EXPLORING STUDENT MOTIVATION IN A BLENDED AND SELF-DIRECTED GROUP-LEARNING ENVIRONMENT

Flex Tio

School of Engineering, Nanyang Polytechnic, Singapore

ABSTRACT

This paper presents a study that was conducted to explore the effectiveness of conducting self-directed learning (SDL) in a blended and self-directed group learning environment to motivate learners to learn by themselves. Many of our learners tend to be extrinsically motivated by the attainment of course credits, and that often results in poor participation and completion rate for topics delivered through SDL. With the implementation of SDL in a blended and self-directed group learning environment, we hope to tap on a different set of motivation that is proposed in the self-determination theory to encourage learners to participate and complete the SDL topics presented to them. The study gathered perceptions and opinions of learners on their SDL experiences in the blended and self-directed group learning environment. We analyzed to see if their needs for competence, autonomy, and relatedness could be met and whether the initial exposure of SDL in the blended and self-directed group learning environment could help them become more independent to self-direct their learning in more advanced topics. Initial results found that participation and completion rate for this SDL implementation was encouraging. Most learners reported that they faced less stress and found it easier to clarify doubts they had had the option to interact with other learners face-to-face.

KEYWORDS

Blended Learning, Group Learning, Self-Directed Learning, Student Motivation, Self-Determination Theory, Standards 5, 7

MOTIVATION

Getting learners to do self-directed learning (SDL) has become ever more important, especially under the background of the Singapore government, embarking a movement to develop skills in Singaporeans (Seow, 2015). This is also enabled by the advancement in technology evident in the explosion of availability and accessibility of Massive Open Online Courses (MOOCs). The importance of SDL can also be seen in our institutional approach to pursue eLearning and blended learning to deliver effective and engaging lessons to our learners.

On the ground, lecturers can possibly agree on the importance of getting learners to self-direct their learning too. Yet, there is also the fear that learners are not motivated enough to complete a piece of SDL task, sometimes, even if marks are allocated to the task.

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This paper presents a study that was conducted to explore the effectiveness of conducting SDL using a different approach to motivate learners to learn by themselves. The results obtained from the study could provide some insights into student motivation using alternative approaches of SDL.

LITERATURE REVIEW

Studies had shown that factors such as motivation, attitude towards eLearning, confidence in SDL skills, and life-long learning behaviors were some of the key success factors in SDL (Bonk & Lee, 2017; FitzPatrick, 2012; Kim, 2004; Li, Tancredi, Co, & West, 2010).

In terms of motivation, Bonk & Lee (2017) found that majority of the respondents who embarked on SDL in MOOCs were motivated by their wants to acquire a new skill. Many of them hoped to help others or society with the skills that they would be acquiring. In other words, they were largely intrinsically motivated, and that drove them to embark on SDL. On the other hand, studies such as Kim (2004) confirmed that the main reason for learners dropping out of SDL was due to a lack of motivation. Putting these studies together, the implication is that intrinsic motivation like the ones suggested by Bonk & Lee (2017) contributed to the success of SDL in learners.

However, the profiles of our learners are largely extrinsically motivated as opposed to the intrinsic motivation suggested by Bonk & Lee (2017). That is, our learners are motivated by attaining the course credits required by the diploma, which they are studying for.

Perhaps, another way to motivate these groups of learners would be to apply the self-determination theory (Deci & Ryan, 2000) into the way SDL is conducted, which is to meet learners' innate needs for competence, autonomy, and relatedness to motivate them. In particular, the need for relatedness appeared to be the most difficult to meet in SDL. Many studies on SDL suggested that learners were learning alone in SDL. In fact, Kim (2004) also found that the lack of human interaction found in the online learning environment to be a major cause of a decreased motivation to persist learning. As such, it is important for us to address the need for relatedness in SDL.

Studies showed that alternative implementation of SDL, such as a blended learning approach or a self-directed group learning approach, could meet the learners' needs for relatedness. In a study conducted by Cleveland-Innes et al. (2017), they reported that opportunities to discuss with other learners online and in a blended learning environment was rewarding for the learners. In another study conducted by Fukuda et al. (2014), which attempted to get learners to meet for SDL study sessions together, they found that getting learners to agree on a common time to do self-directed group learning can be a challenge.

RESEARCH DESIGN AND METHODS

Our study seeks to explore the effectiveness of conducting self-directed learning in a blended and self-directed group learning environment to motivate learners to learn by themselves. The target implementation presented will attempt to address some of the shortcomings of the approaches introduced by Cleveland-Innes, et al. (2017) and Fukuda, et al. (2014).

Willing learners were asked to participate in interviews or surveys that were conducted at least seven weeks after the deadline of the SDL phase. This also allowed them to apply what they had learned in their SDL in their projects, giving them a better perception of how the SDL had or had not helped them in their learning.

Blended and Self-Directed Group Learning Approach (The "MakerLab" Implementation)

The blended and self-directed group learning approach of SDL was implemented in a prescribed elective titled 'Internet of Things Application Development,' which was offered to Year 3 students of the Diploma in Multimedia and Infocomm Technology offered by the School of Engineering, Nanyang Polytechnic. Known as the "MakerLab" implementation, it was designed by applying the self-determination theory (Deci & Ryan, 2000) such that learners' need for competence (the sense of being able to complete and achieve something out of the MakerLab), need for autonomy (the sense of having control over their learning) and need for relatedness (the experience of someone being in the learning journey with them) were met.

The "MakerLab" comprised two components, the environment, and the content. The environment where "MakerLabs" were conducted aimed to meet the learners' needs for autonomy and relatedness. They took place in classrooms during scheduled face-to-face classes. No actual teaching took place to allow learners to go at their own pace. To enhance interaction between learners, leaners were seated in groups and encouraged to learn from each other. They could also clarify and bounce ideas with the instructor of the day who would be monitoring their progress. The "MakerLab" content was compiled in an interactive digital format. Learners were led through a series of tasks such as programming, watching videos, and reading curated documentation and articles. Knowledge check quizzes for formative self-assessment purposes interleaved the tasks regularly to provide learners with customized feedback based on their responses. At the end of each series of tasks was a programming assignment where they will be "making" (or developing) a mini prototype using the knowledge they learned.

To meet the learners' needs of competence, the content was ordered in increasing difficulty. The content was made with more detailed instructions and explanation, more bite-sized, and with more interactivity to help learners maintain focused.

The "MakerLab" implementation was also not a problem-based learning (PBL) and project-based learning (PjBL). In PBL and PjBL, learners are usually given an open but focused problem or project where they will need to learn skills along the way that help them solve their problem or complete their project. The "MakerLab" implementation is closer to a traditional lab session where learners are guided with an option for learners to go beyond the compiled learning content whenever they want.

Selection of Participants and Data Collection

Thirty-five willing learners of varying academic abilities and sociability participated in an interview (16 learners) or a survey (19 learners).

Academic abilities were chosen as a dimension to study as it could affect the self-efficacy of learners in SDL. It was determined through the Grade Point Average (GPA) and the grades obtained from the lab test.

Sociability was chosen as a dimension to study as it can affect how well learners can meet their needs for relatedness during SDL. Participants were classified as "introvert" or "extrovert" based on the instructors' day to day classroom observations on their level of interaction with their peers and the learners' personal assessment of their personality. The terms "introvert" and "extrovert" used in this paper were defined as the sociability of the learner in the context of the module they were learning. It was chosen to be defined as such because we also observed that learners could be more socially active or withdrawn depending on the subject matter they were interacting with.

The first batch of 16 participants out of a total of 34 learners who were offered the module shared their experiences of the "MakerLab" through interviews. Interviews were used as it allowed an in-depth exploration of factors that could affect the learner's motivation in the self-directed learning process. Most interviews were conducted in a focus group to explore the extent of group dynamics within a clique of friends learning together. A few learners were interviewed alone to give them a safe environment to share the more sensitive experiences they had.

The second batch of 19 willing participants out of a total of 33 learners who were offered the module was asked to complete a survey. A survey was chosen instead of this time around with the aim of getting more participation from learners for a better picture in addressing the gaps found from the first round of analysis gathered from the interviews. One gap was to explore if learners were motivated enough and can continue their self-directed learning at home, after having gone through some sessions in a blended and self-directed group learning environment. To explore this factor, the second batch of learners were dismissed on their fourth face-to-face class to complete their SDL on their own.

As the principal investigator was also one of the instructors delivering the module and this relationship may influence the willingness of the participants to give honest opinions, (1) all participants were assured that the aim of the research was to find out about how to help the participants learn better in a self-directed approach and has nothing to do with the grading process, (2) the interviews and surveys were conducted only after grades for the self-directed learning portions of the work were finalized and made known to the learners, and (3) 50% of the participants were drawn from another group of learners guided by a different instructor.

In terms of the comparability of the two batches of participants, participants were only drawn from the learners who were in their Year 3 Semester 2 of their studies even though it was also offered to those in their Year 3 Semester 1 of their studies. The number of participants broken down by their academic abilities and sociability profile is summarised in Table 1.

Table 1. Profile of the Research Participants

	Batch 1 (Year 2018)		Batch 2 (Year 2019)	
	Introvert	**Extrovert**	**Introvert**	**Extrovert**
High Academic Ability	4	4	7	4
Low Academic Ability	5	3	5	4

Data Analysis

Interviews conducted with the first batch of participants were recorded and transcribed for further analysis. The extracts of the transcripts of the interview were labeled and regrouped into categories: responses related to the needs for autonomy, competence, and relatedness as proposed in the self-determination theory (Deci & Ryan, 2000), and sentiments relating to distinct features of the implementation.

Similarly, open-ended responses from the survey conducted with the second batch of participants were also labeled and regrouped into categories.

Patterns, major themes, and exceptional cases found through the analysis were compiled under the findings section of this paper.

Limitations of the Research

As the selection of participants relied on their willingness to participate in the interviews and surveys, it was possible that learners who had no interest in the module at all may refuse to participate in the research. This potentially missed out on the input from learners from those profiles, rendering it impossible to learn more about their motivations in the SDL implementation that was being studied.

Classification of the learners by their sociability relied mainly on day-to-day classroom observations. While instructors had the opportunity to work with the participants for between 40 to 60 hours, it could still be influenced by the personal opinions of the observers, which may result in discrepancies.

This study was also largely restricted to qualitative data, learners' perception, and their motivation. No quantitative measurements were made on how much the participants improved in self-directed-related skillsets or outcomes they perceived to have gained.

FINDINGS

Meeting the Need for Autonomy

Participants cited different ways which they could learn: researching on their own (favored by introverted participants), asking a friend (favored by extroverted participants), or asking the instructor. They switched between approaches seamlessly, depending on what they felt suited the moment. As one participant said, "*For some cases, I searched the Internet on my own, some cases, it was under the guidance of the lab instructions. If there were Internet links provided in lab instructions, I would see the link [sic] to see exactly the specific parts. But some part [sic] I want to understand more, I will go on my own.*" (Student 1H, extroverted with high academic ability)

Participants found it easier to ask someone for help in the "MakerLab" implementation. As an extroverted participant with low academic ability puts it, "*When you do e-learning at home, communication by texts is [sic] really hard to understand, face to face is more conventional*" (Student 2H).

Participants can also choose the amount of time to spend understanding the material. They reported that they experienced less stress. One participant reported, *"The self-paced is fine for me because honestly, I won't feel pressured? Because other teachers they want like [sic] get it done and do away with, but as for the self-paced ones, it will be like easier for us, for the slower ones."* (Student 1F, introverted with high academic ability)

Meeting the Need for Relatedness

Most participants found it more enjoyable, more engaging, and safer to study with friends. However, at least two participants also felt that it might be distracting at times. One of them noted that *"I cannot work with my friends. *laughters* Because I will chat with them all the time. Especially N *laughters* Without N talk [sic] to me, I will work all the time. I rather work alone."* (Student 1U, extroverted with high academic ability)

Participants said that they did not start off knowing each other. Some felt that through working on the "MakerLab," they had built teamwork and friendship. Sitting in groups also helped them to communicate with each other.

One probable issue with group learning we explored with some of the low academic ability participants as if they would feel inferior when they found that they were slower than their classmates. They reported that such stress was more on the positive for them. Learners often supported and motivated each other. One participant even said, *"B is faster. So sometimes, she will ask me and D where we have completed till, and that helps to speed us up. She will ask us where we have progress till. After that, sometimes, we tell ourselves that we must catch up with her."* (Student 1X, an introvert with low academic ability)

Meeting the Need for Competence

Participants generally felt a greater sense of achievement, leading to some believing that they could do more. They also felt they understood the material better because they understood the content in their personal way and can understand in other manners having discussed with their friends on the problem. As one participant said, *"We are in a group, we learn [sic] ourselves, then we can consult like our friends, which they give [sic] different advice. But instead, if the lecturer just [sic] teaching in front, they just go through the textbook kind of style, then after that, we just learn the textbook kind of way, then just follow according to what [sic] the textbook says."* (Student 1P, introverted with high academic ability). On a flipped side, a few participants also reported that they were unsure if they understood the content with enough depth.

When asked which part of the learning experience they felt that they were able to achieve something, the majority of the participants reported that:

- **Seeing** the LCD lights hardware responding to the codes they have implemented (generally mentioned by learners with lower academic abilities), and
- **Understanding** how the turnstile works and implementing the prototype for themselves (generally mentioned by learners with higher academic abilities)

was an achievement for them. A few participants also reported that these achievements were the most memorable part of the learning experience.

One thing to note was that such competency was built through a period of time. Several participants pointed out that they were initially doubtful about whether they could remain focus or even cope with learning in the "MakerLab." Factors that gave them confidence include completing intermediate assignments, availability of detailed instructions and knowledge check quizzes, and time to get accustomed to the self-directed process. As one participant put it, *"At first when I heard it (that I need to do SDL), I was like 'Oh no'. But after I see the notes, it's actually quite detailed; then I was quite assured that it will come [sic], it will happen." (Student 1R, introverted with low academic ability).* They also reported that they have improved in self-directed-related skillsets such as independence, time management, and responsibility by the end of the "MakerLab" phase. Participants were able to see how the skillset was important in the work context.

Instances where Needs were not Met

An introverted participant with low academic ability opined that the "MakerLab" did not work for him. In his words, *"It's not the best way of learning for me because when I lack the fundamentals, it's hard to just self-learn. Have to have someone to guide. So self-learning is quite difficult." (Student J)*. He was uncomfortable to ask his classmates for help as he was unfamiliar with them, and he felt that the guidance provided by the instructor was insufficient.

Transiting to Self-Directedness Outside of Face-to-face Time

Whether conducting the SDL in a blended and self-directed group learning environment initially can help learners to feel more motivated to complete their own SDL, to explore this in more depth, the second batch of learners were dismissed from their fourth face-to-face class and asked to complete the "MakerLab" on their own.

Participation Rate, Completion Rate and Motivation

16 of the 19 participants surveyed attempted the "MakerLab" for one to two sessions outside of their pre-arranged face-to-face class. Out of the 16, 15 reported that meeting the deadlines for the completion of the "MakerLab" tasks was their primary motivation for doing SDL while one learner cited that exploring the material was his primary motivation. 8 of the 16 participants chose to meet their friends to work on their SDL. 12 of the 16 participants spent between one to three hours per session working on the SDL. Two participants with lower academic ability reported spending up to 6 hours per session on the SDL.

For the three participants who did not attempt the "MakerLab" outside of class time, they reported that even though they knew they were behind time in meeting the deadlines for completion of the "MakerLab," they were either busy with other commitments outside of class or not motivated to self-direct their learning. Nevertheless, 85% of the learners were able to complete all "MakerLab" tasks satisfactorily.

Learners felt limited in the pure SDL approach

Despite high participation and completion rate, some participants cited difficulties in displaying the same level of competence when they had to complete their "MakerLab" outside of the blended and self-directed group learning environment. Participants who chose to work on the "MakerLab" alone reported lower competence level in completing the tasks. For instance, Student 2E, an extroverted participant with high academic abilities, mentioned that "*Sometimes I do not know if I'm doing the right thing*."

Participants also find it difficult to ask questions and receive timely feedback. For instance, some participants found it troublesome to include screengrabs of their work in order to ask a question through email. They also had to wait for the reply, and that broke their learning flow.

DISCUSSION AND FUTURE RESEARCH

The "MakerLab" implementation addressed two issues of the SDL: increasing opportunities and improving accessibility for learners to discuss with other learners (Cleveland-Innes, Stenbom, & Gauvreau, 2017; Fukuda, Suzuki, Hashimoto, & Okazaki, 2014).

The findings indicated that the reception for the "MakerLab" implementation was generally positive. Participants felt that they understood the content better and improved in skillsets such as independence, time management, and teamwork.

Participants had the autonomy to choose how they want to learn and can change from one way to another seamlessly, leading them to learn in a manner that fits the moment and their learning styles.

When participants chose to ask someone, the "MakerLab" was more accessible than home-based SDL: learners found it easier to ask questions to whom they trust (which can be their friends or the instructor). They were also able to express their questions more accurately and receive timely feedback from other people. Timely feedback was important to keep learners' momentum so that they can clarify essential questions in order to continue their learning.

In terms of the need for competence, findings showed that successfully implementing a prototype contributed to most participants' most memorable learning experiences. It was then important to plan for learners to attain such achievements consistently to help reinforce that they are improving to improve their motivation (Madtha, 2015).

Progressing to Full Self-Directed Learning

The participation rate of the pure SDL learning session planned for them and the completion rate of the "MakerLab" was encouraging. Several participants had cited a lack of confidence when they were first introduced to the "MakerLab" learning approach but also felt that they improved in their SDL skillsets by the end of the SDL phase. Based on this understanding, learners should be given the opportunity to do SDL in a blended and self-directed group learning environment in the initial phase so that the learners can get used to the method, thus giving them more confidence to transit to participate in SDL by themselves. This is not surprising as confidence is one of the top characteristics associated with success in self-directed learning (Li, Tancredi, Co, & West, 2010). However, a more detailed collection and analysis of quantifiable data of their participation habits will be needed to affirm this initial sensing.

The "MakerLab" approach to SDL did not change the learners' motivation to an intrinsic one. A clear majority of the participants reported that they were still extrinsically motivated by deadlines, and it was this which encouraged them to complete their SDL outside of the preplanned face-to-face sessions. They still showed some limitations in meeting their needs for competence as they cited difficulties in their learning experiences without timely feedback. Maybe this was why 50% of the participants completed their SDL tasks with their friends.

Perhaps, an intermediate step to get the learners to be even more confident would be to designate full self-directed learning sessions during face-to-face class but without the instructor's presence. This could give learners the protected time for better accessibility to their friends to bounce ideas, instead of leaving it to themselves to schedule their own learning sessions which may or may not take place.

Easing Learners with Lower Academic Ability into Self-Directed Learning

Not all learners can cover the content by themselves and had friends that they trust enough to seek help from. An unconfident and shy learner will continue to face problems in the "MakerLab," such as in Student J's case, limiting his options for different learning approaches. Possible approaches to improve learner's motivation could then include:

1. Identifying such learners early and having the instructor to offer directed guidance to lead them into the SDL process, easing the learning curve to help the learner to achieve something: This is to meet the learner's need for competence.

2. Creating a conducive classroom environment that encourages collaborative self-directed group learning that celebrates effort in learning: This is to provide a safe learning environment for the learner; in the long term, to meet the learner's need for relatedness and hence, opening the option of approaching friends for help.

The latter is important as it develops learners' independence to learn by themselves, freeing the instructors' time to focus on learners and learning topics that require their attention, for learners to learn more effectively.

Other Potential Research Areas

Beyond the self-determination theory, there were also other factors that influenced student motivation. These include the subject matter, the quality and form of instructional content and the role of the instructor in a blended and self-directed group learning environment. Further exploration could shed light on how each of these factors could affect or work together to make SDL more effective.

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BIOGRAPHICAL INFORMATION

Flex Tio is a Specialist in Teaching & Learning and Senior Lecturer with Nanyang Polytechnic teaching software development and engineering practices, and user experience design. He was a research and development engineer with the Government of Singapore specializing in Visual Analysis and Text Analysis. He is a member of the Learning Experience Design workgroup in Nanyang Polytechnic, driving initiatives that target to improve student engagement in learning. He also has a keen interest in ICT-Enabled Teaching and Learning and Active Learning, often exploring education pedagogy seeking to engage learners in understanding how hard skills and heart skills work together in the real world.

Corresponding author

Flex Tio
Nanyang Polytechnic
School of Engineering
180, Ang Mo Kio Avenue 8,
Singapore 569830
flex_TIO@nyp.edu.sg

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