

The Application of Google Classroom as a Tool for Teaching and Learning

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Abstract—Learning activities in the computer lab is one of the challenging in higher education. Subject that is most practical activities such as Data Mining are by nature illustrative or demonstrative in the computer lab that emphasize the acquisition of observational skills; and allow students to see the concept dealt in action and relate theory more closely to reality. However, the students' reaction to practical work is often negative as a result they are not effective in laboratory work and this may reflect a student perception that there is lack of clear purpose for the lab hands on task. The main objective of this study is to explore the effectiveness of Google Classroom's active learning activities for data mining subject under the Decision Sciences program. A set of questionnaire has been distributed to a sample of 100 students who enrolled data mining subject were used in this study. The analysis of the data was carried out using Technology Acceptance Model (TAM) to examine the relationship between the identified factors and the effectiveness of the learning activities. The results prove that majority of the students satisfy with the Google Classroom's tool that were introduced in the class where all ratios are above averages. In particular, comparative performance is good in the areas of ease of access, perceived usefulness, communication and interaction, instruction delivery and students' satisfaction towards the Google Classroom's learning activities.

Index Terms—Google Classroom; Web 2.0 Tools; Teaching and Learning.

I. INTRODUCTION

Google is a popular Web 2.0 tools that offers a lot of interesting facilities and applications. It, like many other Web 2.0 tools, has potential for teaching and learning because of its unique built-in functions that offer pedagogical, social and technological affordances [1]. Google Classroom is a new tool introduced in Google Apps for Education in 2014. This classroom facilitates the teachers to create and organize assignments quickly, provide feedback efficiently, and communicate with their classes with ease.

Current traditional method of teaching is teacher-centered learning where lecturers use visual aids in the form of presentation slides, whiteboard and visualizer. Learning activities in the computer lab involves four major types of practical works: exercises, experiences, demonstrations and investigations. Therefore, current traditional method is not practical to be employed in computer lab teaching. Subject that is most practical activities such as Data Mining are by nature illustrative or demonstrative in the computer lab that emphasize the acquisition of observational skills; and allow

students to see the concept dealt in action and relate theory more closely to reality. However, the students' reaction to practical work is often negative as a result they are not effective in laboratory work and this may reflect a student perception that there is lack of clear purpose for the lab hands on task. Computer lab teaching in universities is often criticized for being prescribed, impersonal, lacking an opportunity for personal judgments and creativity due to the lack of time, for example data mining class in undergraduate level is conducted only three hours per week.

In this paper, TMA is proposed in the analyzing of the effectiveness of Google classroom's active learning activities for data mining class. The rest of the paper is organized as follows: in the next section, a review of related works is provided, followed by the research method used in this study. The results and findings is then explained and summarized.

II. RELATED WORKS

Online education continues to grow and is playing and increasingly significant role in Malaysian higher education. Shea and Bidjerano [2], said in this rapid growth, research is beginning to emerge indicating that online education has transcended the "no significant difference" phenomena. For more than a decade the accepted wisdom has been that online education and its predecessor, "distance learning" resulted in no significant difference relative to learning outcomes achieved through classroom instruction.

TAM was developed by Davis [3] to explain the computer-usage behavior. There are two important determinants of the actual system used: perceived ease of use (PEOU) and perceived usefulness (PU). Saadé, Nebebe, and Tan [4] insisted that university students' participation and involvement were important to successful e-learning systems and therefore students' acceptance behavior should be assessed. They suggested that TAM was a solid theoretical model where its validity can extend to the e-learning context.

On the context of integration of Google classroom into the teaching and learning of data mining and related applications concepts, the users (teachers or students) must have perceptions that Google classroom is useful in helping in the teaching and learning process, as its ease of use they will intend to use it when needs arise. The teachers uphill tasks are to make students aware of its use in future workplace, as well as to ensure students confidence that it is easy to use.

Google classroom can be elevated to become a

pedagogical/cognitive tool to help in changing the focus of the classroom from one that is teacher-centered and controlled to one that is learner-centered and open to inquiry, dialogue, and creative thinking on the part of learners as active participants. The use of Google classroom in teaching and learning data mining and related applications is intended to be used as a cognitive/pedagogical tool. Traditional instruction is defined as instruction that is not supplemented with the use of computer software. Using Google classroom also promotes higher order thinking skills, promotes the development of problem solving skills and supports “what if...” type questions which are more desirable in this computer age.

In relation to the online environment, social integration is related to feelings of social connectedness and group cohesion [5]. Social presence provides an environment for this connectedness and group cohesion to develop. In turn, teaching presence has been found to be significantly correlated with student persistence due to its effect on social presence [6]. Factors leading to attrition are complex, they all pointed to the lack of social and academic integration as primary factors. Academic integration, student satisfaction in intellectual development, is less dependent on the form of communication when compared with social integration.

From the literature review, it was found that Google classroom is needed in teaching and learning especially when involving computer lab learning activities such as making observations; posing questions; examining books and other sources of information to see what is already known; planning investigations; reviewing what is already known, using tools (computer software) to analyze the data and interpret data; proposing answers, explanations, and predictions; and communicating the results.

III. RESEARCH METHODOLOGY

The target populations for this research are students who enrolled data mining subject where the class is taught in a computer lab. In order to have random selection method, simple random sampling had been applied when choosing the sample. The survey included questions on demographics, five predictor variables, and student satisfaction. Demographic questions covered gender, marital status, course, and the average on internet accessed.

In order to develop the instruments of the questionnaire, the Internet self-efficacy scale was developed by Eastin & Larose [7] is used as referenced. All the items were measured using a five-point nominal scale ranging from 1 (strongly disagree) to 5 (strongly agree). Prior to the distribution, the instrument was first reviewed by experts to ensure its content validity. The experts were selected on the basis of their expertise in online teaching and learning domain. Considering their recommendations, some minor modifications were made involving paraphrasing, deleting items, rephrasing sentences, and renumbering items. Further, a pilot study was carried out to ensure reliability. It involved 30 students who enrolled data mining subject. The results reveal a Cronbach Alpha greater than 0.9. Data was analyzed using both descriptive statistics and inferential statistic.

Based on the survey, it is observed that the students are dominated by female. This is clearly visible based on the high

percentage (82%) of female respondents for the survey compared to only (18%) male respondents. 97% of the respondents are Decision Science students and 3% comes from Industrial Statistic background.

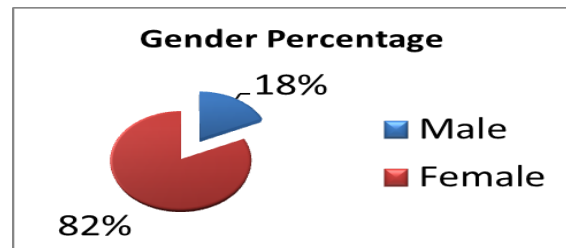


Figure 1: Gender percentage

IV. RESULT AND FINDINGS

A Likert type question on average of how often the internet is accessed was asked in the questionnaire in order to identify the level of information and communication technology (ICT) usage among the respondents. Five answers option were provided as shown in Figure 2. Slightly above (80%) respondent use the internet several times a day and almost (20%) of them use internet many times a day. These imply that the entire respondents are familiar with the use of internet and web based program.

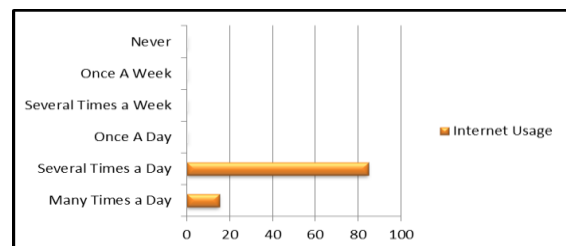


Figure 2: Internet usage average

Table 1
Mean value for each component of ease of Access

Factor	Component	Mean
Ease of access	Signing on to the Google Classroom	4.45
	Accessing course materials	4.39
	Sending and receiving assignment	4.52
	Submitting Assignment	4.55
	Navigating the system	4.24
	Easy to understand the system	4.39

Based on Table 1, all score shows above average with the highest mean is submitting assignment component with mean of 4.55. Respondents strongly agreed that the introduction of Google Classroom in their class makes the process of submitting assignment easier. Next, the lowest mean value goes to component of navigating the system with mean value of 4.24. The respondent disagreed that it is easy to navigate the system compared to other variables. Therefore, lecturer should pay more attention on helping or aiding the students with necessary materials in helping them to easily navigate the system.

Table 2
Mean value for each component of Perceived Usefulness

Factor	Component	Mean
Perceived Usefulness	The quality of learning activity was excellent.	4.24
	Google classroom is an excellent medium for social interaction (lecturer vs students and students vs student) as demonstrated by this activity.	4.30
	Google classroom help me to submit assignment on time.	4.33
	The course activities helped me to examine issues, to evaluate new ideas, and to apply what I have learned.	4.27
	The feedback provided by the lecturer is useful.	4.42
	The grading system in Google classroom help in monitoring my performance and understanding the current topic discussed.	4.24
	The subject objective, assessment and content were consistent with the aid of Google Classroom.	4.27

Based on Table 2, all score shows above average with the highest mean is component of the feedback provided by the lecturer is useful with mean of 4.42. Respondents strongly agreed that in term of usefulness of the Google Classroom, the feedback provided by the lecturer is very useful. Next, the lowest mean value goes to component of learning activity quality and the grading system in Google classroom with mean value of 4.24 each. This result indicates that the respondent disagreed that quality of learning activity and the grading system in Google classroom is useful compared to other variables, however the value of 4.24 still indicates that on average the respondent strongly agreed that those component is useful.

Table 3
Mean value for each component of Communication and Interaction

Factor	Component	Mean
Communication and Interaction	I felt comfortable conversing through this medium for this activity	4.24
	Lecturer helped to keep course participants engaged and participating in productive discussion.	4.39
	I felt comfortable interacting with other participants in this activity.	4.21
	My point of view was acknowledged by other participants during this activity.	4.33
	Lecturers are enthusiastic in teaching and explaining via the Google Classroom.	4.42
	Lecturers are friendly, approachable and could be easily contacted.	4.61

Based on Table 3, all score shows above average with the highest mean is component of the Lecturers are friendly, approachable and could be easily contacted with mean value of 4.61. Respondents strongly agreed that lecturers are friendly, approachable and could be easily contacted in Google classroom. Next, the lowest mean value goes to comfortability of interacting with other participants in this activity with mean value of 4.21. This shows that respondent disagreed that it is comfortable to interact with other

participants in virtual world compared to other variables. Therefore, lecturer should put more concern on making interactive platform of online learning in order to have an active online learning.

Table 4
Mean value for each component of Perceived Instruction Delivery

Factor	Component	Mean
Perceive Instruction Delivery	Lecturer provided clear instructions on how to participate in course learning activities.	4.45
	Lecturer clearly communicated important due dates/time frames for learning activities.	4.42
	Lecturer clearly communicated important course topics.	4.39
	Lecturer helped keep the course participants on task	4.36
	Lecturer provides feedback that allowed me to better understand the content of the course.	4.33
	Lecturer provided clear instructions on how to participate in course learning activities.	4.45

Based on Table 4, all score shows above average with the highest mean is component of instructions on how to participate in course learning activities is clearly provided with mean value of 4.42. Respondents strongly agree that in perceive of instruction delivery lecturer should provide clear instructions on how to participate the course learning activities. Next, the lowest mean value goes to feedback that allowed to better understand the content of the course provided by lecturer with mean value of 4.33. This shows that respondent disagreed that in perceive of instruction delivery lecturer should provide feedback that allowed them to better understand the content of the course. Therefore, an alternative way should be implied to increase student's understanding.

Table 5
Mean value for each component of Student's Satisfaction

Factor	Component	Mean
Student's Satisfaction	The subject met my personal goal through the medium introduced.	4.30
	I would recommend this method of learning to be applied to other appropriate subject.	4.42
	Google classroom is my first choice in active learning compare to other method.	4.18
	I like the Google Classroom as a learning initiative and motivation booster.	4.24

Based on Table 5, all score shows above average with the highest mean are the respondent would recommend this method of learning to be applied to other appropriate subject. Respondents strongly agreed and satisfy with the introduction of Google classroom an active tool of learning and would recommend it to be applied to other appropriate subject. Next, the lowest mean value goes to Google classroom as first choice in active learning compare to other method with mean value of 4.33. This shows that respondent disagreed Google classroom is their first choice in active learning compared to

other method. However, the mean of 4.33 still indicates the value of strongly agree.

V. CONCLUSION

This paper found out that overall students are satisfy with of Google Classroom's thus show it is effective as an active learning tools. The research effort shows that we are constantly determine through observations, surveys, and analyses of student demography and course design to what leads to a greater student's satisfaction on method of learning. This approach, in turn, will contribute to the training of online instructors in methods and the designing of educational support programs that allow students to succeed in the online environment. It is timely that google classroom's tools should be integrated into the teaching and learning of data mining software, not solely because it is a useful utility tool. More importantly it is pedagogical tool that will enhance the teaching and learning of data mining and related application.

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