

Assessment for Effective Lecture on Knowledge Retention towards Student Learning with Web-based Educational Tools

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Abstract— This study assessed the effective lecture for knowledge retention towards student learning. The survey involved 42 university students (fourth year in Chemical Engineering and Sustainability Energy Department, UNIMAS) where all of them were tested before and after the class through a 10 questions quiz as assessment. From this quiz assessment, only 50% (21 students) of the students managed to answer at least 7 questions correctly before the lecture was delivered. After delivering lecture, 100% (42 students) of the students managed to answer 10 questions correctly. However, after four weeks, only 90% (38 students) of the students managed to score 10 questions correctly due to short knowledge retention.

Keywords— Assessment, effective, lecture, knowledge retention, students.

I. INTRODUCTION

Since the last century, learning has been a central topic in many fields especially education since the largest part of the previous century. Learning can be defined as a change in behaviour due to the experience gained [1]. Learning can be explained as ontogenetic adaptation [2]. Therefore, learning is important among all the students especially in higher education. Students manage to learn or increase their knowledge through lectures given. Different students have different types of learning styles. One of the most attractive style and lengthen the knowledge retention among the students in higher education is web-based educational tools [3].

Lecturing has been one of the most employed tools for information transmission in higher education. It is one of the best methods in reducing knowledge gap between lecturers and students. The main benefit of lecture includes low cost as one lecturer focuses on a large group of students. Lectures are effective as this

process involves spontaneous communication skills between both lecturers and students [4]. Through this way, students managed to gain important information effectively. In addition, effective lecture helps to cover large chunks of materials in a shorter period, and simultaneously it helps to fit the needs of all the students [5]. Through the web-based educational tools such as online books or journals, it helps the students to study the notes earlier, understanding the topic before the lecture and voice out their opinions and enquiries [3]. However, this may be a real challenge to ensure all the students can have the same knowledge after the classroom as some students may not putting the effort on studying lecture notes or online materials provided.

To ensure all the students manage to obtain the same knowledge level after a lecture, assessment is a strategic method to ensure the quality of the students. Assessment can be well explained as the bridge between lecturing and learning [6]. Different assessments can be categorized into formative assessment [7], summative assessment, school-based assessment and diagnostic assessment [8]. All these assessments are closely associated with socio-constructivist theories of learning. Assessments help in the process by making learning visible to the students [8]. Students' knowledge and learning can be improved through assessment and evaluation while lecturers manage to improve their lecturing methods through the assessments given [9].

Lecturing, learning and assessment are interrelated and equally important in higher education. Assessment is one of the engines to drive student active learning. It helps the students to understand their weak point on specific lecture and enhance that specific part through more learning such as tutorials, quizzes and assignments. To improve the knowledge retention within

students, web-based educational tools are needed. Web applications for teaching and learning such as blogs, wikis and social networking tools are gaining popularity among higher education students. For assessment, many web applications such as Quiz Revolution, Moodle, Socrative, Quibblo and Zoho can be applied among the higher education students to ensure the students can understand the lecture better and clearly.

For this research, the aim is to investigate the assessment for effective lecture on knowledge retention towards student learning with web-based educational tools. The students were selected and tested on the same period.

II. METHOD

This research was a single-experimental study which involved 42 students from fourth year of Chemical Engineering and Sustainability Energy Department under Universiti Malaysia Sarawak (UNIMAS). All the students were given a 10 questions quiz assessment (summative assessment) right before the lecture started on the same period. The quiz was set based on the energy and power topic and this quiz was conducted using web-based educational tool namely Kahoot where all the students managed to take the quiz simultaneously. All the quizzes were marked right and discussed after each question. The same quiz was given to all the students once again right after the lecture and four weeks after the lecture. Data in relation to knowledge retention and effective lecture were collected before the lecture, right after the lecture and 4 weeks after the lecture. The data collected were plotted in table form.

III. RESULTS AND DISCUSSION

All the data collected were tabulated as shown in TABLE 1 and TABLE 2. TABLE 1 showed the quiz assessment results before and after lecture delivered. 42 students were requested to take the quiz on the same period right before the lecture. There were only 21 students who managed to answer seven questions correctly. This proved that all the students had different prior knowledge on the topic given [10]. Due to this limitation, only 2 students could achieve all the ten questions correctly. Discussion on all the questions were conducted right after each question to ensure the students gained in-depth knowledge. After the quiz assessment, a 2-hour lecture was delivered to the students related to the quiz assessment. This lecture was conducted to ensure the students understand the topic in depth as well as to lengthen the knowledge retention among the students. Thus, after discussion and lecture, all the students (42 students) managed to answer all the questions correctly without any mistake. This showed that lecture was

important with the aid of discussion for knowledge transmission from the lecturers to the students [4]. Lecture was effective to ensure the students managed to gain the knowledge clearly and enhanced knowledge retention.

Table.1: Quiz assessment results before and after lecture delivered

No.	Matric Number	Assessment results before lecture delivered (Correct answer)	Assessment results after lecture delivered (Correct answer)
1	45428	6	10
2	45521	8	10
3	45663	8	10
4	45830	8	10
5	45886	10	10
6	45900	9	10
7	45978	9	10
8	45996	7	10
9	46363	7	10
10	46416	7	10
11	46627	7	10
12	47104	6	10
13	47132	6	10
14	47210	6	10
15	47525	5	10
16	47858	5	10
17	48052	4	10
18	48665	4	10
19	48882	3	10
20	48927	8	10
21	49452	8	10
22	45411	8	10
23	45429	6	10
24	45436	6	10
25	45445	9	10
26	45458	9	10
27	45509	7	10
28	45516	7	10
29	45533	7	10
30	45659	6	10
31	45678	6	10
32	45688	6	10
33	45738	6	10
34	45742	6	10
35	45974	10	10
36	45988	8	10
37	46049	8	10
38	47157	5	10
39	48736	6	10

40	48884	5	10
41	48887	5	10
42	49556	5	10

*Note: 1 correct answer = 1 question managed to answer correctly

TABLE 2 showed the quiz assessment results after the lecture compared with the quiz assessment results after four weeks. The purpose to conduct the same quiz assessment after four weeks was to investigate the knowledge retention among the students on the specific topic. As mentioned in TABLE 1, 42 students managed to score perfectly in the quiz assessment right after the lecture. However, only 40 students managed to score perfectly again on the same quiz assessment. There were 2 students who scored at least 8 questions and above which proved that knowledge gained was well retained. In addition, 95% of the students managed to score perfectly with the effective lecture given to the students four weeks ago. This proved that the application of web-based educational tool such as Kahoot assisted the students to understand the topic while the effective lecture improved the students in terms of depth knowledge. The combination of web-based educational tool with effective lecture helped the students to enhance the knowledge retention [11] and thus, it helped to produce quality students with wide knowledge.

Table.2: Quiz assessment results after lecture delivered and 4 weeks after lecture delivered

No.	Matric Number	Assessment results before lecture delivered (Correct answer)	Assessment results after lecture delivered (Correct answer)
1	45428	10	10
2	45521	10	10
3	45663	10	10
4	45830	10	10
5	45886	10	10
6	45900	10	10
7	45978	10	10
8	45996	10	10
9	46363	10	10
10	46416	10	10
11	46627	10	10
12	47104	10	10
13	47132	10	10
14	47210	10	9
15	47525	10	10
16	47858	10	10
17	48052	10	10

18	48665	10	10
19	48882	10	10
20	48927	10	10
21	49452	10	10
22	45411	10	10
23	45429	10	10
24	45436	10	10
25	45445	10	10
26	45458	10	10
27	45509	10	10
28	45516	10	10
29	45533	10	10
30	45659	10	10
31	45678	10	10
32	45688	10	8
33	45738	10	10
34	45742	10	10
35	45974	10	10
36	45988	10	10
37	46049	10	10
38	47157	10	10
39	48736	10	10
40	48884	10	10
41	48887	10	10
42	49556	10	10

*Note: 1 correct answer = 1 question managed to answer correctly

By comparing TABLE 1 and TABLE 2, all the students scored better before the lecture and four weeks after the lecture. This proved the importance of lecture in student learning. In order to ensure the knowledge gained through lecture could be retained, web-based educational tool (Kahoot) was in need to be applied on student learning.

IV. CONCLUSION

From this quiz assessment, it was significant that the students managed to answer all the questions correctly right after the lecture given. This proved that lecture delivered was effective to remain the knowledge right after the lecture. However, knowledge retention did last long for four weeks where 90% of the students managed to answer the same quiz perfectly. It was clear that effective lecture helped the students to understand, analysed and applied all the knowledge learnt from the lecture on the quiz assessment given which improved their knowledge and at the same time lengthen their knowledge retention.

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