



Student Motivation in Learning Electronic System Course Through Online Platform

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ABSTRACT

The COVID-19 pandemic has shifted the teaching and learning into completely online. The use of many educational platforms and online teaching tools make it possible to continue the educational sector running. This paper attempts to find out about student motivation in learning Electronic System course through online platform among electrical engineering students. The online learning and teaching for this course were conducted using both synchronous and asynchronous approaches. Apart from the lecture, learning activities were also included such as demonstration of electronic system functionality, simulation hands-on and collaborative work. The study sample consists of students taking electronic system course at the present semester. Quantitative data was collected using Motivated Strategies for Learning Questionnaire (MSLQ) under motivation scales. Through statistical analysis, it was found that the students were generally affected by the task value motivation scale when learning electronic system course online. Therefore, a practical learning strategy is necessary for effective delivery of the course content.

1. Introduction

Electronics system is one of advanced electrical – electronics course that involves challenging engineering content related to circuit design and analysis. Since the shifting of teaching and learning after the COVID-19 outbreak into online platform, both learner and instructor are trying to adapt to the new normal of teaching the technical content of this course. This involves the use of various digital teaching tools online and offline to achieve the course learning outcomes [1]. The implementation of the open distance learning through synchronous and asynchronous approach must be properly designed to maximize the learning process as the student adapts and learns independently [2]. Online learning can be beneficial for the student to achieve excellent performance

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if they able to discipline themselves [3]. However, online learning can also negatively affect for those that unable to manage their study time effectively.

Learning motivation is one of the key factors that can keep the students engaged well during the learning process and create excitement regardless of the challenge faced and level of difficulty of the course content. Kim *et al.*, [4] have conducted a study on changes in student motivation during online learning. Earlier study has investigated about student learning motivation for high school students majoring in science according to gender during online class [5]. They noted that there is a significant difference between male and female students for learning motivation where higher mean score is achieved for female. In another study by Avila *et al.*, [6], they carried out a descriptive study about student motivation and learning strategies in using educational technologies. They revealed that the use of educational technology has motivated the students to learnt through online platform. The instructor also needs necessary planning in the teaching delivery as the student motivation will affect their academic performance and the approach could differ for upper level and lower-level college student [7]. Electronic system course is one of the advance electronic courses where the content involve circuit design an analysis. Delivery of this kind of technical content can be very challenging to ensure the student understand the subject matter well.

2. Design of Electronic System Online Class

The design of this class is through both asynchronous and synchronous approach. The class materials are organized using the learning management system lesson activity allowing self – directed learning particularly for asynchronous class. Each lesson has pre-recorded lecture, and quick quiz to assess their understanding. The hands – on simulation is provided for certain topic to helps student to understand the subject matter. The students are required to complete the lesson prior joining the live synchronous class. Student will post any question they had in asynchronous communication platform for further discussion, and it is shared with the whole class. Figure 1 shows the design for electronic system online class.

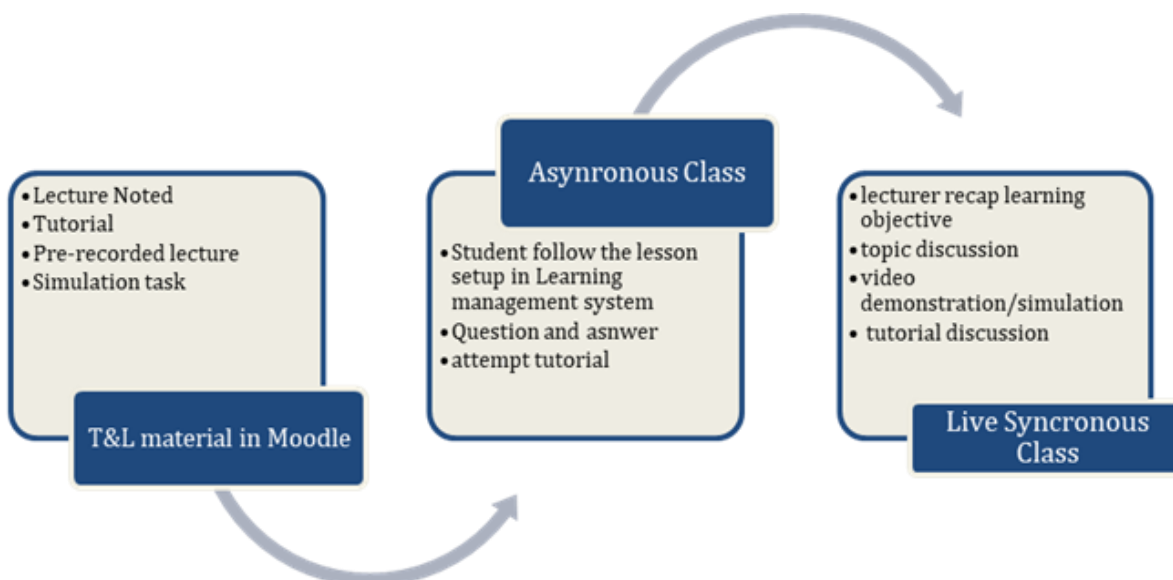


Fig. 1. Design for Electronic System Online Class

Live synchronous discussion where the instructor will discuss some tutorial and answer any questions from the student. Microsoft OneNote is used during the live discussion and the annotated file will be shared with the student at the end of the class session. Some topics are conducted in synchronous live class, enabling learner to ask question directly particularly for a more challenging topic. With this teaching strategy in electronic system course, this research aims to study about the learner motivation after having to learn this course online. The outcome would help the instructor to improve in the future implementation. The following are the research questions for this study:

i) Which motivation component mostly contributes to student learning electronic system course online.

3. Methodology

In this paper, the learning motivation factor is studied among electrical engineering students taking electronic system course delivered through online platform. This study employed quantitative research design to study on student learning motivation. For this, Pintrich's Motivation Strategy for Learning Questionnaire (MSLQ) under motivation section [8] is used to assess the learner motivations component. The questionnaire was given to the students towards the end of the semester. The MSLQ motivation scales have 31 items where the student must score using Likert scale between 1 to 7. For each motivation components, the score for all items is averaged to measures the motivations. The data were then analyzed with descriptive statistical analysis which are the average mean and the standard deviation using SPSS software. To further evaluate each of the components, the mean and standard deviation for each component is analyzed.

4. Results and Discussion

Students' responses to each of the MSLQ item are listed in Table 1. The MSLQ instrument were given to-wards the end of the semester, and they need to score their motivations about learning Electronic System course online based on the Likert scale where scale 7 indicates 'very true of me' and scale 1 indicates 'not at all true of me'. From the descriptive analysis shown in Table 1 that the MSLQ item for six constructs have an average mean between 5.06 and 5.87 with standard deviation between 0.96 and 1.19. Inspection of the six constructs of MSLQ motivation, the students are motivated to learn electronic system through flipped class-room model in their task value (5.87) followed by the control of learning belief (5.85). It can also be seen that the least motivation construct among students during the online class is on the self-efficiency and test anxiety. It is also notable to observe from Table 1 that online learning for electronic system course among student have higher extrinsic motivation with average mean of 5.76 compared to the intrinsic motivation with average mean of 5.60 counterpart. The students also showed higher rating for control of learning believe motivation components where they feel the accountability and ability to control their learning to master the course content for a better performance. Comparing the rating for self – efficiency for learning and performance and test anxiety component, suggests that the students require the instructor to guide the learning particularly for challenging content like circuit design. The students' lowest student rating relating to affective component, test anxiety proofs the effectiveness of the learning strategy applied for the online learning in this course.

Table 1

Descriptive Statistic of The Learning Motivation in Online Learning for Electronic System Course

Component	N	Average Mean	Std. Deviation
Task Value	45	5.87	1.13
Control of Learning beliefs	45	5.85	0.95
Extrinsic Goal Orientation	45	5.76	1.20
Intrinsic Goal Orientation	45	5.60	1.08
Self-Efficiency for Learning and Performance	45	5.44	1.19
Test Anxiety	45	5.06	1.12

To further evaluate, the items in each component are analyzed. The descriptive statistic is investigated. The data are listed in Table 2. In task value component, the mean for item 2 which is “it is important for me to learn the course materials in this class” is the highest (6.36) with standard deviation of 1.00. 57.8% of the respondent give a score of 7. Item “I think the course material in this class is useful for me to learn” have a mean value almost equal to item “Understanding the subject matter of this course is very important to me” with a standard deviation of 1.42 and 1.40 respectively. The lowest score for this item is 2 obtain from only 2.2% of the respondent.

According to MSLQ, task value refers to students’ perception of the course material in terms of interest, importance, and utility. The highest average mean for task value achieves in this study indicates that the students found that the learning materials are helpful in the online learning process particularly the shorts notes and live class discussion. In terms of the learner control of learning beliefs, majority of the learner belief that they should be able to learn the course materials when using it in an appropriate way where the mode is a score of 7 for item number 2. It can also be seen from Table 2 that the highest mean for this component is item 2 with a mean of 6.20. The lowest mean is for item number 25 for “If I don't understand the course material, it is because I didn't try hard enough” with mean of 5.80 and standard deviation of 1.52. In the evaluation of student extrinsic motivation after the online class of electronic system course, from the four items, the mean achieve is for item “Getting a good grade in this class is the most satisfying thing for me right now” with mean of 6.20 and standard deviation of 1.16. This indicate that getting a good grade is one of the external factors for motivation. Most notably, the mean for item “I want to do well in this class because it is important to show my ability to my family, friends, employer, or others” has the lowest mean which is 5.31 with standard deviation of 1.81.

Comparing the average mean for intrinsic and extrinsic motivation in Table 1, the average mean is lower for intrinsic motivation component. Details inspection of the items in intrinsic motivation component, the highest mean is achieved for item “The most satisfying thing for me in this course is trying to understand the content as thoroughly as possible” (6.09). This is followed by item “When I have the opportunity in this class, I choose course assignments that I can learn from even if they don't guarantee a good grade” where the mean is 5.67 with standard deviation of 1.67. However, the lowest mean for item “In a class like this, I prefer course material that really challenge me, so I can learn new things” which is 5.11. The student learning motivation about learning technical based course also relates with self – efficiency for learning and performance. According to mean of this component presented in Table 2, item “I'm certain I can understand the most difficult material presented in the readings for this course” has the lowest mean of 5.01 and the standard deviation of 1.53. There is a markable different on the on the mean achieves for “I'm confident I can understand the basic concepts taught in this course” (5.87). The mean is closely to item “I expect to do well in this class” which is 5.80 but with higher standard deviation of 1.47. Based on this, it can infer therefor that the learner expectancy component of the learning motivation is one of the contributing factors is determining the successfulness of the course delivery.

The lowest average mean for affective component which is test anxiety suggests that the learner have less negativity thought about their performance when having online class. This is evident from the descriptive statistic listed in Table 2 where the highest mean is 5.49 on item “When I take tests I think of the consequences of failing” with standard deviation of 1.73. The mean score for item “When I take a test I think about items on other parts of the test I can't answer” is 5.38. This mean score is 5% higher for item “When I take a test I think about how poorly I am doing compared with other students” (5.11). The lowest mean score for test anxiety component is 5.00 related to item “I feel my heart beating fast when I take an exam”.

Table 2
 Descriptive Statistic of The Learning Motivation in Each Component in MLSQ

Component	Item	Mean	Std. Deviation
Task Value	10	6.36	1.13
	23	6.02	0.95
	27	6.00	1.20
	26	5.80	1.08
	1	5.78	1.19
	17	5.62	1.12
	Control of Learning beliefs	2	6.20
9		5.96	1.35
18		5.87	1.26
25		5.80	1.52
Extrinsic Goal Orientation	7	6.09	1.20
	11	6.04	1.38
	13	5.87	1.34
	30	5.31	1.81
Intrinsic Goal Orientation	22	6.09	1.31
	24	5.67	1.67
	16	5.56	1.41
Self-Efficiency for Learning and Performance	1	5.11	1.42
	12	5.87	1.31
	21	5.80	1.47
	31	5.60	1.39
	20	5.51	1.29
	29	5.47	1.41
	5	5.29	1.34
Test Anxiety	15	5.04	1.40
	6	5.01	1.53
	14	5.49	1.73
	8	5.38	1.56
	3	5.11	1.73
	19	5.02	1.64
	28	5.00	1.67

The results from this study suggest that the highest learning motivation is about the value component. This suggests their interest about the course, and how they feel about the usefulness of the course content. Although the learners did not experience much on variety of teaching strategy during online class, they found that the learning materials help to increase the motivation to learn. The same outcome was achieved in a study by Avila *et al.*, [6] when evaluating student motivation and learning strategies in using education technology in online learning. The extrinsic motivation seems to be higher compared to intrinsic motivation when learning online. This indicates an external

factor motivates them most. According to a study by Firat *et al.*, [9], the intrinsic motivation level is high in e - learning environment. The level of motivation component form MLSQ among learner taking electronic system during online learning may vary depends on their environment.

3. Conclusion

This paper reported on learner motivation factor in learning electronic system course online using MSLQ instrument. Analysis of the results shows that the learners are motivated mostly by the task value of this course indicating they value the course materials and the organization of the live synchronous class. The online learning for challenging technical content in electronic system course has also motivates the student intrinsically ad extrinsically. Despite of the online learning, the students show least rating in test anxiety motivation component indicating their satisfaction in the delivery of the course content. Each of these components has been analyzed to evaluate on each of the items. The outcome of this study can become a guideline for the instructor to improve the teaching strategy to diversify the teaching strategy by incorporating active learning activity. The current study has not correlated the learning motivation with the learning strategy in correlation with students' performance and should be consider for future work.

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