THE DEVELOPMENT OF VIDEO LESSONS FOR DEVELOP THE SKILLS TO SOLVE PROBLEMS OF MATHEMATICS, MATHAYOMSUKSA 1 (GRADE 7), THE DEMONSTRATION SCHOOL OF SUAN SUNANDHA RAJABHAT UNIVERSITY, THAILAND

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ABSTRACT

Video lessons were very useful in education system. It was presented in multimedia and also delivered content that was apparently created substantial interest. When it was employed in class, it attracted the attention of students. Students were able to remember and gained more knowledge. In mathematics where most abstraction content was emphasized. A video lesson helped boosting mathematical problem-solving skills among students. The purposes of this study were 1) to create a video lessons aimed to improve the grade 7th student's skills in solving mathematic problems in order to meet the efficiency standard of 80/80 2) to compare the study achievements before and after video lessons learning.

The population for this study was those 7th grade students in 4 classrooms at the Demonstration School of Suan Sunandha Rajabhat University. The sample group was selected 1 classroom contained 30 students in the 1st semester of 2015, selected by random sampling. The statistics used to collect data, included average scores, standard deviation, and the t-test.

The finding from this study showed that the video lessons augmented the mathematics problem-solving skills with the efficiency at 83.75/82.17 which was higher than the established requirement. The achievement of post-study was higher than that of the pre-study at the statistical significant 0.05.

Keywords---- Video lessons, mathematic problem-solving skills

INTRODUCTION

At present, education played a significant role in developing and managing education to enhance potentiality and quality of the people in the country. It was essential to earnestly execute this in order to reinforce a person's ability to the maximum including the ability to analyze, to solve problems, to initiate new ideas, to do self-learning, to adapt oneself to keep up with abrupt changes (Akkarin Simahasarn, 2003). In fundamental education management, mathematics was a subject that led to scientific and technological breakthroughs. Present world had been advanced due to scientific discovery which depended on mathematical knowledge. In addition, mathematics intensified each individual's logics as it promoted sanity, thinking management system, work execution planning (Siriporn Thipkong, 2002). The nature of mathematics was mainly an abstract. Some content was difficult to explain to learners. It required logical thinking in order to perceive and understand the mathematical structure. Due to this, most students or learners did not prefer mathematics and their academic results was not successful (Noppawan Molkongnoppaklao, 2002). It was apparently evident that Thai students were rather weak at mathematics. As indicated from the O-Net examination for the 6th grade elementary schools hosted by the National Institute of Educational Testing Service (NIETS) for the academic year of 2015, the average score of the 5 main subjects were less than 50% and mathematics was one of them. This pointed out that the mathematics teaching management was not well fulfilling. The root causes could have come from the teaching methods from the teachers or even from the students themselves. Hence, the core role that teacher needed to settle was various teaching methods so as to

trigger interest towards the subject among students' minds. Nowadays, mathematics academic teaching and learning management was focused on urging students to use logics, sanity, and skills to solve mathematical problems on a daily basis.

Using media in teaching could successfully activate interest and satisfaction among students' minds which led to better academic result. As mentioned by Samrerng Boonreungrat (1981), when students were into the subject, they concentrated on it , they were willing to search for more knowledge , pay significant attention to it, perceive and respond to based on their positive perception, and accept the value of the subject. At the end, their academic results became better off.

At present, video technology was employed with various works particularly on academic management, curriculum planning, teaching media, etc. Owing to advanced computer technology together with state-of-the-art information system developed for globalization era, academic development unceasingly grew and presented useful information for every level of learnings (Somkiat Korbuakaew, 2003). The importance of the video was referred as follows; the video was fully qualified in terms of audiovisual education as it sent out information to audiences to visually and audibly perceive. It created good tangible experience (Howell, 1970). Besides it was a medium that resulted in high perception as a person's perception came from vision for 75%, hearing for 13%, touching for 6%, smelling for 3% and tasting for 3% (Dale, 1956).

By virtue of the above-mentioned matters and reasons, it was important to deal with the problems in the existing mathematics teaching and learning management particularly on mathematic problem solving issues as well as the benefits from using the video as mentioned earlier. The researcher was inspired with the idea of elaborating video lessons by focusing on mathematics problem solving matter in order to deploy them as teaching media tools to cope with the teaching and learning problems. They also helped to efficiently boost students' skills when it came to solving mathematic problems.

LITERATURE&THEORY

Learning was all about behavioral change, idea development, ability development through experience and interaction between students and environment. It allowed a person to live happily in a learning society which was full of complex procedures. Organizing academic learning and teaching that inspire students' enthusiasm to learn was not an easy task. Many philosophers and psychologists had tried to locate theories and processes relating to learning over years such as learning by doing conducted by John Dewey , discovery learning discovered by Jerome S. Bruner, meaningful learning researched by David P. Ausubel , to name a few. Robert M. Gane proposed 8 conditions of learning including signal learning, stimulus response learning, chaining, verbal association, discrimination learning, concept learning, rule learning, and problem solving process.

In order to improve the academic teaching and learning in mathematics efficiently, relevant principles along with theories were concerning mathematics learning management had to be put into account as a development framework. Such theories were pointed out as follows (Komol Paisarn, 2011);

1. Bruner's Theory of Instruction: It was a theory directly related to mathematics teaching and learning. It referred to a productive learning comprising 4 fundamental factors -- a content structure, learning readiness, insights from systematic speculation of past experience, and motivation to learn. Additionally, this theory indicated that a person owned an ability to learn or think mathematically in 3 different levels as explained below;

   1.1 Level of direct and tangible experience

   1.2 Level of visual image

   1.3 Level of relations and symbols—a level where a learner could symbolize what he perceived at the 1st level and the 2nd level.

2. Piaget's Cognitive Theory and Vygotsky's were the foundation of the Constructivism theory. As stated by Piaget, a person's cognition was adapted through the assimilation process and the accommodation process. The development emerged when a person obtained and assimilated new information or new experience and they were blended with his existing cognitive structure. Piaget believed that everyone

had a step-by-step cognitive development resulting from his interaction and experience with external environment together with his logic and mathematic thinking, knowledge socialization, maturity, and a balance development process of the person. On the other hand, Vygotsky was heavily focused on culture and society. He proposed the idea on 'zone of proximal development'. This concept played a significant role to changes on mathematics teaching and learning management. He pointed out that every student had his own cognitive development and had his own potential to develop the cognition to the target level. The gap between where a student was currently at and where the target level he had a potential to reach was called 'zone of proximal development' (Tissana Khaemanee, 2011).

Concept of student-centered teaching and learning management

This was complied with the Cognitivism which believed in brain-based learning. This involved information management process, information storage and usage, memory-based learning that affected memory, forgetfulness, and knowledge transfer. Motivation arising during the learning process was crucial as it could indicate interest, influence to information management process and direct impact on learning pattern of learners (Chanathip Pornkul, 2008).

RELATED WORKS OR DISCUSSION

The analysis to locate the efficiency of the invented educational video lessons found that the efficiency was at 83.75/82.17 which was higher than the initial criterion set at 80/80. When comparing the differences of the academic results before and after the video lessons were employed, it was discovered that students achieved in better academic results after the use of the video lessons with the level of significance at .05. This was in accordance with the research conducted by Chalit Limprakun (2013) which was on the development of educational video lessons for basic repairing of clothes subject for 36 students in the 5th grade elementary level, the demonstration school of Silpakorn University (early childhood and elementary). He used a random sample selection method. It was shown that the efficiency of the invented educational video lessons was at 77.76/77.97 which was higher than the pre-set criterion at 70/70. Moreover, the analysis result was in conformity with Intira Robroo's study (2015) which was on the development of multimedia lesson used for demonstrating the applied program of audio media production. According to this study, the efficiency of the lesson created by the researcher was at 80.09/87.20 which fulfilled the pre-determined assumption. The comparison of learning efficiency was in the same manner with Santana Seelao's research (2010) which was aimed to study the comparison of the academic efficiency concerning the subject of number counting for the 1st year kindergarten level. During the class, a video lessons and a standard teaching were deployed, one at a time. It was found that students learning through an animation video lessons had higher academic achievement than those learning from a standard teaching. The level of significant was at .05.

From the observation, the sample group learning the subject of development to enhance mathematics problem-solving skill from video lessons were having a good time towards the lesson in class. The video lessons were in multimedia and came with simulation, and drama. Actor's names were contemporary to those in the present day; moreover, the drama content was funny while giving advice on how to calculate or solve the mathematics problems. All these urged the interest among the sample group's minds which promoted their learning ability, class exercise achievement, along with good score in post-exercise after class. Thus, the guideline to upgrade video lessons to be more efficient was to present it in a drama form or in a hypothetical situation/simulation that was suitable with the contemporary period. Then learners would pay even more attention to the video lesson. This finding was in line with the research of Hewson (2002) which studied on comparison between using animation and using graphic communication in chemistry subject. The finding showed that better academic achievement was on those who learnt through animation rather than those learning through graphic communication. Video lessons were intriguing and handy as it appealed learners to increase their learning ability and to enjoy the lesson, to get excited with the swift change of pictures, sound, light and colors. Various presentation styles like those in a movie formed better communication, and allowed many students to attend class and study all together at the same time as well as helped in demonstration.

METHODS

This research was aimed to study and promote educational video lessons in order to develop mathematics problem-solving skills for the 7th grade high schools. The following steps were used to conduct this study.

1. Study relating documents, theories, and researches.
2. Analyze content by studying the 2008 fundamental academic curriculum for mathematic subject for the 7th grade level.
3. Determine the learning objectives and segregate contents into 2 parts including 1) plus and minus of a decimal and problem-solving 2) logarithm and problem-solving.
4. Create a storyboard and educational lesson for video lessons. Produce educational video lessons in a form of CD Rom.
5. Make a test form to measure academic result, a class exercise, and a measurement form for experts to do assessment towards the video lessons
6. Take the research tool including the invented lesson in video lessons, a test form, a class exercise, and a measurement form to the experts to evaluate their quality.
7. Amend, improve various tools based on the experts' advice
8. Collect data to locate the efficiency of the educational video lessons, the details were as follows;
   1) Take the efficiency measurement test to test with the sample group. This was a pre-test. Execute teaching program by using the created educational video lessons. Once finished, allow the sample group to do the exercise.
   2) Let the sample group study the 2nd lesson from the video lessons and do the exercise. Upon the finish of the 2 lessons, allow the sample group to do a post-test.
9. Take the collected data for statistical analysis as follows;
   1) Analysis to determine the efficiency of the educational video lessons by comparing the average score results from the class exercise and from the post-test (E_1/E_2).
   2) Analysis to compare academic efficiency achievement among the sample groups before and after the video lessons by using the t-test, dependence group type.
10. Summarize the result for discussion

RESULTS

According to the finding,

1. The educational video lessons created to elevate mathematic problem-solving skills for the 7th grade students was at an efficiency level of 83.75/82.17, which was higher than the pre-set criterion at 80/80.

2. The academic achievement among the sample group after attending a video lessons was higher compared to that before the video lessons. The level of significance was at.05 as detailed in Figure 1;

Figure 1 Academic achievement result

	N	$\overline{X}$	S.D.	t-test
Pretest	30	11.23	2.40	t = 23.327*
Posttest	30	29.30	3.06	

* Level of significance at 0.05

As seen from the Figure 1, the academic achievement among the sample group after they attended the video lessons was higher than that before the video lessons with the .05 level of significance. The t-test value from the calculation was higher than the t value from opening the table at the location of $\alpha = 0.05$ and df = 30-1, t value was at 1.6991 meaning learning through the video lessons led learners to increase their learning ability and knowledge.

CONCLUSION AND FUTURE WORK

As pointed out on this research result, the invented video lessons were more efficient than initial expectation per the pre-set criterion. It also augmented learners's academic achievement results compared to those happened before the videos lessons. The video lessons were presented in a creative multimedia form with simulation blended with demonstration focusing on techniques used to solve mathematics problems. This motivated learners to pay high attention to the video lessons, which finally resulted in better learning. Hereby the researcher had some of the advice for the next research as follows;

1. There should be a development of the mathematics video lessons in other different topics.
2. There should be collaboration among the experts in contents, teaching, and video lessons manufacturing in order to successfully develop an efficient video lessons.
3. There should be comparison between the educational video lessons with other teaching media in order to bring in new knowledge.

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REFERENCES

Akkarin Seemahasarn. (2002). **Production Process of school curriculum: from theory to practice.** Bangkok: Bookpoint.

Chalit Limprakun. (2013). Development of video lessons lesson on the subject of basic clothing repair for the 5th grade student at the Demonstration School of Silpakorn University (early childhood and elementary). Academic journal: **Veridian E-Journal**, 6(2), 167-182.

Chanathip Pirnkul. (2008). **Teaching design: Integration of reading, analyzing, and writing**. Bangkok: Chulalongkorn university press.

Dale, Edgar. (1956). **Audio-Visual Methods in Teaching Revised Edition**. New York: Holt, Rinehart and Winston.

Hewson, L. (2002). **Animating the mind: An analysis of animation as a representational mode for learning**. Retrieved November 1, 2015, from http://ro.uow.edu.au/theses/518/

Howell, Jeremy. (1970). "**The Use of Television in Agriculture Extension.**" Education Televisional Instructional, no.4 (June 1960):6-7.

Intira Robroo. (2015). **Development of multimedia lesson for demonstration on applied program of audio media production**. The research was subsidized by Suan Sunandha Rajabhat University's fiscal year budget. Bangkok: Suan Sunandha Rajabhat University.

Komol Paisarn. (2011). **Learning management: learners create their own knowledge for the subject of analytical mathematics**. The research was subsidized by Suan Sunandha Rajabhat University's fiscal year budget. Bangkok: Suan Sunandha Rajabhat University.

National Institute of Educational Testing Service (NIETS). (2015). **Ordinary National Education Test** (O-NET) 6thgrade elementary education, year 2015. Accessed on 1st of May,http://www.onetresult.niets.or.th/AnnouncementWeb/PDF/SummaryONETP6_2558.pdf.

Noppawan Mongkolgaew. (2002). **Study on opinions of the mathematics teachers from 1st grade till 6th grade in Sukhothai school**. Bangkok:Primary education service office.

Samrerng Boinreungra. (1981). **Measurement of attitudes and interests**. Journal of Academic result assessment: 7-13; September - December 1979.

Santana Seelao. (2010). **Study in comparison of academic achievement on number counting at the 1st year kindergarten schoolers in class using video lessons versus standard class studying**. Education administration Thesis, Education technology department, Ramkamhaeng University.

Siriporn Thipkong. (2002). **Mathematics curriculum and teaching**. Bangkok: Institute of Academic Development

Somkiat Korbuakaew. (2002). **Information technology in Industrial work**. Bangkok: Suan Sunandha Rajabhat University.

Tissana Khaemanee. (2011). **14 teaching methods for professional teacher**. **10th edition**. Bangkok: Chulalongkorn university press.