Refining Pre-Calculus for Students by using Video Podcasts

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Abstract - In recent days students are facing procedural problems in certain subject areas like mathematics. By providing video podcasts which is very short, web-based, audio visual explanation that help us to solve it. A video podcasts covering all fundamental self-study mathematic tools and it is used by students to acquire pre-calculus skills. At last, the result concluded that most of the students used video podcasts which is very useful for their studies. By learning these tools, pre-calculus concepts would be gained.

Keywords: Pre-calculus, mathematics, video podcasts, web-based.

I. INTRODUCTION

Generally two separate teaching approaches have been observed referring the use of video podcasts in education. One is receptive viewing and another one is problem-based. Receptive viewing of podcasts assumes that learning material in whatever format (PowerPoint Presentation) is to be viewed by students. Problem-based video podcasts provided web-based, audio-visual explanations to specific procedural problems that students may need to solve in a courses such as mathematics or science.

Though limited search has been calculated on problem-based video podcasts, this paper was to calculate the effectiveness of problem-based video podcasts designed to improve calculus readiness for students.

II.VIDEO PODCASTS

A. Podcast

A new technology currently receiving a great deal of attention is "podcasting". A podcast is an audio or video file placed on the web for individuals to subscribe and listen to primarily on Mp3 players such as the apple iPod. The term 'podcast' like that of 'radio'or'video' can refer to either the content or the method of delivery.

B. Video podcasting

Video podcast can be defined as a set of audio-visual files that have distributed in a digital format through the internet using personal computers or mobile device [1]. It is podcasts that contain visual information either in the form of still images, animation, or video. Video podcasting may be useful in both ways, first is to communicate content and second is of student's media production. Since 2006, the use of video podcasts in higher education has grown rapidly students have described video podcasts as enjoyable to watch[2], satisfying, motivation, intellectually stimulating, useful, helpful and effective with respect to improve learning, students particularly enjoy control over when and where they learn[3]. In addition improvement in study habits have been observed including fostering independence, increasing self-reflection. Regarding learning performance, researchers have reported that the use of video podcasts has resulted in significant gain in skills.

C. Problem solving and video podcasts

The main advantage of this paper is specially for basic learners is to minimize extraneous cognitive load that is engaging in processes that are not beneficial to learning and optimize germane cognitive load that is engaging in processes that help to solve the problem at hand[4]. The main purpose of this study is to calculate the effectiveness of problem –based video podcasts designed to improve student understanding of pre-calculus concepts.

III.METHODOLOGY

The sample was carried out at a primary school belonging to surrounding area in an urban school. Students reported high school calculus grades of 60-60(13%, n=20), 70-79(33%, n=50), 80-89(30%, n=45), and 90+ (10%, n=15). In this paper we covered four areas by the video podcasts addition, subtraction, multiplication, division. The length of the clips ranged from 0.14 to 14.29.

In this paper, following features are described:

A problem solved by the teachers in a step-by-step fashion. The teacher would start by explaining the nature of the problem to be solved. Students could also control the video podcast with a pause, stop, or play button. This paper consists of some key design features. First the problem type was selected and segmented into clear steps [5] and the context of the problem was explained and clear visuals were used finally important elements in problems were highlighted in order to focus student attention.

A.Use of video podcast website

The total number of video podcast visits was recorded by a custom designed tracking tool. Students were also asked to estimate how many times they visited the video podcast website and the total time they spent watching clips.

B.Research questions

- Why do students choose to use or not to use video podcasts?
- How often are video podcasts used?
- How did students rate the usefulness and quality of video podcasts?
- Did student understanding of pre-calculus knowledge improve as a result of using video podcasts?

IV. RESULTS

A. Reasons for using video podcasts

Five reasons were cited by students for selecting these video. The first and most frequency reason for using video podcasts was related to learning benefits such as remembering better, reviewing old material, helping to solve and understand problems better, and visualization. The second reason was linked to the quality to video podcast explanations and the opportunity to follow clear, step-by-step explanations. The third reason was the students thought, in general, that video podcasts were useful or helpful. The fourth reason offered was based on the design features of video podcasts such as ease of use, variety of sums, and speed of teaching. The fifth reason for students using video podcasts was the interactivity provided by trying to solve the student-based problem.

Category	Sample Comments
learning	I used the video clips to help me solve the questions
Good explanation	They helped a lot to visualize and understand what was happening
General comments	I... Found them helpful.
	The video podcasts were useful and informative
	Very detailed, interesting, and helpful
curious	I was interested to see what the video podcasts had to offer

Table1: Sample reasons cited for using video podcasts

B. Reasons for not using video podcasts

Students did not select this medium to learn because students felt that it was not needed and some students, in spite of being sent emails, did not know that video podcasts were available. Finally students they did not have time to watch the video podcasts.

Category	Sample Comments
Did not need help	I was already comfortable with the material
Did not know	I did not know about them
No time	I have not found the time as of yet
Technology problem	The video podcasts played slowly

Table2: Sample reasons cited for not using video podcasts

C. Use of video podcasts

During the period of 7 days that the video podcasts were available, 75 visits were recorded by the tracking program. The mean number of visit per day was 11 (S.D=26) Almost 90% of the students who used problem-based video podcasts rated as useful or very useful which was calculated by their comments and likes of that particular video. This result is consistent that video podcasts supported learning, provided clear, step-by-step explanations, control over the pace of learning, and helpful visual aids.

V. CONCLUSION & FUTURE ENHANCEMENTS

The whole paper is based on how video podcasts are useful to the students for learning mathematics which provide a pathway for the students to learn. The video started was to develop interest in mathematics for the students who are not interested in that particular subject. By using video podcasts pre-calculus skills were improved for students.

Now Video podcasts was developed for school level students, later it will be developed for the college students, with functions, trigonometric and others.

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