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The Impact of Blend Methods of Teaching Numerical Analysis on Students Achievement, as Study Case

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ABSTRACT

This study tried to analyze the difficulties that is facing engineering students when taking a Numerical Analysis course, where video lecture notes can be used to involve and develop students' performance. Several teaching strategies adopted including Video lecture notes as class lecture notes support. 45 engineering students divided into 3 groups each of 15 students, two as experimental groups and the third as the controlling group. In class tests, homework's Questionnaire was distributed to the students to determine the learning strategy they prefer. There were statically significant in one of the experimental group. Third as Controlling group, The results showed that the blend method of in -class note plus the video lecture notes were the best, then came in the second place is in Class notes supported with handouts while teaching videos as a form of distance learning on their own were the last. In class test, post test and delayed test was deployed to assure the method's effectiveness.

INTRODUCTION

The numerical analysis course is one of the core courses in Mechanical and Electrical Engineering. Many students find the course extremely hard, they fail this course more than once or lack the basics needed for this course. They have no interest in the subject and its application, their only intention is to pass that course; reflecting on my experience in teaching this course for almost 10 years. The content depends on mathematical background. Most of the students do not master Matlab software and C++ programming language. Most of the students depend on calculator only (most of the students prefer to do calculation rather than use software and programmes prepared by the teacher or the authors). Given this situation, the researcher tried many strategies and different procedure to teach this course**.**Yoon and Lim, (2007) describe blended learning as "a purposeful blend of delivery media (particularly face-to-face and various forms of technologies) to improve learners' performance." They Defined blended learning as diverse. Rossett et al, (2003), emphasised the need for a blended learning design strategy focusing on the aims of learning as a form a blended learning strategy. They used audio and audio feedbacks in higher education.(Bradley et al., 2006). They discussed methods of teaching, learning and assessment to provide a good opportunity for academics and to find the most effective ways to engage their students in the process of teaching and learning. Video lecture notes are good tools for the blended learning because it is easy to access. Preparing and recording video lecture notes are time consuming and It's crucial to pay attention to whether the new technology deployed to enhance the best teaching method was efficient andcould compete with the traditional methods that was laden with restrictions and challenges. The students were to access small segments of the recordings which will help them clarify information to enhance understanding of specific points. The research aimed to develop a different approach, where short video lecture notes were labeled and distributed. The students and teachers supported such recordings, they said it offers an excellent supplementary part of learning resources. Working with a short video clip gave the student more control, allowing them to catch the video more easily and when they were ready to study the content. The researcher enthralled by the results of the video clip was ale to arrest and engage the attention of the students to learning. . The voice pictures, nuance as well as the expressions are able to deliver more than mere words and this can provide an additional meaning and boost the listeners attributes. The Purpose is to affect learning rather than to transfer knowledge. (Bradley et al., 2006). The Teacher's self assessment and directive approaches may be modified according to their timing and by the supplementary techniques and the context in which it is deployed. Deployment duration and method of delivery are examples of other facets that may affect the video lecture notes. This can promote student reflection and feed forward action, leading to improvement in the student's performance; the potential impact of this creative note fading with time. . The recorded personal video lecture notes and conversations would enable students to refresh their memory of the conversation and re-activate their memory, software and mechanical engineering students agreed to apply the video lecture notes and see whether these notes has an academic or professional context. Recording the lecture conversations provides an opportunity for students to make stronger connections to the lecture notes, reflect on their own contribution to the conversation and improv their grades and academic progress**.**

Study question

Is there any difference in student performance related to the method of teaching**?**

Sample of the study

The study sample was 45 students in the Numerical Analysis course in the second semester academic year 2010/2011 at Balqaa Applied University. Engineering students (mechanical and electrical engineering)

Statistical method

The researcher conducted a semi experimental procedure, where mean, standard diviation and analysis of variance were computed in their grades beside the attached questionnaire.

Aims of the study:

This study aimed to analyze engineering students' performance in Numerical Analysis Courses**.**

Limitation of the study

1. Math course (Numerical Analysis) for spring semester 2010/2011
2. Electrical and mechanical engineering students' of Al-Huson University College / Balqaa Applied University
3. The subject of the study was limited to the units 5 and 6 of the text book" Numerical Analysis by Burden the seventh editio**."**
4. The topic exactly was using Euler and Runge Kutta method of solving O.D.E**.**
5. Duration of the study was four weeks**.**

METHODOLOGY

1. The researcher divided the students into 3 groups. Each of which 15 students were a blend of both mechanical and electrical engineering chosen randomly as :

- Group 1: to study the subject using class note of the teacher, supported with video lecture notes and hard copy handouts of group two, (15 students) the researcher gave the class lecture notes, supported by video and hard copy of these notes, along with Matlab problems, solving the homework on the lab. The lab lecturers are always one lecture behind the theoretical Part and students are required to solve the homework in the class All exams were class test using software and closed book test (applied and theoretical).
- Group 2: studied the subject of video lecture notes and supportedit with lyrics of these videos on their own, using thesame textbook . The course syllabus for these students were modified to make sure the students finished the subject before the other two groups starts. The subjects considered in this experiment were Euler method and Runge Kutta since it is independent of the other course topics. It is worth mentioning that this group joined the rest of the class all time. The test in the subject to the post test was in early stage, they were to finishe their task before the two other groups starts , while the delayed test was with the class.
- Group 3; studied the subject with the class notes using white board supported with handouts and Matlab software. The researcher gave them class notes and helped them with Matlab codes.He told them to work it on their own. The same tests applied to them as the first and second groups.. Application time of the experiment was for four weeks with all required exams.

2. Lecture notes were prepared By the researcher ,who recorded these notes supplied by the video lectures from the textbook. She recorded them as video lecture notes prepared as live video instead of power points and the lyrics of these lectures were handed to each class**.**
3. For group one, the researcher gave class lecture for the first one hour, for the 3 hours left, the teacher just watched and advised the students doing their homework using Matlab software. Everything was done in class, the researcher explained and corrected mistakes where necessary. **.**
4. The same video lecture notes and its lyrics was given to group 2 with no interference of the researcher as a form of a distance learning**.**
5. Group 3 was attending to the class lectures. Algorithms codes were handed to each class .They were to write Matlab aigorithm codes on their own**.**
6. The same test was prepared for the three groups; these groups also did the delayed test
7. The whole experiments took four weeks**.**
8. Averages and standard deviation were computed for the three groups in the theoretical part as in table (1)

Table (1) Grades of the three groups in the post test and the delayed test

	Post test			Delayed		
Group	G1	G3	G2	G1	G2	G3
1	65	13	69	65	65	60
2	70	20	65	70	52	70
3	75	75	96	83	45	91
4	82	65	50	82	33	55
5	79	52	71	79	85	69
6	65	45	82	72	75	84
7	85	33	93	90	97	85
8	83	85	98	95	13	95
9	40	75	71	90	20	72
10	98	97	79	40	75	77
11	77	66	38	65	60	33
12	90	55	59	85	55	45
13	85	57	50	75	57	48
14	95	35	71	90	35	73
15	95	46	93	85	46	90
AV	79.1	54.6	71.4	77.7	54.2	69.8
S.D	15.1	23.5	18.7	14.1	23.4	18.4

Study findings

As an answer to the study question- "Is there any difference in student performance related to the method of teaching?" the researcher found out there is significant difference in achievements according to the method of teaching and the following outcomes assure that table (1) shows that the averages of the three groups varies according to the method of teaching where the outcomes came as unexpected to the researcher. Group 1 was the best in both the post test and the delayed test respectively with average and standard deviation: (79.1, 15.1), (77.7, 14.1) The third group came up with the average and standard deviation in the post test (71.4, 69.8) and the delayed test (69.8, 18.4). While group 2 came up as the last with the average and standard deviation in the post test (54.6, 23.4) and delayed test with average and standard: 54.2, 23.4.

Table 2

Questions	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	Not Applicable	Unanswered
I have used the video lecture notes	7	6	1	1			
I regularly used the video lecture notes	0	5	3	3	2	2	1
I have used some of the video lecture notes	0	7	1	0	4	1	1
I used the video lecture notes prior to the lecture	3	5	4	3			
I used the video lecture notes post the lecture	5	6	2	2			
I have used the video lecture notes for revision purposes	4	5	5	1			
I found the video lecture notes helpful	3	4	4	0	2	2	1
I have learnt from the video lecture notes	1	5	4	0	2	3	1
The quality of the video lecture notes is satisfactory	3	6	0	0	1	2	1
The video lecture notes are easy to search	2	4	1	0	1	3	1

Group1: survey response to video lecture notes

The survey results for group1 (Table 2), for which there was 15 students, indicates that 86.7% of the survey respondents used the video lecture notes; using the lecture notes correlate with the results survey on the way video lecture notes were used for post lectures, and for revision purposes. Students who used the videos found them useful, “we're happy with it, and found them easy to search as lectures”,. The video lecture notes are no more than 15 to 20 minutes long, named according to the relevant sections in the lecture handouts.It is worth mentioning that the electrical and software engineering excelled more than the mechanical engineering students in all three methods as in Table 3

Table 3: Group2- survey response to video lecture notes

Questions	Strongly Agree	Agree	Neither Agree nor	Disagree	Strongly Disagree	Not Applicable
I have used the video lecture notes	9	5	1			
I regularly used the video lecture notes	10	4	1			
I have used some of the video lecture notes	5	3	5	1		
I used the video notes prior to studying the textbook	6	6	3			
I used the video lecture notes post the study from the textbook	7	3	3			
I have used the video lecture notes for revision purposes	8	4	4	2		
I found the video lecture notes helpful	5	4	4	2		
I have learnt from the video lecture notes	5	3	2	1	1	
The quality of the video lecture notes is satisfactory	9	4	1	1		
The video lecture notes are easy to search	9	3	1	1		

Group2 response rate to the survey was 93.3% of 15 students. A small sample questionnaire results showed that when students used the video lecture notes, it helped them a lot with learning and understanding the subject. The video lecture notes allowed deeper understanding of the theory and its application. Using video lecture note distribution varies. The intention was to offer a tool that could affect students' learning, the survey result shows that with Video notes, the student can adapt to a new tool and method of teaching or blended ones. Future work needed to evaluate the video methodologies with larger sample groups and longer time. Mixed methods of learning, teaching and assessment provide exceptional opportunities for academic improvement and student engagement in the learning process; learning environment's tools, may complicate methods of evaluating these methodologies. Teachers appllied more than one teaching and learning strategy, but to determine the right combination was s of difficult. Understanding the impacts of any technique is essential to teach software engineering and mechanical engineering at the Balqaa Applied University/Al-Huson University College. The integration of the visual learning environment with the physical space allows educators to change their practice 5.

effectively. This paper shows that the virtual space can be enhanced by the human voice and picture incorporation of traditional qualities too, in class lecture

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