A Multi-Dimensional Investigation of Self-Regulated Learning in a Blended Classroom Context: A Case Study on eLDa MOOC

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***Abstract*—Online systems such as massive open online courses (MOOCs) are new innovative learning technology in education. With the proliferation of MOOC systems, little has been mentioned about blended MOOC system and how it enhances students' performance. Blended classroom is a form of learning taking place between two different activities of which one is online and the other is traditional teaching method using bricks and mortal classroom settings. This study reveals the effectiveness of blended classroom teaching for an undergraduate course. The module was embedded in an eLDaMOOC platform, which is a platform for delivery computing concepts, and Python programme course. This research aims to investigate students' perceptions of self-regulated learning (SRL) habits. A multi-dimensional survey was designed to evaluate each aspect of SRL skills, motivation and attaining better grades within the course. This analyses explores (a) cognitive process of students improving their self-regulated learning skills (b) potential of students' preparedness and motivation to engage with the course content in a blended context (c) potential difference in addressing the relation among the methods of engagement and achievement in their weekly assessment results. The research applied an Online Self-regulated Learning Questionnaire (OSLQ) as the instrument for measuring the self-regulated learning in eLDaMOOC learning environment. In developing a revised OSLQ to address the use of instrument to measure self-regulated learning in an online blended classroom context. Data collection process was conducted on a sample of first year undergraduate student who took a seminar module via a blended course format. The results indicate the level of self-regulated learning explored from the measure of the self-regulation in the blended learning environment in this study.**

Keywords — self-regulated learning, blended classroom learning, motivation, MOOC, e-learning development and adaptivity (eLDa)

I. INTRODUCTION

Technology has become a great phenomenon and foundation to teaching and learning in the 21st century. Nowadays, Technology innovation has evolved at a rapid pace. There was a string theme addressed throughout this study which would add value to the choice of endorsing educational technologies and related support in teaching and learning. At the same time, there was significant emphasis on the needs of developing a strategy that allow learners to engage properly with the course content [1] in eLDa MOOC effectively.

There has been little research on blended MOOC learning platform within educational institutions as both an e-learning system tool to support a blended learning environment. This study proposes a multi-dimensional learning evaluation from an online blended seminar classroom different mode of studying. The first mode draw analysis from the perspective of an online MOOC course with over 107 registered participants and a blended inclusive seminar classroom lecture of over 25 participants. The study applied multi-dimension approach for evaluation through six main self-regulated learning dimensions: (i) Goal setting (ii) task strategies (iii) time management (iv) environment structuring (v) help seeking and (vi) self-evaluation. This study will be describing critical thinking and analytical learning skills acquired from the learners' perspective which support individual student attaining personal academic success. An existing standard survey instrument called 'online self-regulated learning questionnaire' (OSLQ) has been developed and applied to 27 student learners for which the data for this study SRL dimension was from 17 students. The study conducted two separate set of OSLQ for the blended classroom participants. The first survey was 37 questions while the post seminar survey was 31 questions. This purposive sample consists of first year undergraduate students who have registered for module. The online blended classroom seminar was hosted in eLDaMOOC platform. The survey instrument tested for usefulness of the content, delivery method supportive to the students, the reliability of the support. The analytical result analysis shows strong support of the blended MOOC classroom learning through the learners' satisfaction. The investigation of the six dimensions revealed the significance of the blended seminar from the learners' satisfactory comments. The data is further analysis for academics and educational online blended system using a statistical package for the social sciences (SPPS) tool.

Learning analytics has shown the various course units that need improvement [2], this however helps to inform a better

course delivery. The use of learning technology as a catalyst towards enhancing the learning process for learners in educational contexts thus involves an investigation of the learners themselves, the content to which they have engage with in this context, the learning platform environment itself and the components that comprised in this environment.

The theoretical study shows that the participants in a blended classroom teaching making a choice of their own method of learning, they obtained the required skills and behave in a manner similar to their learning [1]. These process of applying cognitive reasoning as thoughts, modes, feelings and actions that are first of all planned and adapted to achieve learning goals [3] is called self-regulated learning strategies [4, 5, 6]. Self-regulated learning is said to consist of certain academic learning in education such as motivation, behaviour and cognition [7]. In another instance, the theoretical assumptions that highly educated, experience professionals, and students should have high self-regulation [8]. The students were expected to be confident in exploring new ideas to extend their knowledge and expertise by following their own chosen routes to learn [9]. It is imperative to note that self-efficacy on the other hand, as much as areas of self-regulated learning is context dependent which rely on the earlier knowledge and experience of participating in a blended MOOC learning which could be significant to attaining better academic performance [10].

II. RELATED REVIEW

Theories and principles of educational online learning environment need to be modified to help understand the theoretical foundation of online courses such as those in a blended learning environment [11]. As a matter of fact, modern infrastructures elevate the cost effectiveness of e-learning environment such as in the case of a blended classroom learning. Nowadays, one commonly used infrastructure is the Internet. The Internet has been the most significant medium for delivering a blended classroom courses. It helps to supplement the instructional face-to-face learning methods in a blended context [12]. Learner's autonomy has been known to be a distinguishing factor in online blended activities. In this case, blended learning students take absolute control of their studies and environment after the instructional classes. In the light of this, online blended learning has reduced the limitation of time, environment and the features or resources that provides the learners with an enthusiasm to study consistently [13]. Other studies acclaimed that learner's autonomy gives the students the freedom to self-direct their studies, which enables them to control the topics they desire to learn in order to attain better academic performance [14, p.221] and [15]. Online research study shows that human behaviours are greatly motivated by self-influence habits according to Bandura [16]. Self-regulation encompasses the mechanism of self-efficacy, which plays a central role on the major impact of the learners' thoughts and actions to motivate them in the course engagements. Bandura argued that social factors influences the self-regulative mechanism in a learner. In this study, we will discuss self-regulated learning habit and some of the instruments applied in measuring self-regulation [17,18,19].

A. Self-Regulated Learning

Learners SRL attempts in a blended class tend to understand instructional classroom learning and discussion by engaging in discourse about the course activities. The discussion in a blended class learning as observed in some of the classes involves dividing the task at hand in a strategic manner, managing the time allocated for the task effectively so as to meet the deadline, and set goals in order to successfully complete the given task [20]. Thus the students in this study tend to generate these skills in order to tackle the project at hand. They appear to be indicators and autonomous to take control of the weekly class projects in a collaborative learning space applying aspects of motivation and metacognitive behaviour to support and encourage one another in executing and achieving the task goals [21].

Research on SRL indicates its significance when viewed from a self-directed mode of learning such as self-study, controlling learning habits, self-selected study, engaging in social learning activities and from obtaining electronic sources [22]. The majority of the students in this study interact during conventional classroom group discussions and also with the external link to electronic resources embedded in the blended course. According to Shea et al. [22], with the help of external supports and links in online courses, the self-directed SRL skills and traits could be an avenue for improving learning presence.

B. Blended Learning

Blended classroom learning is an approach of teaching and learning using online course resources in a conventional class setting [23]. In this case , the students engage with the course content at home and in face-to-face at an institution bricks and mortal classroom [24]. With the popularity of MOOC, information about blended classroom MOOC has less exploration. This study introduces and investigates online blended classroom teaching in a MOOC context. The study also investigates self-regulated learning habits amongst students in the blended classroom teaching. Several theories reveals that participants in a blended class decide the approach to follow in studying using familiar learning habits suitable to the required needs [1]. The investigation of SRL in the blended learning context allows for better information on how or whether the learners prepare and plan to achieve any academic set goals [12]. The data analysis in this study helps to show the motivation, and cognitive behaviour of the students.

III. METHODOLOGY

The principle aim of this study is to investigate conventional undergraduate student's blended MOOC participation and self-regulated learning strategies in a blended class seminar teaching and instruction. The study specifically investigates the pattern of learning whether self-regulated learning skills can be obtained in any case amongst the students [1].

A. Research Question

1. What levels of SRL skills are observed within blended class students?

2. What are the areas of deficiency that need improvement?

B. Theoretical Framework of the Study

Instructional online-based learning has not being explored effectively in several institutions. In a comprehensive evaluation by [25] who emphasized on the usefulness and significance of online instructional classroom learning which has not being effectively investigated. The internet facility has been seen as the major medium of choice for most blended learning in all institutions of learning which changes the conventional face-to-face format of course delivery [12]. Online learning made whole studying in a self-regulated manner. The autonomy of the student helps in the learning experiences while studying in an online environment. For the fact that online learning eliminates the occasion of time , place, physical lecture materials, this gives the students the control over their studies [13]. In another instance, a some study argued that the self-directed learning mode of students gives the unrestricted choice of learning [14, p.221]. This study shows that students with internal personal control of their study benefit greatly from the online learning environment. As the online environment move towards learners autonomy (autonomy learning), self-regulation have been said to have a critical success factor in online learning. In another study, the authors argued that student academic success has been attained because of the enhancing behaviours in a traditional (conventional) classroom instructional setting [26, 27, 28, 29]. On the other hand, if self-regulatory learning skills are incorporated in a traditional face-to-face classroom learning it will be a significant factor for playing a very special role in enhancing academic achievement and success [12]. In another related study, Lynch and Dembo [8] investigated the relationship between blended learning context and self-regulation. They claimed that academic success was related to self-efficacy and verbal ability in a blended learning classroom. In another instance, Chang [30], argued that there exist continues positive relationship indicating that the academic attainment in an online blended learning is supported within the effective practice of self-regulatory learning skills.

The aim of this study is to investigate an existing instrument developed for measuring the ability of student to self-regulate studying habits in a blended classroom context. In following the model of an online self-regulated learning questionnaire (OSLQ), a physical copy of this OSLQ model was distributed during the blended classroom seminar, for which the students fill in their responses and hand-in the copies. The physical questionnaire in this study sample was design following the structure of OSLQ with the chosen theme relevant to the study. We examined the significance of the study across different learning patterns of the students in the blended classroom delivery method. The questionnaire was based on students' ability to self-study and how they forge ahead in their learning ability to achieve planned goals.

IV. ELDA PLATFORM

eLDa tool is an online MOOC course platform which gives the learner the ability to decide the pattern of their studying. The course is structured in such a way that allow the novel features of directing the learner to decide their route to study either in a self-study mode or follow the instructional approach provided to accomplish the course learning objectives and set goals. The platform has two major novel paths; the self-directed learning and the instructor-led mode.

A. Course Design

The course design and visual layout may be influenced by the intended learner's experience. Arguably, often at times virtual learning environments (VLEs) try to do all, by creating a one-size-fit-all model such as in the case of most MOOC platforms. However, there is an essential need for basic framework that could be consistent with the site navigation or terminology and the fundamental online resources. These factors if put into consideration could support the learners in improving and developing self-regulatory learning skills that would help building and directing their individual learning experience. However, with the additional functionality and the features or components determine by the learning platform, this could also direct the learners in making an informed choice of route during the learning process. On the contrary, developing and using a learning tool to achieve the function for which it was not designed for could lead to learners' dissatisfaction. Modern educational learning tools should be constructed to meet the required needs and expectations of the learners, thus this could foster motivation and commitment [31, 32].

It is arguable that modern technology could only play a significant role of achieving learning design outcomes. The modern pedagogy design is an enhancement of existing learning design approaches. Moreover, the basic principle is to describe how the various processes are common to within all the learning modes underlying in the technology to function effectively in order to enhance learning experience [32, 33, 34].

The true purpose of any new e-learning design model should demonstrate the novel learning principles or paradigm which reveals the added value in the operation. For example, the tool used in this study allows the learners to interact remotely to exchange private messages and knowledge. In addition to the novel feature in this tool, learners decide route to study either in a self-directed mode or in an instructor-led mode. These self-learn and directed learn could not be made possible without the incorporation of novel features and components to support the process in the learning tool. In the case of the blended classroom resources, this was embedded in the eLDa tool , which foster these remote interactions and gives the students the opportunity to engage with the course resources before attending the orthodox face-to-face classroom learning. The course resources were delivered every other week before

the instructional class, so that learners could have the opportunity to study early and practice the exercises online before the class. The role of the blended classroom learning was imperative to incorporate the face-to-face and online learning environment which was fostered by the design model used in developing the learning tool.

Nevertheless, the enhancement of the tool is for improving educational supplement, although, the underlying principle illustrates both online blended learning and a conventional classroom setting which were based on the same theoretical constructs [32, 33, 34, 35]. This explains that a good pedagogical design is one with absolutely no inconsistencies in the curriculum, the teaching approaches, the learning environments and the assessment procedures. Furthermore, in order to achieve consistency, careful examination of any assumption at any stage is significant. The learning outcomes should be carefully defined, and also learning and teaching activities should be carefully selected in order to help the students to direct their individual learning habits. In like manner, assessment tasks should be design in such a way that will genuinely test the students understanding, knowledge and learning outcomes, which could help the students to self-evaluate their studies [32].

B. The Research Development

This research development, design and construction lasted for the period of five weeks in term 1 semester of 2015/16 academic year. The online blended classroom instruction was used as the method of teaching during the seminar classes. The students participated in a traditional teaching approach and asynchronous online learning resources in eLDa platform designed using Wordpress for each of the weekly seminar sessions. The module was implemented in Wordpress content management system (CMS), because it is the original free and open source CMS based on PHP and MySQL used in developing the eLDa platform tool for which the course and module was embedded in. The choice of this Wordpress is because of it's compatibility with the requirement for incorporating novel features of enabling learners deciding their routes and mode of learning. Although, before choosing Wordpress, several learning management systems had been tried and investigated, their components and structure made it difficult to implement the novel features of the eLDa platform system. The flexibility of Wordpress features allows effortless construction of a laudable learning platform with ease. As illustrated in Fig.1 and Fig. 4, Wordpress with some suitable plugins such as 'Sensei plugin' allows the visualization of course content which helps the students to know which direction to follow to study and complete courses or lessons yet to be studied. Security features were easily applied in the platform example, Wordfence plugins provide effective monitoring and security of the tool against intruders. Other features of the eLDa tool include the database management system designed in Apache web server; Macintosh Apache MySQL PHP (MAMP) and MySQL 5.5.42.cll.lve. The module was developed in the first semester of the 2015/2016 academic fee-paying year and embedded in a novel eLDaMOOC learning platform. The module encompasses all the features and components of eLDa MOOC system, for example, the students are free to engage with the course as they desire and at a self-directed chosen pace. The contents for the course were deployed on a weekly basis before the seminar class so that the students could have access to the learning resources and study before the online blended classroom seminar. The 5 weeks seminar course was aimed at educating the students on computer security incidents, how to understand the day-to-day threats in computer security, and how to resolve these anomalies or security issues in a real world or life scenarios. At the end of the semester, the students were requested to fill two different set of survey questions; (1) the first is a general survey question for the blended classroom instruction which was administered at the beginning of the course, and (2) the second was a self-regulated learning strategies questionnaires which were given out to students at the end of the course. Both surveys were subsequently analysed and evaluated.

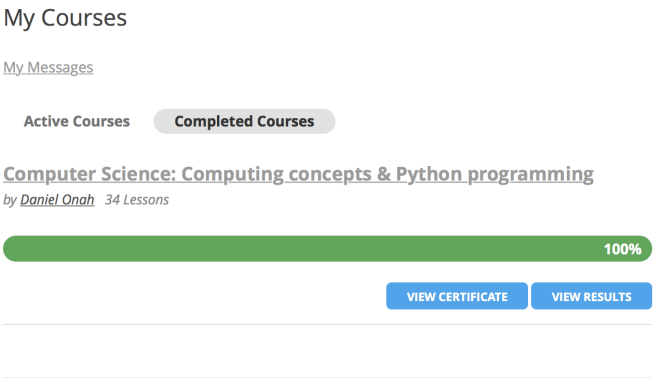

Fig. 1. Visualisation of course completed

C. Blended Course Architecture

The overall blended learning architecture is demonstrated in Fig. 2. The students were registered into the eLDa platform by the instructor and login details sent to each student via e-mail. The students are presented with visual map of the lesson for that week and previous weeks for revision. The lessons content are delivered every other week. Each lesson had class exercises and solutions which were also embedded in the module. Part of the class exercise was done during the blended session and the students' in-turn can go through the online solutions after the seminar class. Thus this is another element which promotes learner reflection and self-evaluation of their understanding of the seminar lesson. Also this enables students to understand better and encourage studying further.

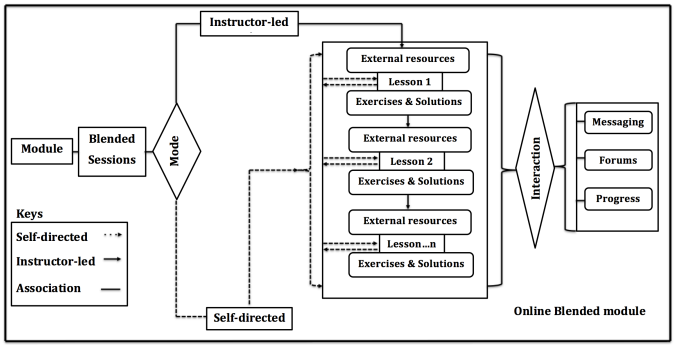

Fig. 2. Architecture of the online blended module

Mode of study: The solid lines indicate the pathway of the blended seminar class as led by the tutor. During the conventional classroom setting, the tutor delivered the seminar using the online blended resources in a structured manner. Just as in the various e-learning system, there are videos, lecture slides and links to external resources necessary for more enlightenment on the topic of discourse during the seminar class. This mode of study as led by the tutor was incorporated with some orthodox method of teaching so as to make the lesson to be more interactive and engaging. The dotted lines in the architecture indicate student self-directed pathways to study after the blended session. The students self-direct their learning in this case and they decided on how to engage with the course at individual learning pace. They can self-direct their route to go back to either previous lessons so as to acquire more knowledge in order to have optimum understanding of the current lesson. The students were encouraged to study the materials before the next lesson. These materials as mentioned are uploaded online every other week and private messages are sent to all participating students via the eLDa platform embedded e-mail system.

Messaging: Private messaging is another vital and useful resource to motivate and encourage shy students to communicate with the tutor privately and sought for assistance in the module. The platform introduces an instant messaging system which sends a message to the tutors personal email and private forum notification embedded in the learning tool. Students on the other hand can send private messages to peers in the seminar class and seek for help with their studies.

Forums: After the blended class, the students can engage with the lessons and share knowledge using the discussion forum created for this module as embedded in the eLDa platform. This describes the introduction of students learning engagement in form of discussion community developed specifically for the module. This forum enables exchange of ideas about the module and weekly assignment/exercises. Our observation shows that most of the students who constantly engaged and participated in the community forum found it beneficial. The tutor also used this forum to communicate with the students and provide support with external resources suitable to aid the conventional assessment as seen in Fig. 3.

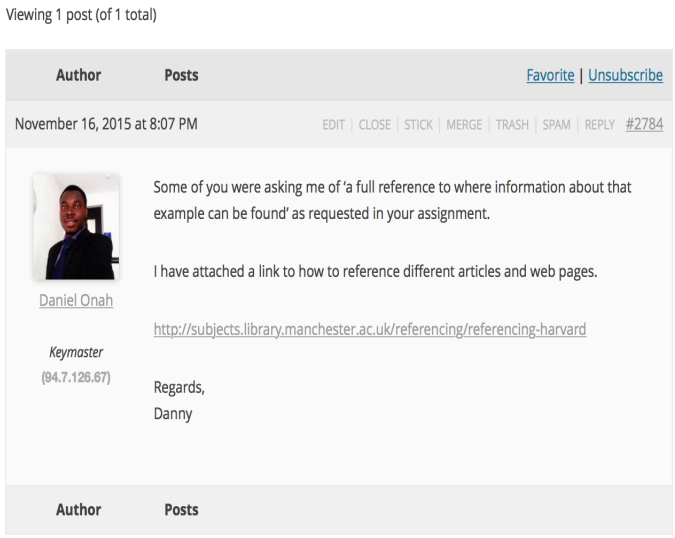

Fig. 3. Visualisation of course forum

Progress map: In order to support the students to follow the lessons in order and to know those not yet studied, a visualisation of lesson component was incorporated in the blended module. This visualization provides the students with individual view of lessons completed and those yet to be studied. Fig. 4 illustrates a progress map of a session in the eLDa platform course. This stands as a support to re-route and direct the students to the next lessons promptly without any time waste.

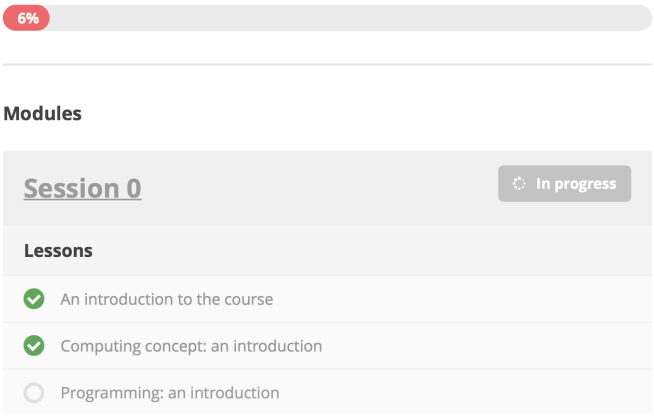

Fig. 4. Visualisation of lessons completed and those yet to be studied

V. RESULTS

The study results were conducted using SPSS descriptive statistics in the larger part of the evaluation. Further analysis and investigation was conducted on the averages of the self-regulated learning dimensions to understand the significant of the study to the student's SRL skill levels.

A. The Research Participants

The participants for the research sample were drawn from 27 first year undergraduate students of computer science discipline at the University of Warwick, United Kingdom. These 27 students samples were in a seminar group participants of the 136 students who registered for an optional module in computer security, which satisfied the university educational requirement. The students were selected from a purposeful sampling of a seminar group out of over 136 registered students. However, based on the respondents from the survey conducted, majority of the students have not participated in any blended classroom instruction before prior to this. For those students who participated continuously, the result shows good performance and better weekly assessment grades as revealed in the survey responses.

When students were asked if they have participated in the blended class before this study, over 85% (n=23 students) said they have not participated in any blended class before this and only a handful of about slightly over 14% (n = 4 students) said they have. The survey question: 'Have you ever participated in a blended classroom learning before' the responses as indicated in Fig. 5.

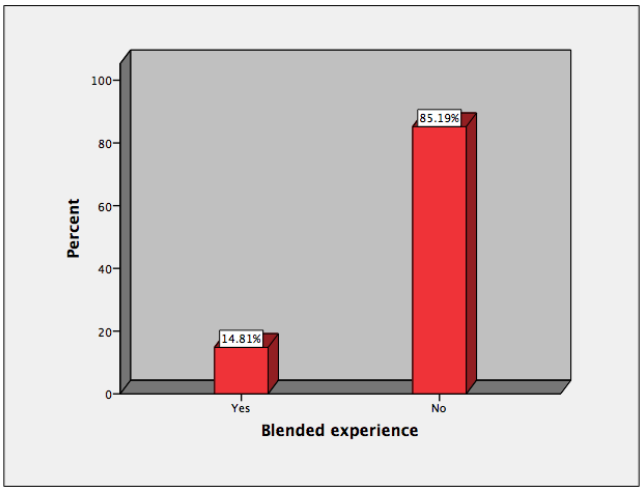

Fig. 5. Show percentage of students who have participation in a blended class.

The proportion of male to female students in percentage indicates approximately 93% (n = 25) male and 7% (n = 2) female as illustrated in the gender demographic in Fig. 6.

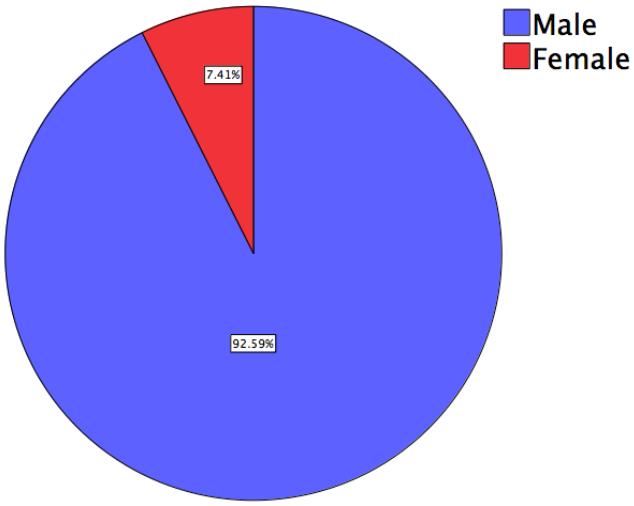

Fig. 6 . Gender demographic (n =27)

B. Data Collection Procedure and Approach

Exploring online self-regulated questionnaire (OSLQ) to address the need for a measuring instrument in a virtual learning environment, this study reveals the hiding significance of the instrument. How this instrument structure can be applied to a traditional face-to-face focus group interview and online questionnaires. The data were collected from a single sample of first year undergraduate computer science students. This sample of students took the blended class in combination with a conventional (traditional) classroom teaching and learning approach. The OSLQ instrument applied were from an existing instrument [12]. The data were collected based on the OSLQ format as follows: (1) Goal setting (2) environment structuring (3) task strategies (4) time management (5) help seeking (6) self-evaluation and (7) general questions on blended classroom seminar.

The first questionnaire was to obtain the general knowledge of the students demographic, the knowledge of whether they have participated in any online blended learning in the past, also to gather the thought of the students about the blended classroom instruction. This general information gathering survey questions direct the inclusion and exclusion of patterns of teaching in the future based on the responses. For the self-regulated learning, the questionnaire used for this study was an existing instrument known as 'online self-regulated learning questionnaire' (OSLQ) developed by Barnard et al. [12]. This study questionnaire structure was in six fold designed specifically the research in order to addressed the research questions. Although the strategies involved during the data collection were similar to the initial instrument. The first questionnaire had 37 questions in combination of Likert scale options; strongly agree as the highest respond with 5-point and strongly disagree with the lowest respond with 1-point, and finally hand written comments to gain the thoughts of the students in respect to the online blended class instruction .

C. SRL Dimensions : Survey Responses

This section presents a selected question from each of the SRL dimensions and the responses received.

Goal Setting: The goal setting question present a response when students were asked to respond to the statement 'I set goals to help me manage studying time for my blended classroom lecture seminar'. The result indicates 52.94% agreed to the statement as seen in Fig. 7.

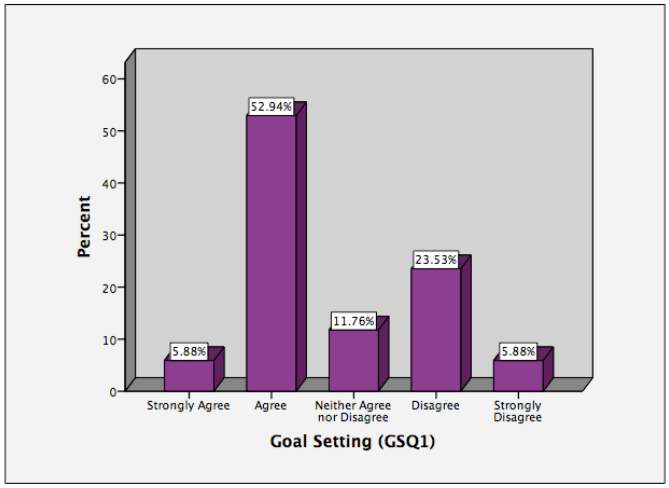

Fig. 7. Goal setting question

Task strategies: In the task strategies dimension, response to the statement 'I find the solutions to problems in the blended class or any online courses aided me to master the content', reveals that 58.82% of the students agreed to this question and 11.76% of students strongly agreed as seen in Fig. 8.

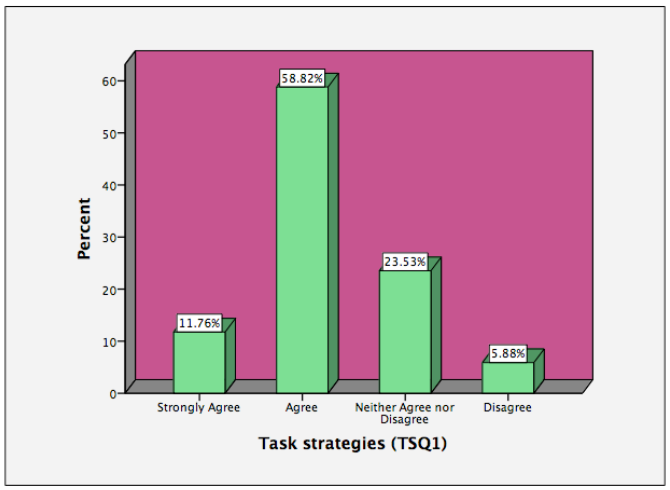

Fig. 8. Task strategies question

Time management: When students were asked about their time management skills in this statement; 'I allocate sometime to my online blended classroom seminar to acquire more knowledge', 23.53% agreed to the statement, majority of the students where careless about the time management or really don't want to explain their time skills (as seen in Fig. 9). Although this confirm similarity of the results in the SRL dimensions in section 5.5.

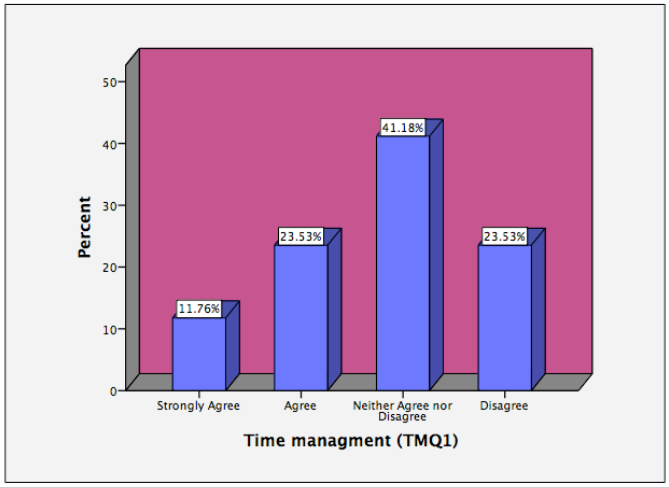

Fig. 9. Time management question

Environment Structuring: The students in the study show prove of their individuality and preference of study environment when they were asked to respond to the statement; 'I choose my preferable environment to study in order to avoid any distraction', majority of the students were positive in their responses. Most of the students about 58.82 agreed to the statement and while 17.65% strongly agreed as illustrated in Fig.10.

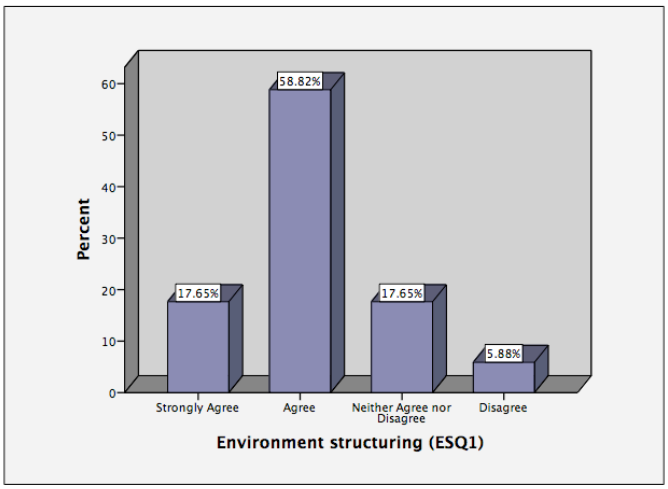

Fig. 10. Environment structuring question

Help seeking: In the help seeking statement 'I find a colleague who is knowledgeable in the course content so I ask him or her when I need any help', 35.29% agreed to the statement and 23.53% strongly agreed as seen in Fig. 11. This

result indicates students' willingness to ask for help both from their peers and tutor.

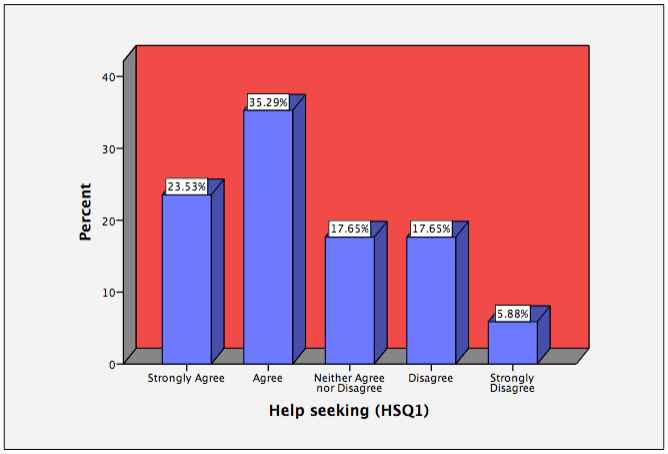

Fig. 11. Help seeking question

Self-evaluation: In terms of self-reflection or self-evaluation while studying, the students' responses to the statement; 'I summarize my blended classroom learning to examine my understanding of what I have learnt', shows 29.41% agreed as reveals in Fig. 12. This reveals very little students are willing to give accurate response to the question or may be due to the fact they are new to this blended learning, they could not understand fully the importance of self-evaluation while studying.

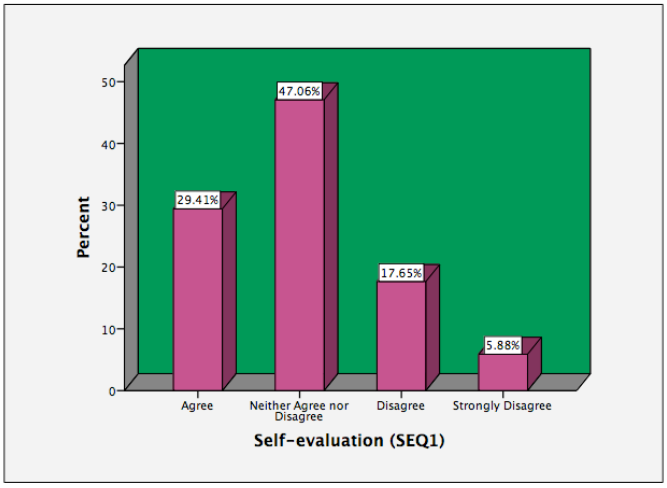

Fig. 12. Self-evaluation question

D. Measuring Self-Regulated Learning Skills

In order to acquire responses from the self-regulated learning strategies using OSLQ , the following four structures were used to collect the data; (1) Goal setting and learning environment , this has 9 questions. (2) Assignment and time management, with 10 questions. (3) Critical thinking and analytical skills , with 8 questions. (4) Self-regulated and personal enhancement skills acquired from the blended seminar, this had 4 hand written comments boxes to gain the insights on the effectiveness of the blended class to motivate or help in boosting self-regulated learning skills.

The measuring instrument for this study as discuss earlier is the online self-regulated learning questionnaire (OSLQ) which was constructed using 31-item with 5-point Likert response format, having ranging values of strongly agree as 5-points, agree as 4-points, neutral as 3-points, disagree as 2-points, and strongly disagree as 1-point. The OSLQ was developed considering the accuracy and reliability of the results from the data sample collected [36,37].

The students were requested to answer the questions with all honesty. The questionnaires were administered anonymously and were confidential. The participants agreed and signed the consent form to contribute to the research and they were assured their responses would be treated with optimum confidentiality and anonymously. There are no right or wrong respond, the students' opinions will help develop a more useful and better blended MOOC structure in the nearest future.

E. Data Analysis

The data analysis in this study was conducted using Statistical Package for the Social Sciences (SPSS) descriptive statistics and inferential statistical method. The descriptive statistics was applied in this case study to understand the percentage ratio of the students who responded to the survey questions. Finally, content analysis method was applied to analyse the hand written comments section of the questionnaire. The data were inputted into an online Google doc file for data capturing purposes and were later imported into MS Excel spreadsheet format. For the sake of analysis, the excel data was imported into SPSS (V.22.0). Analysis was performed using descriptive statistical methods to evaluate the data.

F. Visualising SRL Profiles amongst Students

Fig. 13, demonstrates the fact that even with scores of 3 and above, there are certain questions in the OSLQ that required further improvement. For example as shown in the Fig. 13, task strategies have score of above 3 in TSQ3 but required improvements in other individual area questions such as TSQ1, TSQ2 and so on.

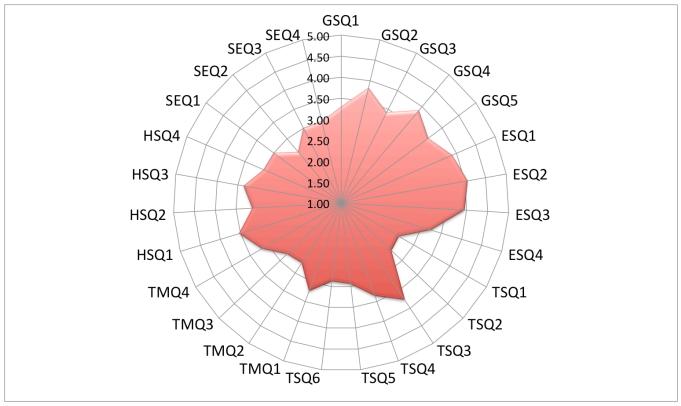

Fig. 13. Visualisation of average SRL scores for the OSLQ

Table 1 shows the overall average scores of the OSLQ grouped into six dimensions. The result indicates close averages between the time management and self-evaluation strategies. Respondents show noticeable effect in the environment structuring dimensions, which reveals the students carefully considered the important of study space. However the students are less inclined to manage their reading time and self-evaluate their reading habit , but although they goal settings achieve reasonable SRL score, which reflects that students are willing to set proper goals and work towards achieving them with consistent task strategies laid before hand. In order for SRL skills to be considered high, the students should have either chosen 'agreed' or 'strongly agreed' in the Likert scale questions to score point 4 or 5 respectively. The average result as represented in this study indicates that there is a considerable need for improvement in all the six dimensions as shown in Table 1 and Fig. 14.

TABLE I. OVERALL AVERAGE SCORE FOR EACH OF THE SIX DIMENSIONS

GS	TS	TM	ES	HS	SE
3.60	3.03	2.97	3.78	3.25	2.90

Fig. 15, shows clearly need for improved time management and self-evaluation. This shows students study effectively without taking time into consideration and also prepare so hard to present a good quality assessment sheet and on the other hand lack the skills to frequently self-reflect or self-evaluate their learning activities. This two areas of SRL dimensions need to be reconsidered and see how proper guidance could be provided to support the students making proper time judgment and personal reflection on their studies.

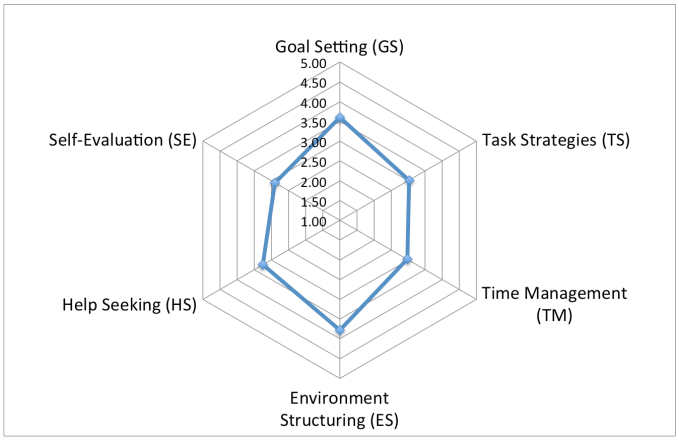

Fig. 14. Visualisation of overall average SRL dimensions

G. Results by Individual Students

Table 2 illustrates the average SRL score for individual students. There is distant in observation amongst the scores for instance a student with 4.14 average and another with average score of 2.43. Majority of the students have average that fell between 3 and 4.14. Fig. 15, shows the individual student's SRL score with respect to the six dimensions, revealing areas of high SRL and low SRL that needs improvement. The result indicates considerable weakness in self-evaluation dimensions in most of the student learners, while environment structuring shows considerable high level amongst most of the students.

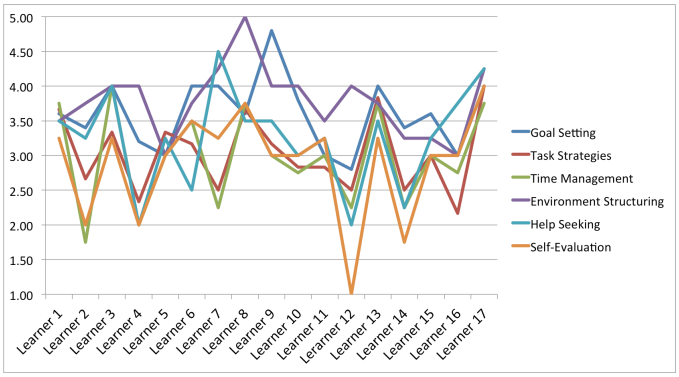

Fig. 15. Individual student's SRL score with respects to the six strategies.

TABLE II. AVERAGE SRL SCORE FOR EACH STUDENT

	Average SRL Score
Learner 1	3.54
Learner 2	2.80
Learner 3	3.76
Learner 4	2.59
Learner 5	3.10
Learner 6	3.40
Learner 7	3.46
Learner 8	3.88
Learner 9	3.58
Learner 10	3.23
Learner 11	4.14
Learner 12	2.43
Learner 13	3.68
Learner 14	2.57
Learner 15	3.18
Learner 16	2.94
Learner 17	4.04

H. Average Weekly Assessment Marks

Table 3 shows the average mark for 22 students in the module. The overall mark for this group of assessment was '25 Marks'. Even with the low level of SRL skills, this marks shows that students are learning in a different way suitable to them and which help motivate their studies. For example in a focus group interview conducted, a student could challenge his or herself in playing a game and when he or she looses, then they are forced to study. Different motivational techniques that works for them and which is suitable to the student believes could support effective learning which can improve student academic performance. Another good scenario observed from the focus group interview; a student could go out for sports and when they return immediately start studying because this motivate them to read effectively.

TABLE III. STUDENT AVERAGE WEEKLY ASSESSMENT MARKS

Mark 1	Mark 2	Mark 3	Mark 4
21.77	21.18	24.11	23.02

VI. DISCUSSION

The research question in this study focused on the SRL skills demonstrated amongst students and investigating area of interest that need improvement. Our objectives is to investigate whether the average SRL scores from this findings could be further improve from the blended class room students' perspective. The overall average SRL six dimensions score reflects areas that definitely required more improvement. All the six dimensions need further improvement from the students point in order to reach the threshold point for high SRL. Thus, this are highly surprising findings, given that most of the students study using their own learning styles. However, majority of the students as learnt from the demographics have not had any experience in blended classroom sessions before coming to the university. So at this point they struggled to understand the rationale and concepts of SRL in a blended context. Although, the students were very familiar in the area of social media, but they found this formal educational process new to them even though it is an online inclusive learning. The concept of SRL skills is said to be context dependent [38]. Though some of these skills might overlap from student to student depend on where their study strength dominated. There are several aspects of SRL skills which need further development in this study. The individual learner shows distinctive strength in the different dimensions. Be that as it may, two students show average SRL skills individually above the threshold to benchmark the high SRL levels. However, when it come to the collective average SRL six dimensions scores, non of the score was close to the threshold of 4 and above to meet the level of high SRL skills in respect to the dimensions. This findings in terms of average score is worrying as majority of the learners about 88% (n = 15) students score individual average SRL score below 4 and only just about 12% (n = 2) students were able to score average above 4 as reference in the Table 2 above. Even for experience blended learning students, the level of SRL skills is most probably likely to be challenging. Currently, the lack of blended learning experience of the students in this study could be a contributory factor to the low level SRL skills as observed in the findings. Although with the subsequent run of the module and with the sufficient instructional information on the development of SRL skills, the results might improve. On the contrary, these low level SRL skills did not in any way affect students' performance. This shows that student academic performance increases in a dynamic way above the average pass mark. Therefore the SRL enhance better academic performance, but in our study, greater percent of students on one hand are new to blended concepts, but they in one way or the other developed individual strategies to succeed in their studies in order to achieve better academic

success as referenced in average weekly assessment scores in Table 3 above. The students' autonomy has led to better grades even with this lack of effective SRL skills. Further encouragement of developing new skills will be pursued in order to create both an implicit SRL skills which foster self-directed learning and allowing student to take control of their learning activities, and an explicit SRL which directs students to self-evaluate and reflect on enhancing their SRL skills. Thus, further methods of introducing new concepts such as explicit goal setting skills would be easy to understand by the students.

VII. CONCLUSION

There has been little research on blended MOOC learning platform within educational institutions as both an e-learning system tool to support a blended learning environment. In order to maintain the significance of blended learning in a face-to-face classroom teaching methods, the online tools should introduce extended novel features to support students in their learning [39]. This study proposes a multi-dimensional learning evaluation from an online blended seminar classroom different mode of studying. Learning analytics has shown the various course units that need improvement [2]. This however helps to inform a better course delivery. The use of learning technology as a catalyst towards enhancing the learning process for learners in educational contexts thus involves an investigation of the learners themselves, the content to which they have engage with in this context, the learning platform environment itself and the components that comprised in this environment.

There is no particular outstanding score from the overall average SRL six dimensions from the data. However for the individual students SRL average score, two students (learner 11 and 17) achieved an average score of above 4 which show high self-regulation from the result. The classification of less than or equal to 3 scores is deem to be low level therefore we say low self-regulation and also 4 above is said to be high level which is deem high self-regulation. This undoubtedly reveals first year undergraduate students in an orthodox class setting rely mostly on the tutor for guidance and direction in the early phase of their studies with very little self-study mode. Although this study present findings from small sample data points, but it opens avenues for important areas which need exploring in further investigation. However, this provides indication for a large scale data analysis. Although, it might not be totally possible to obtain consistency in the students responses grouped into the six SRL dimensions. We shouldn't rule-out the fact that some students on the other hand may response to the questionnaire as they deem it fit, even if they don't understand the question or statement. Lastly, the different motivational strategies which are unique to individual students provide the support they needed to be successful academically.

Thus, students in this blended learning are demonstrating desire to be more autonomous and develop individual learning objectives. Although the need for learners developing their own learning strategies is in itself shows the skills of self-determination on the student part. This study aim at supporting learners to foster and develop SRL skills in addition to skills already acquired. With the further design science research approach, further social learning techniques will be incorporated to inform students of the significance of these skills in learning and which will also support developing SRL strategies. Providing constant online blended exercises to increase their skill levels might lead the students to acquiring more tools to increase their SRL strategies which could motivate planning realistic goals and encourage them to pursuing the set goals effectively. The visualisation of the course content in form of progress map, help to focus 'whole' into the 'part' necessary for individual studies. These visual representation features support and provide more effective use of the students' thinking abilities and applying effort in reflecting on their studies [40].

A current preliminary study has been carried out in respect to the main learning platform eLDa for which this module is embedded in. Research data has been collected and examined for which interesting themes have emerged. Further comparison of the findings between this blended classroom SRL study and the full online course developed to deliver Computing concepts and Python programming. This will enable us to compare SRL results between these two totally different study modes. Results emerging show discrepancies which will lead to further interesting exploration.

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