen (Saks and Leijen 2014)

how to self-direct their studies is a skilful way of self-regulating learning activities and performance. In addition, SRL is a micro-level concept, which is processed within and during the task execution. A study argued that SDL may include SRL but not the opposite. In other words, self-directed learners are supposed to self-regulate their learning, but self-regulated learners may not necessarily self-direct their learning (Jossberger et al. 2010). However, despite their similarities, the theoretical models, backgrounds, and dimensions are different. In comparing research methods applied to these terms, SDL is mostly studied with surveys and case studies, while SRL is studied using experiments and surveys (Saks and Leijen 2014).

3 Research question

Based on the six dimensions

1. What are the themes emerging from the focus group discussion (that were based on the six dimensions)?
2. Are there any similar SRL relationships among the students studying in different educational or course context?
3. What are the similarities and characteristics of different students studying independently?

4 Research methods

4.1 Methodology, instruments and analysis

Our study applied mixed methods of quantitative and qualitative data approaches. In the first study, we explored distinctive students self-directed and self-regulated learning skills using existing MOOC online self-regulated learning questionnaire (MOSQL) instrument comparing six dimensions: goal setting, task strategies, time management, environment structuring, help seeking and self-evaluation. The questions in this instrument were modified to suit our research objectives in both the first and second case studies. In order to collect the research data and to explore reasonable results from our investigation, both physical copy and online version of the questionnaires were provided and distributed to the blended-learning and conventional students in the first two case studies to gather their self-regulated learning skills and general demographics. In order to further capture in-depth the self-regulated learning skills of the individual students, we conducted additional focus group interviews to aid our data collection processes within the blended course setting. The data analysis was done with descriptive statistical analysis, thematic analysis and content analysis.

In the second study, the research participant took part in an individual interview in June 2016. The interview questions were parallel to the focus group questions used in the first study and covered the six dimensions of SRL skills. In October 2016, the research participant then completed an online questionnaire in which the questions were adapted from the questionnaire used in the research by Wolters et al. (2005). The questions covered three categories of SRL skills; strategies for the regulation of

academic cognition, strategies for the regulation of academic motivation and strategies for the regulation of academic behaviour.

4.2 Participants and context

The result of this study is presented from a qualitative approach. A semi-structured focus group interview was conducted with two groups. The first group was made up of six participants while the second group was made up of three participants. The result section presented a discussion of the participants using synonyms to represent the students' identity. The first case study comprises 8 male and 1 female.

In the second case study, the research participant, Anne was a 3rd year female undergraduate student completing a Bachelor of Arts in Education Studies. She took part in an interview during the week of her final examinations of her degree pro-gramme. She completed the online questionnaire after she had graduated from her undergraduate course by reflecting on her experience of studying a Bachelor of Arts in Education Studies in the UK.

5 Results

This section discusses results from the qualitative research conducted using a focus group discussion based on the six SRL dimension in this study.

5.1 Case study I

The participants presented was from a small group of a larger study published previously. The result was published in graph as percentage and based on the number of selected students from the larger study. If these approach is applied on a larger scale study with more population sample, these could replicate the same results in a generalizable manner.

5.1.1 Goal setting

Figure 2 demonstrates common terminologies used during the goal setting session of this focus group discussion. Many of the students (about 40%) said they set up their goals based on interest and to gain adequate learning experience. The students believed they are motivated to study when a module is interesting and when they are interested in the topics. About a third (34%) of the learners mentioned that they organised their goals based on modules with the nearest deadlines and to understand their subjects. Finally, fewer than 26% said they set their goals based on motivation and results.

5.1.2 Task strategies

Figure 3 shows that 21.88% of the students said they planned their task effectively by reading. This process helps them understand the strategies used while organising the task. Fewer than 19% of the students agreed that they strategise their studies effectively by listening to music and planning their preparation.
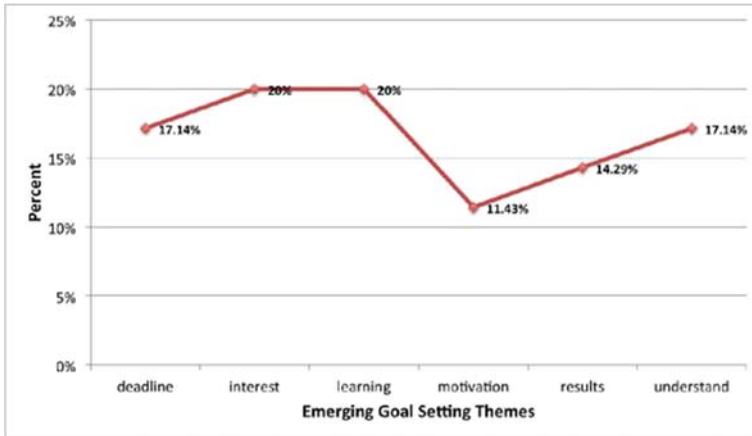
Fig. 2 Percentage of important themes in goal setting session

5.1.3 Time management

Of the students in the focus group, about 30% agreed that when they are under pressure, they tend to manage their time effectively to meet deadlines. In this case, they work based on modules with the nearest deadlines. About 60% of the students said that, when a module is important to their degree, they prioritise their reading first in terms of those topics that are important to them, as seen in Fig. 4.

5.1.4 Environment structuring

Figure 5 demonstrates that over 30% of students in the focus group session prefer to study in an environment with people. They study this way because they want to be able to share ideas and ask for help with difficult subjects. This habit of studying with other people is also an attribute of help seeking skills. Over 26% of the students said they prefer an environment where they can stay focused and study. About a third or under
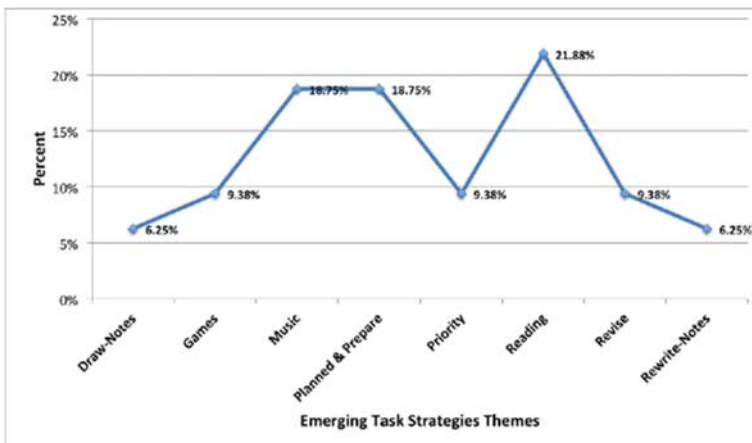
Fig. 3 Percentage of important themes in task strategies session
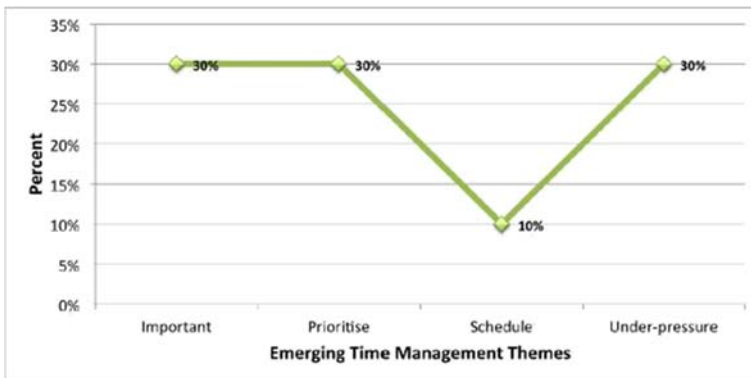
Fig. 4 Percentage of important themes in time management session

35% of the students said they prefer their learning environment to be tidy, silent, and with few distractions.

5.1.5 Help seeking

Many of the students, over 33% in the focus group discussion, sought help mostly from the Internet while learning online. The other popular means of seeking help was study groups. Over 22% said they seek assistance from their study group mates, while under 15% agreed to ask friends for support in their studies, as seen in Fig. 6.

5.1.6 Self-evaluation

Figure 7 shows that some students (over 28%) self-evaluate themselves when they received their assessment scores. Fewer than 18% of the students mentioned that they tend to reflect on their achievement when the results from their examinations are released and when they see their final grades. Many of the students, about 42.87%, said that they self-evaluate themselves while listening, reflecting, and revising their lectures notes.
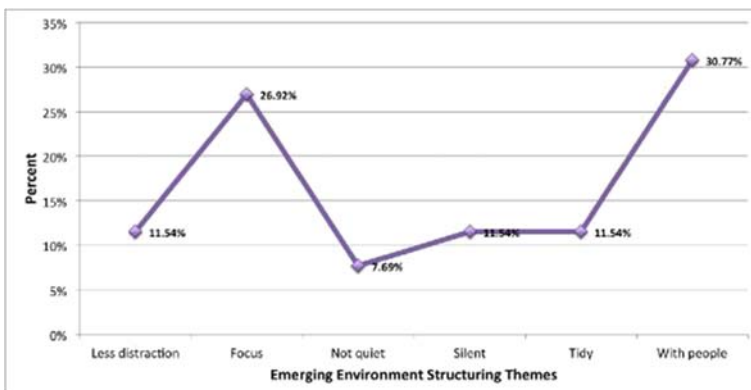

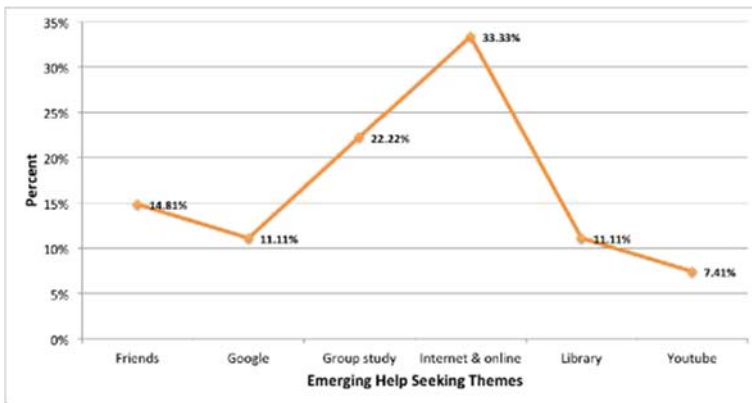**Fig. 5** Percentage of important themes in environment structuring session

Fig. 6 Percentage of important themes in help seeking session

5.2 Study mode

5.2.1 How do you prefer to study? Explain to me if you wish to be guided in an instructional way or if you prefer self-study mode

Sub-theme *Choosing a study mode (this sub-theme was derived from the question).*

Ben said that he prefers self-study mode. He tried studying once with friends, and it did not work out too well. When he was asked whether he needed anybody to instruct or guide him while studying, he said this could help him, but he did not feel he wanted to because he wished to do his reading by himself. However, Ben said he liked independent learning, and most of the time, he likes to go to lectures and learn something. Therefore, he prefers both ways of learning. For Lucy, she said she prefers studying by herself to understand, first, and if she struggles she goes for help in a group study. When she was prompted as to whether she benefitted from the instructional method of study as well, she said yes, meaning she also preferred both modes of study.
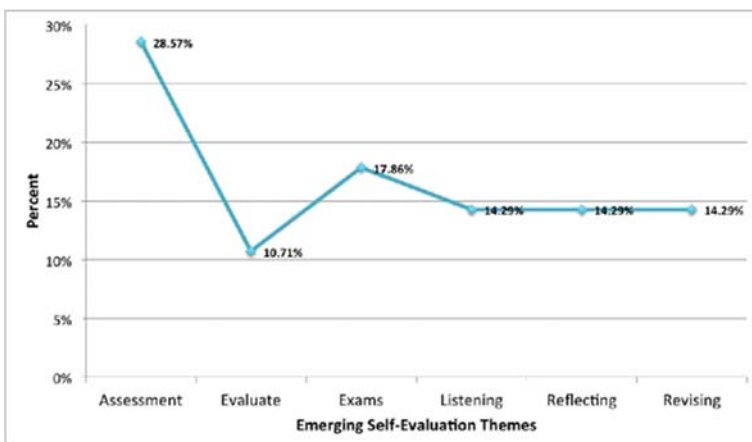

Fig. 7 Percentage of important themes in self-evaluation session

For Phil, he prefers independent study; he said he likes trying to get his work done by himself. He does not like structuring his studies and really does not like people telling him what to do. He prefers to complete his work at his own pace and time. Joe said he prefers both as well; he likes to learn in an instructional way because he feels he can acquire more information than from just an application. He said he likes the moment when someone teaches him, compared to learning by himself. Jim also prefers both modes of learning, in his own case, if someone tells him what it is that he needs to know, he just makes sure he notes this, rather than trying to learn everything by himself. Chris, just like the others, prefers a structured manner of learning, primarily because he said it is just less time-consuming. Chris said structured learning helps him focus on the aspects that matter with the best resources. He gave an example of participating in an online course in Khan Academy. He likes the fact that he could visualise the video and comment on it and interact with the participants by asking questions and quickly get a reply. Chris said that, in his case, focusing on what is important is the best form of learning.

In terms of modes of study, Table 1 shows the mode preference of the learners. This reveals that the students in this study prefer to direct their studies and are also comfortable with instructor-led modes. The results, as extracted from the coded data, indicate that 71.4% preferred self-directed and both modes of study, while 28.6% preferred to be guided sometimes.

6 Case study II

Anne stated during the interview that she preferred to study using the traditional learning approach and hardly participated in any form of blended-learning during her undergraduate studies, although there were opportunities for her to study using the resources on Moodle as well as other form of online forums. The findings from the interview are discussed based on the categories of SRL skills below.

6.1 Strategies for the regulation of academic cognition

Anne shared that she had used three types of rehearsal strategies to aid her in her learning. Firstly, she went over all her course readings and articles but only looked at the main points in her lecture notes. Secondly, she memorized some keywords to help her remember important concepts and thirdly, she made a general list of key points she wanted to remember. In terms of elaboration strategies, Anne emphasized that she had gathered information from different journal articles, books and notes from discussions in class. She related these ideas and made connections to her previous knowledge.

Table 1 Study mode preference

Study Mode Preference	Self-directed	Instructor-led	Both
I preferred to study in ... mode(s)	35.70%	28.60%	35.70%

She also applied new ideas learnt to any coursework she was working on as well as group discussion in lectures and informal discussions with peers. In relation to organization strategies (Braun and Clarke 2012), Anne seldom used charts, diagrams or timetables to organize her learning materials or way of learning. Instead, she preferred to go over the main points from lectures using her notes on key concepts and main ideas. She also highlighted important ideas in main readings and outlined any important points which then helped her to organize her thoughts and reflections. Anne shared that for metacognitive self-regulation, she often came up with her own questions which was used to help her to focus on reading journal articles or texts in the reading lists. She often re-read articles and texts when she could not grasped the content, main concepts or ideas. She also found it helpful to skim through materials before reading them, highlighted difficult concepts and addressed them later by clarifying it with her lecturers.

6.2 Strategies for the regulation of academic motivation

Anne used the strategy of mastery self-talk (Wolters et al. 2005) by focusing on her studies and sacrificed what was not necessary. She persuaded herself to keep on revising and improving her grades especially from her 2nd year for all her modules including her optional module, French. It was interesting to note that Anne also used strategies for relevance enhancement where she tried to connect to the materials from her modules, which seemed more useful and sought help from her lecturers, personal tutor and peers when she had difficulty understanding certain concepts. She also made the effort to relate what she learnt to her personal interests. Anne commented on her performance and relative ability of self-task where she felt she did better than some of her classmates and worked equally hard. She also had an awareness of wanting to do better as well as her peers and had worked even harder in her final year. In relation to performance and extrinsic self-talk, Anne always reminded herself that getting good grades was of great importance. With reference to the strategies of situational interest enhancement, Anne shared that she did not use learning or completing assignments as a game. She never saw doing revision, assignments and examinations as fun. However, she shared about self-consequence and how she had promised herself to achieved a goal and then later rewarded herself when she achieved it. She felt this strategy had helped her to achieve her goals and emphasized that goal setting played a huge role in relation to the strategies of self-consequence.

6.3 Strategies for the regulation of academic behaviour

Anne explained that she had taken steps related to effort regulation. For example, she always worked hard in class even she did not enjoy doing certain tasks. She never gave up when she found some tasks daunting and sought help to overcome these challenges. She also found that she needed to also do more individual work and developed her own learning strategies.

On the issue of perceived cost of help-seeking, Anne shared that she never felt that her peers looked down upon her for seeking help. She was not shy of asking for help and felt it did not matter as it solved questions which were lingering in her mind. Anne believes it was important for her to seek help from an external source such as lecturers

and her personal tutor as well as seeking help from an internal source, such as other students. Additionally, she commented that the lecturers always tried to answer her questions as clearly as possible and this helped her to master new concepts.

6.4 SRL dimensions

This section addresses the six SRL dimensions used to measure the self-regulated learning abilities of the cohort of student in this study.

Goal setting: In relation to Goal setting, Anne explained that the way she set her goals depended on the expectation of her lecturers and what is required of the examination. She practiced written tasks by herself and did oral exercises with her classmate who was better in French. Anne explained she prioritised her reading patterns for revision before examinations based on time and the subject. She chose to do her revisions at her most productive time in the day and her goal was to first revise subjects she was not very good at and did more research on specific sub-topics which she found difficult.

Task strategies: Anne emphasized that goal setting also came into place with task strategies as she tried to plan each day and made full use of her time. She motivated herself to study and do revision by giving herself treats after completing tasks and achieving goals. This helped her to stay motivated and she remained productive until she completed her dissertation. She explained that the new way of learning she has acquired includes general skills which she could apply to other disciplines and tasks in her daily life even after graduating from university. She compared these new skills to the way she had learned in her country, and stated that her previous way of learning which lacked task strategies from the learners did not equip her with advanced learning skills which are important for one's personal development.

Time management: Anne explained about two difference strategies on how she managed time for her studies and revision. Firstly, she made decisions of whether the task was going to be done over a longer period of time or needed to be completed immediately. For example, an extended project had to be spread out over a few months and revision for examinations had to be done in an intensive manner over a shorter period of time. Thus, Anne emphasized that she needed to make a conscious decision for each task, taking goal setting into account while planning her time management. Anne shared another strategy she used in her time management was based on the credit weight of each module. For example, 15 credits or 30 credits for each module and a dissertation project which had higher credits.

Environment structuring: Anne shared that she neither studied nor did academic work in her own room and preferred to revise in the library where she could see her classmates and friends. She stated the following. *".. . I need to know that there are people whom I know… that type of 'spiritual accompany' helps me to focus on my study and… also… silence is like my main requirement".* Anne explained that a quiet place aided her to study in comfort and calmed her nerves. She called it a *'self-hint or something like psychological effect', which helped her to concentrate,* and remained calm. She added that if the library became too packed and people who passed by made

noise, she moved to an empty classroom in another building on campus with a few friends and they each studied independently in different corners of the room. She emphasized that this strategy helped her improve and she achieved the grades she had set as her targets. Her lack of good sleep and a homely environment also affected her self-regulated learning strategies.

Help-seeking: Anne shared that when she was struggling with essays and assignments during her first year in the UK, she always approached her lecturers for guidance on certain topics, which she found difficult. She clarified questions about the content and arguments for questions, which did not have one correct answer. In addition, she also sought help from her personal tutor and discussed with her classmates after lecture hours.

Self-evaluation: As Anne was at the end of the 3rd year of her undergraduate studies, she shared that she has indeed reflected on the process of her learning over the last 3 years and discovered that she is a rather critical person on the strategies and approaches she had used during the course of her studies. Anne realised the strategy of mastery self-talk was necessary and kept her focused on her studies. Anne had used the strategy of mastery-talk where she kept focusing on her studies and sacrificed what was necessary. She persuaded herself to keep on revising and improving her grades for her modules. She also made the effort to relate what she had learnt to her personal interests such as the core Education modules.

7 Conclusions and future work

In recent times, little research reports and articles are emerging on the effect of applying MOOC as an environment for blended-learning classroom activities and online learning (Broadbent 2017). This research has applied an exploratory perspective of a theoretical framework to investigate the SRL skills adopted by different categories of undergraduate students. The stand-alone MOOC used for this study was designed for delivering an online course in computing concepts and Python programming. The course allowed the students to direct their studies, to determine and track their distinctive paths of study within the course content (Onah and Sinclair 2015). These students individually develop their own strategies to study, they are highly effective and high achievers in their various respect. Although, SRL is said to be contextualised approach in independent learning, these students constantly adjusted their learning patterns according to the study activities of the day. Our results revealed that the students in the blended study concentrate on courses that are closed to deadline and prioritise their time effectively in tackling those in order to meet any established deadlines. The first case study of this research was designed for traditional learning students who engaged in a blended (hybrid) learning settings. Likewise, the students in a conventional classroom studied in an interactive mode together and exchange ideas during and after the lectures. They tend to motivate

themselves by way of organising constant group discussions to learn from one another.

Self-regulation in learning behaviours has been presented to mediate in several studies as a way of enhancing knowledge control and attaining better academic achievement (Herndon and Bembenutty 2017; Kizilcec et al. 2017; Onah and Sinclair 2017). Educators uses blended-learning concepts to elevate the knowledge of weak and low achieving students to help them self-direct their learning patterns online and face-to-face (Biemiller and Meichenbaum 2017; Onah and Sinclair 2016b). This study has revealed the relationship between students learning from different course perspectives. These perspectives has shown the various strategies and modalities for which these groups of students studied in order to attain better academic achievement. Some studies have argued that students that lack the ability to regulate their studies effectively could be classified as low achievers and also limiting their prospect of self-directing their studies effectively (Barnard et al. 2009; Onah and Sinclair 2016a).

The two case studies reveal aspect of similar prioritisation practice among the cohorts of students. They students from both case studies, set up their goals, strategise their given task, and prioritise according to task with high credit and those that required urgent attention. Most of the students claimed that they reflected and evaluate their studies after they received their assessment and examination grades. In relation to performance and extrinsic self-talk, Anne in the second case study stated she always reminded herself that getting good grades was of great importance to her and she had reflected often after not achieving good grades in especially in her 1st year. Anne also shared about self-consequence and how she had promised herself to achieve a goal and then later rewarded herself when she achieved it. She felt this strategy had helped her to achieve her goals and motivated her to further improve her skills and obtained better grades by the 3rd year of her course. She emphasized that setting goals played a huge role in relation to the strategies of self-consequence.

In summary, the study revealed similar sub-theme amongst the students in the focus group and how they apply similar study patterns in their studies. This study also revealed students SRL relationships and studying habits. Several students from different educational background and course of study tend to ask for help for their studies by speaking with peers when they found any difficulties in their course or studies. This research also point out that the students working independently, work in self-pace and direct their individual study patterns. A further study is necessary to explore the conceptualisation of SRL with new instrument and cohorts of students to understand the existing instrument, and to provide accurate assessment of the self-regulation of distinctive students studying in different context.

Compliance with ethical standards

Research involving human participants With diligent consideration with the permission of the student participants, the authors applied careful approach and tag anonymously all the feedback analysis with no subject to any one single individual student in the class. We understood the ethical implications involved in reviewing individual confidential feedback for public information. The authors do have full responsibility for all information contained here.

Informed consent The authors declared that appropriate ethical concepts and full approval were given by the host institution to conduct the research.

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