

Comparison between traditional teaching method and Discussion style to teach computer science courses and the impact of using discussion technique on the students marks.

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Abstract

If the teacher was able to clarify to students what is the purpose of the lecture? What they will learn? How to build and construct what they learn by themselves? If the students were able to answer similar questions; that would increase their chance to understand the lecture. The main goal of this study is review the curriculum of the cores to find any potential problem and suggest a solution for such limitation then analyze the impact of that solution on the knowledge of students. Furthermore, this paper presents a result of a real study of the impact of changing teaching method from traditional method to teaching with discussion technique and who that reflected on the level of students.

Keywords: discussion method teaching programming database computer Science

1. Introduction

Based on my teaching philosophy I am concentrating on three aspects for each lecture. Firstly, clarify for students why that lecture important for them to learn. Secondly, explain the concept and the theory behind each formals or equations in the lecture and how the scholars came up with them, and what are used for. Finally, deliver and teach students how to construct and apply what they learned from that lecture.

I believe of that it could be increase the chance to students to understand and enhance their knowledge of the lecture if the teacher was able to persuade his students and clarify the importance of what he teaches them. To reach that goal; the teacher has to use examples of what students know and how they practice them in their life activities. In such case it would be obvious for students the purpose of that lecture and realize why they learn that lecture and how it could be applied. The smart teacher who encourage his students and make them enthusiastic to know what are the concepts behind that lecture and make them hope to learn it. My goal in the previous semester was to improve my teaching method to enhance the level of the knowledge of my students. I have tried to pick up any potential problems and try to resolve them. Furthermore, I have investigated the impact of using discussion way during the lecture on students, as a trying to find more appropriate teaching method for students.

1.1. Review of related literature and improvement plan

During the previous semester I was teaching essential course which called “Fundamental of Database”. Database systems exist in the universities, schools, hospitals, clinics, airlines and everywhere. Any sorted data which meet the goal of organization are database. There are several models are been used to

design a database. The most famous used model called “Relational model”. More than 90% of the database systems around the world are based in its design on the Relational model. So the most important chapter in the fundamental database course is Relational model chapter. The Relational model concept depends on mathematical theories. I found the background of students in that mathematics which should learn from the secondary school not that good. I found this problem with most students during last years. But because of I have decided in the previous semester to answer the following question as challenging to me "how can I improve my teaching method of teaching fundamental database course?" By the end of semester I could reached a very high successful rate.

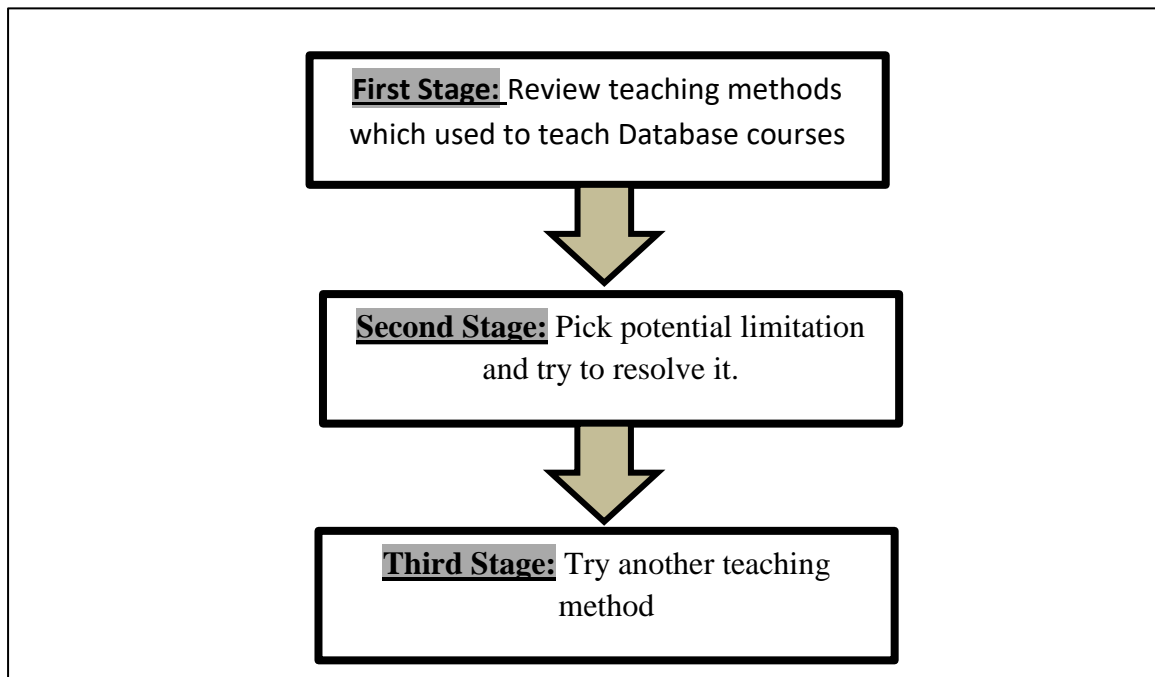


Figure1. Plan Steps of Development of Teaching Method

I call it improvement plan, that plan consists of three stages Fig [1]. The first one, I have searched literature trying to find suggested teaching methods which proposed by researchers assist teachers how to teach Programming or database courses to use it with my students. I fund [1] Teach database using teaching method based on blending learning theory which combines traditional and constructivist methods then he achieved a high rate of successful after practice for 3 years. [2] Developed a peer-learning simulation system to facilitate learning of programming language. In their developed system the agent plays the role of tutor to explain for student using artificial intelligence technologies.[3] The author conducted his research to see if the hypothesis that boys are better than girls in programming is true or not , then he came up with the following results that boys are developing programming skills easier than girls. For educational purpose [4], they presented video capture software which provides the multimedia designers with the tools which assist them how to create digital movies effectively. [5] Presented mix-methods to enhance the effectiveness of teaching writing, as a case study in digital learning environments in low income schools. So I could not find any of these teaching methods which appropriate to be used as it is in our environment as solution to my student's weakness, because of none of them mentioned to minimum required pre-request knowledge which I thought the weakness points of my students.

Therefore, I moved to the second stage of improvement plan. Because of Relational model which essential chapter in our course based on 8 math topics, After I found most of our students have weakness in mathematics course overall, then I decided to treat that limitation by running some lectures as revision of these math topics. Therefore, to evaluate the effectiveness of these math lectures on my students I have run a

quiz belonging to that chapter (Relational chapter) then analyzed the relationship between attendance of students in revision math lectures and their marks in the quiz. The purpose of that study is to know to which degree my teaching philosophy successful and may assist careful students to cover the course objectives. Statically I have found a relationship between the attendance of students to these math revision lectures and their marks in the quiz. So the students who care about attendance lecture have more chance to get higher marks, but the strength of that relationship is weak because of the correlation coefficient value is 0.2105. Therefore, after further investigation I moved to the third stage of improvement plan to be sure I am using applicable teaching strategy with my students. Hence I have tried to apply different teaching method with my students by using discussion style during the lecture; based on some videos I upload them in the Blackboard before the lecture. I have applied that technique with chapter called "ER Diagram design" by uploading some videos one week before the ER lecture and request from students to check these videos before they come to the lecture then we take the ER lecture in form of discussion then I asked one of my colleagues a person who teaching the same course now with other two sections to prepare a quiz to evaluate the knowledge of ER design for my students and compare it with his students. The effect of watching that uploaded videos and spent the ER lecture in discussion form with students is obvious on my student's results. The average of my students is 9.07 out of 10, in contrast the average of students at other sections only 3.66 marks out of 10. Also to evaluate the success of the proposed teaching method I have compare it with another teaching method which used by another teacher. The comparison been conducted between my students marks for people who attended the discussion lecture with other 22 students belonging to another teacher who using his own teaching method, who teaching the same course (Fundamental Database)and he prepared the quiz which been conducted by my students and his students in the same time, his students marks average only 3.27

1.2. Background to this project

One of significant chapter of database course is "Database Model". There are several models are used to design a database. The most famous used model called "Relational model". More than 90% of the database systems around the world are based in its design on the relational model. For that reason I have focused in my teaching in that course on this model. So, I can summaries the main objectives of that course (Fundamental of Database) are three main goals: firstly, I need to be sure that students are able to design a database using relational model. Secondly, the students able to build what they have designed. Finally, the students able to learn how to use what they have been designed and they can confirm the success of their designing by the ability to generate some correct required reports. Because of I found most students not understanding the required math concepts of topics which that Relational model based on. Therefore, have decided to run some revision lectures of these math topics. Then I have studied the relationship between attendance of students in particular math revision lectures and their marks in questions which belonging to that Relational model chapter. The purpose of that study is to know to which degree the syllabus of the fundamental of database course need to be updated as a solution of one of discovered weakness points of our students. The following section presents the results of the impact of math revision lecture and comparison of traditional teaching method with discussion teaching method.

2. Results and Discussion

I believe that the marks of students do not reflecting the used teaching method which their teacher was using. Many parameters may effect on the students marks. For instance, the designed curriculum of the course could be applicable to the level of students and it could be not, so if the syllabus was very hard to be delivered to students in such period of time or those topics were depending on other prerequisite topics in other courses which taught in previous semesters or the difficulty level of questions was not suitable for students because they were very hard or they were very easy to be answered by the majority of students.

Therefore, to evaluate my teaching method I have done as a case study on a particular two chapters: "Relational Model" and "ER Design" chapters. Relational Model requires a mathematics background; I have tried to cover this mathematics background as an additional revision lecture before Relational Model lecture then the students are ready to understand the concepts of Relational Model. To evaluate the significance of these mathematics revision lectures I have studied the impacts of attendance of these revision lectures on the marks of students in the midterm exam by focusing on questions which belonging to Relational Model. The result of that study appears in Fig. 2.

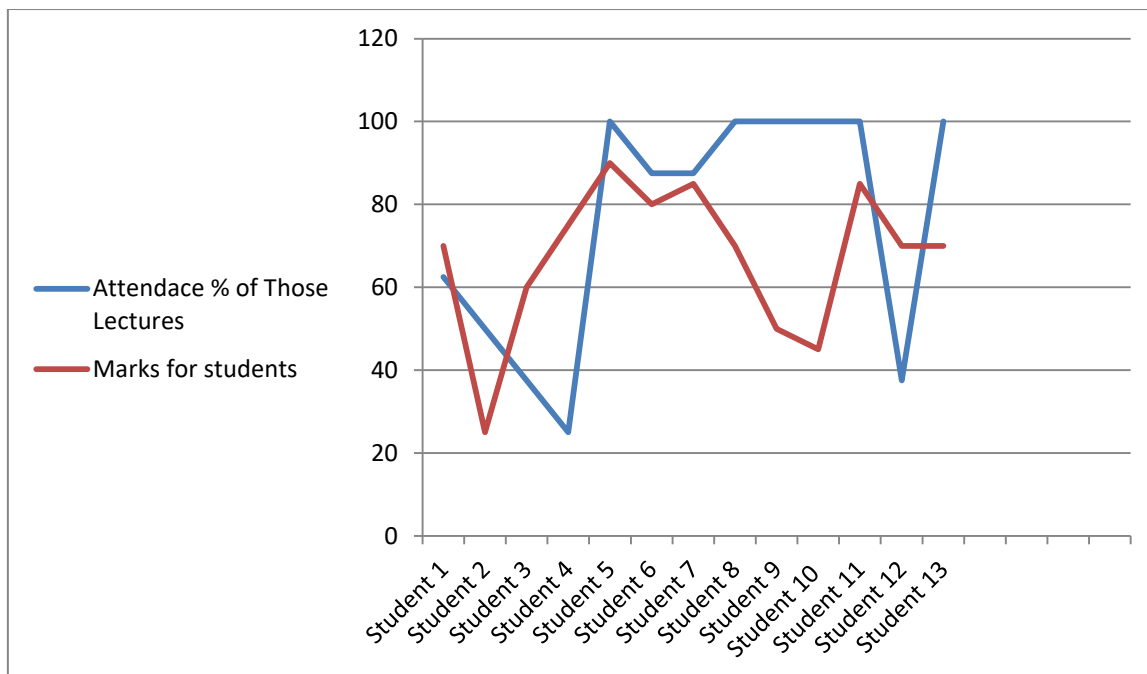


Figure 2. Impact of revision lectures of math topics on marks of students.

Statically there is a relationship between the attendance of students to the revision math lectures which I proposed to resolve the weakness points of students and their marks in the quiz which designed to assess students in the relative chapter. So the students who care about attendance that revision lectures have more chance to get higher marks, but the strength of that relationship is weak because of the correlation coefficient value is 0.2105. Therefore, I have been encouraged to reinvestigate my teaching method to be sure I am using applicable teaching strategy to my students. Hence I have moved to the third stage of development plan, so I have tried to apply different teaching method with my students by using discussion style during the lecture; based on some videos I upload them in the Blackboard before the lecture. I have applied that technique with chapter called "ER Diagram design" by uploading some videos one week before the ER lecture and request from students to check these videos before they come to the lecture then we take the ER lecture in form of discussion then I asked one of my colleagues a person who teaching the same course with me with other two sections to prepare a quiz to evaluate the knowledge of ER design for my students and compare it with his students. The effect of using discussion form with students as teaching method in the ER lecture is obvious on students marks as appears in table No.1 and figure No. 3 where students from number 1 to student number 13 represent the marks which belong to students who seen the videos and attended the discussion lecture, with very high average 9.07 out of 10. In contrast their friends from number 14 to number 19 , the students who did not attend the ER lecture or did not prepare to the lecture the average of their marks drops to 3.66 out of 10. Also to evaluate the success of the proposed teaching method we have compare it with another teaching method which used by another teacher. The comparison been conducted between my students marks for people who attended the discussion lecture with other 22 students belonging to another teacher who using his own teaching method, who teaching the same

course and he prepared the quiz which been conducted by my students and his students in the same time, his students marks appear from No 14 to student No 35 shown in Fig. 4 and the average of his students marks only 3.27.

Table 1 The maks of quiz of my students eaiter who attended or miss the ER-lecture

Student No	Students who attend ER-Lecture	Marks
1	10	
2	10	
3	10	
4	9	
5	10	
6	9	
7	7	
8	10	
9	9	
10	8	
11	10	
12	9	
13	7	
Average	9.07	
Student No	Students who miss ER-Lecture	Marks
14	2	
15	2	
16	6	
17	2	
18	7	
19	3	
Average	3.66	

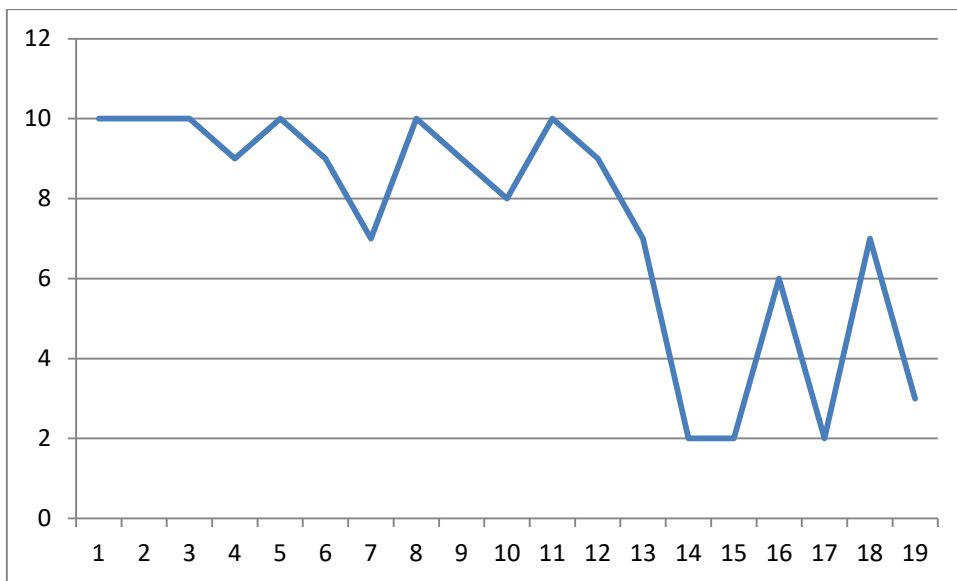


Figure 3. Affect of attendance discussion lecture on students marks

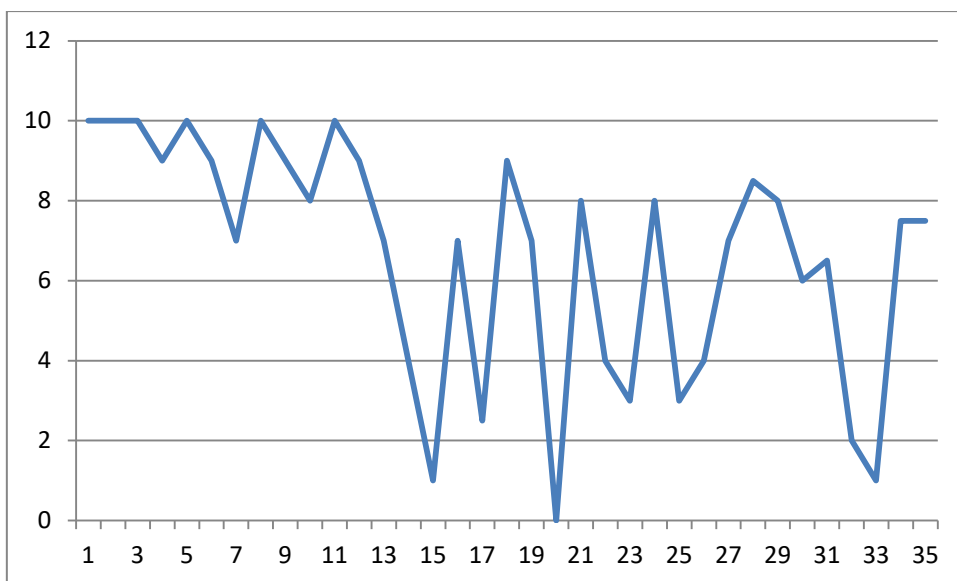


Figure 4 coparision of the marks of my students using discussion as teaching method with another teaching method by another teacher.

3. Conclusions and future works

Based on the results of this study which been conducted on particular topics in the midterm exam and some quizzes I have found that the benefit of revision lectures which related to prerequisite topics is weak. The significant result of this case study I found students prefer discussion style during the lecture in contrast to the teaching using traditional method where students prefer to participate in the lecture to be in two sides, from the teacher to student's side and from students to their classmates and their teacher side. So to reach to that goal and make students able get engagement in the lecture I have to provide them with some resources

before the lecture which assist them to prepare to the lecture, I have encouraged my students to review these resources before the specific session as a preparation to the lecture by giving some extra marks for students who prepared to the lecture very well, for instance "YouTube" videos which explain the same topics by varies instructors. As future work I plan to exam the discussion technique with other topics in coming semesters with more sections in various courses to increase the number of samples in the study to guarantee I am using the most appropriate teaching method.

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