Teaching Methods and their impact on performance of University students

Sania Usmani and Kalpina Dawani*

ABSTRACT

There are many teachers trying new teaching techniques in the classrooms with the intention of making learning process more effective. In this research, comparison has been made between the spaced and massed learning methods to determine which teaching method is the most effective and helpful learning methods enhancing academic performance and retention rate of students. Results revealed that the performance of the students who were taught through spaced learning was better as compared to massed learning. On the other hand, a comparison between multimedia and chalk & talk teaching tool have shown that chalk & talk is more effective tool in both spaced learning and massed learning, and they increase and improve the academic performance and retention rate of students both.

Introduction

Education is an enlightenment, which explores the person about the distinction between the two notions of right and wrong. Making a person knowledgeable is not the only purpose of education, but also making him/her to learn about rationale thinking, the right attitude, behavior, and creating knowledge and autonomy. When there is an inspiration to bring a revolution, there is room for improvement everywhere. Innovation can be enhanced which paybacks both students and the teachers.

Teaching and learning are interrelated terms. The very effective and useful method in order to calculate good teaching is the quantity of knowledge that the student have gained throughout the process. There are constantly positive associations between rating of the students regarding the "amount learned" during a semester and largely evaluation for the teacher and the subject itself (Cohen, 1981; Theall & Franklin, 2001).Thomas Angelo also have given a similar idea, when he described; "if there is no learning during the teaching, then it is equivalent to just talking". An instructor's efficiency is all over again just about, how much student has learned during instructions.

A teaching method encompasses the principles, policies and methods that could be used for instructing students. The very frequently used methods of teaching may include class participation, demonstration, and memorization or could be the blend of these. The selection

of teaching method or methods to be implemented depends mainly on the knowledge or skill that is going to be taught to the students, and it may also be influenced by the ability of students that how much they have the potential to learn. There are many teachers who always try new teaching techniques in the classroom with the intention of making learning more successful.

Many schools, colleges and universities are trying to hire effective teachers so that students learning experience is enhanced. Besides that, they are trying to explore and identify many innovative teaching methods in order to enhance their own teaching experience. According to the requirement of course, ability of students, and availability of resources, many teaching methods are available that instructors can implement in their classes, in order to raise the performance of students.

In this research comparisons has been made between the spaced and massed learning methods and under these, chalk and talk and multimedia teaching tools have been applied, in order to determine about which is the most effective and helpful teaching method, so that the retention rate and ultimately the academic performance of students can be enhanced. In this study the effect of teaching methods has been tested on the retention rate of the students.

Literature Review

Education is a varied and complicated activity. Education presents multiple numbers of collective objectives but its basic and unique goal is only connected with the production of required information in order to produce learners.

Instructors can select from a variety of teaching techniques. Studies have determined that the most common in-class styles are lectures; discussions; use of video, audio, computer, and other technologies; teacher as facilitator; and simulations (Davis, 1993; Eble, 1976; Grieve, 1995).

Little has been studied on how to measure student outcomes using various styles. Hilligoss (1992) found that students performed better (in terms of class attendance and exam results) when interactive learning model was used rather than a lecture. Research suggests that teaching style influences student evaluations, Rutland (1990) and students prefer non-lecture styles (Smith 1996). Both teaching styles and student learning styles have an impact on the assessment. Students give better evaluations to instructors whose teaching styles are in accordance with their learning styles. Common student learning styles include individual learning, group learning, or audio visual learning (Grasha, 1996).

Teaching-Learning Paradox

In terms of systems theory of management, a classroom is treated like a black box. Some variables from the external resources are stored in e.g. students, teachers, resources, rules, parental anxieties etc. Some outputs are achieved; competent and knowledgeable students, good test results, teachers with more or less satisfaction or exhaustion. But it is very critical to know what actually is going on inside the black box to ensure that new inputs produce better outputs. The only answer that comes to mind is that it is going to depend on instructors and it is their responsibility that they have to work harder so that knowledge can be transferred in the most appropriate manner but this justification is not good enough, firstly, because some internal factors could be effected, in turn it would become difficult for teachers to enhance academic performance and retention rate of students. Secondly, it is inequitable to make the instructor responsible of raising students' standards entirely.

Therefore policy makers and management should be involved to offer facilities and support to the instructors so that healthier learning could be achieved (Black & Wiliam,

2006). Teachers also have huge pressures to help students achieve better exam results, along with creating new approaches to teach (Black & Wiliam, 2006).

Teaching Methodologies: Learning, Remembering, and the Spacing effect

The spacing effect is the most admired, vital, and the dependable element of human remembrance. The spacing effect specifies that growing the sequential gap between consecutive study episodes improves the performance on an afterward memory test. This concept was first described by Ebbinghaus (1885/1913). After that so many further studies on spacing affect have been conducted (Pashler, Rohrer, Cepeda, & Carpenter, 2007). Spacing effect can be described as a spacing revision of learning concepts over a period of time. The spacing effect takes place when the audience is explained concepts, then they have to wait for some time, and then the same idea is presented to them again (Thalheimer, 2006). Spaced repetitions facilitate long-term retention and enables learners resist forgetting than non-spaced repetitions therefore repetitions with spaces are better than repetitions without spaces. Also repetitions having wide spaces are better than repetitions with narrow spaces (Thalheimer, 2006). Spacing effect can be created in two ways. One way is to put a delay i.e. wait between two or more repetitions and the other way is to present other learning material i.e. Topic B and C in between the interval (Thalheimer, 2006).Spacing effect will not be produced unless the repetition has been done more than once or twice. This is critical particularly when complex, technical or extensive learning materials are used (Thalheimer, 2006).

Spacing interval should be ideally equivalent to the retention interval; i.e. the duration between the previous learning event and information retrieval. For example, if learners need to remember information after two weeks of the last repetition then ideally the time between repetitions should also be two weeks. When the retention interval is about one month, ideally the spacing interval ought to be one month and so on. Longer spacing intervals produce a better effect than shorter ones so repetitions of one day is better but if it is not feasible, then 4-hour spacing's are preferred to 2-hour spacing's, 1-hour spacing's are favored to 15-minute spacing's, etc. Instead of consistent spaced intervals, gradually expanding intervals can also be used. Both constant and increasing are preferred than no spacing's. Also it is important to clarify that dividing unrelated, and non-repetitious learning material over spaced intervals will not produce the spacing effect (Thalheimer, 2006).

Spaced versus Massed Learning

Learning in which the learning content is reiterated few times with two to three breaks is called spaced learning. These breaks could be of varying time and this time could be consistent or expanding. During these breaks physical activities or any distraction activities are performed e.g. studying for half an hour, eating, then again studying for half an hour, cleaning the room, study again for half an hour. While learning in which a lot of information is swallowed over one big time period is called massed learning for e.g. studying 2 chapters of a novel or a book for 2 or 4 hours continuously.

People who use spaced learning remember more information than those who use mass learning therefore spaced learning is a better way to learn information (Fields, 2005).As a method, spaced learning relies on the duration and the frequency of the spaces, not the learning content. The teacher gives lecture/explanations, gives a 10 minute break; again teacher gives the same lecture. Then gives a 10 minute break after the lecture and gives lecture again (Bradley& Kelley, 2008).

The effect of spacing has been researched in numerous fields to find its general applicability among young, old adults and children (Toppino, 1991; Singh, Mishra, Bendapudi, & Linville, 1994). The phenomena has been examined in controlled learning

experiments Verkoeijen, Rikers, and Schmidt (2005), programmed instruction Reynolds and Glaser (1964), classroom situations Austin (1921), multimedia simulations Shebilske, Goettl, Corrington, and Day, (1999)vocabulary learning Dempster, (1987), reading Krug, Davis,and Glover, (1990), learning language in a foreign speech Bahrick and Phelps, 1987; Bahrick, Bahrick, Bahrick, and Bahrick, (1993), and advertising research (Singh, Mishra, Bendapudi, & Linville, 1994).

Singh, Mishra, Bendapudi, and Linville (1994) concluded that if TV ads are repeated with 4superseding ads (i.e. spaced), it creates long term memory as compared to the ads that are repeated with one intervening ads (i.e. less-spaced).

Bloom and Shuell (1981) helped to make respondents learn 20 French vocabulary words with 3 different 10-minute exercises. These 10-minute exercises were presented over 3 days (spaced) or back-to-back on the same day. On an immediate test, spaced learning produced a 5% improvement but on an unannounced test which was taken after 7 days, 35% improvement was examined.

Roediger and Challis (1992) investigated both the effect of spaced and massed learning techniques on recall of the students in 3 different experiments. The learners were presented with a list of words which were repeated after 0 intervening items (massed repetitions) or after a gap of 9, 10, 21, or 31 items. The research concluded that the spaced repetitions produced improvements by 16%, 29%, and 32%.

Cull (2000) conducted four experiments using a pair-associate model to find out whether constant and expanding spacing's were better than massed spacing's. Cull (2000) made respondents learn word pairs comprised of one uncommon and one common word such as *fairn-print*. Then they were presented with repetition of the same pair of words by (a) only the 1st word instigating them to recall the 2nd word, and then they got feedback, (b) only the 1st word encouraging the learners to recall (no feedback), or (c) showing both words collectively. The average learning improvement was 82% due to the spacing in four experiments using widely varying spacing intervals (Second to minute in Experiment 1 and 2, and 2 to 3 days in Experiments 3 and 4).

Appleton-Knapp, Bjork, and Wickens (2005) studied the effects of print advertisements. A series of ads were presented to the people with variability in the number of times these ads were presented. Sample of 5-8 people were asked to recall the brand linked with their slogan. It was concluded that immediate repetitions produced an average of 20% recall, while 20 second intervals produced 33% recall, 40 seconds interval produced 41% recall, and 10 minute produced 44% recall.

Spacing doesn't always improve performance, Toppino and Gracen (1985) showed lists of terms to students with different intervening items and found no indication for a spacing effect.

Research has shown that besides creating better memory, repetitions can make ideas more persuasive and makes products attractive but these outcomes can lead to severe consequences, either functional or dysfunctional (Claypool, Mackie, Garcia-Marques, McIntosh, & Udal, 2004; Downing, Judd, & Brauer, 1992; Nordhielm, 2002; Cox & Cox, 2002).

Traditional Chalk & Talk versus Multimedia

During the era of pre-technology, the instructional process was controlled by the teacher, the lecture was given to the whole audience by the instructor and the students were supposed to just listen to the lecture. Thus, this king of learning method always counted as inactive and the receivers of message play a very little role in the process of their learning new knowledge (Orlich, Harder, Callahan, &Gibson, 1998).

Based on many researches, it has been analyzed in many educational institutions by various instructors and students that the traditional approach of giving lectures i.e. giving lecture in the classroom through the "chalk-and- talk" method has an inadequate impact on the academic performance of students. In this kind of traditional method of teaching, students suppose an entirely passive role and their attentiveness towards getting information disappears after 20-30 minutes. Few drawbacks that exist in traditional chalk & talk method of teaching include:

− Traditional chalk and talk method of teaching is "one way flow" of giving learning to the students.
− Teachers often continuously give lecture for a very long time without getting response and feedback from students.
− The knowledge given to the students is only based on handouts and books.
− Teaching and learning of the student is focused on "plug and play" technique rather than real-world implications.
− There is an inadequate communication with students.
− It is theory based learning exclusive of any realistic and practical life time situations.
− Students learn from memorization of concepts based on theory but not forced to focus on understanding of concepts.
− Focused on marks rather than result oriented.

Multimedia

Basically it's the perception of the students that when they hear, they usually forget it and when they see, they start to believe on it but when they do, they understand more properly. Multimedia learning process is the mixture of audio and video into an application or presentation to communicate knowledge to listeners. Traditional chalk & talk method of teaching resulted in misbalance between what learning is given to the students in the classroom versus what is the need of organizations in the corporate world. As a result of this mismatch many educational institutions are using problem based teaching to produce students who are creative and analytical. So multimedia method of teaching can be explained as an innovative strategy, in which teacher often gives lectures on a particular topic with the help of a multimedia projector, in order to teach different skills and knowledge to an audience which is required in the job market.

Since the basic purpose of teaching is giving knowledge to students, but when they are learning with the help of multimedia method by focusing on practical examples rather than just theory based learning, it is going to give more positive impact on their overall academic performance. Problem-based learning is gradually being accepted in most of the institutions as an instrument to tackle the deficiencies of traditional chalk & talk method of teaching. Hence traditional chalk & talk method of teaching is not that much effective method, which could enhance the confidence level of students, so that they would be able to make analysis about the concepts they have learnt or they could correlate the information obtained previously with practical situations or real time scenarios (Teo & Wong, 2000). Problem-based learning is proven as an effective method in order to teach students in a more appropriate manner, with the help of real-life problems and implement solutions (Boud & Feletti, 1999).Multimedia facilitates the instructor to present the information in a better and significant means, with the help of various elements of media, so that the interest of the students could be developed and their academic performance and their retention rate could be enhanced.

Research Methods

The implementation of successful teaching methods in learning organizations has the potential not only to improve the system and structure of education, but also giving authority to people, reinforce domination and make an attempt to accomplish the goal of individual progress in a more effective manner. This is basically a comparative study between spaced learning, and massed learning using traditional chalk and talk and multimedia methods of teaching. In this research a comprehensive comparison has been made between different methods of teaching. Performance has been measured using retention rate as a proxy to find the differences of these four teaching methodologies.

Method of Data Collection

Experimentation technique has been implemented and a questionnaire has been used as an instrument, to measure the academic performance and retention rate of students. The respondents that have been selected for this study were students of BBA (Bachelor of Business Administration) program, enrolled in their second semester at Iqra University, Karachi, Pakistan.

Sampling Technique and Sample Size

Convenience Sampling Technique from the Non-probability sampling has been used. Sample size used for this study was, 200 respondents.

Experimentation

Four teaching sessions were conducted in which each session had 50 students. The respondents in each session were different from other sessions thus; the sample respondents were not repeated in the study. Lecture on the topic "Motivation and its theories" was delivered in each session using four methodologies. In all the sessions the study material was unchanged.

Experiment 1

The first experiment was conducted using spaced learning with the aid of multimedia on 50 students. In this experiment the repetitions used to expand spacing intervals of 10, 20 and 40 minutes with presentations as retrieval practice i.e. explanation of the topic, etc. The lecture was delivered in first 15 minutes, and then a break of 10 minutes was given in which activity 1 was used. Activity 1 comprised of a game called "Passing the Pillow". Music was started and the pillow was passed, as soon as the teacher stopped the music, the student on who had the pillow had to perform a certain task i.e. sing a song, dance on a beat, share a joke or act. Students played the game for 10 minutes. Because of the limitations of size and structure of the room this activity was performed exactly where the students were seated to take the lecture prior to this activity.

After the game the same lecture was given for next 15 minutes. After the lecture activity 2 was initiated for 20 minutes. Activity 2 comprised of a "Balloon Game". Four people were grouped together to form a team. The 1st person called "Mover 1" was responsible to take the balloon and give it to the second person named "Blower" and wait for the blower to blow the balloon and give him back. Then mover 1 will take the balloon and give the balloon to the third person named "Burster". The burster will have to burst the balloon by sitting on it.After this, the same activity was carried by "Mover 2".

As soon as activity 2 was finished the lecture was repeated the third time for 15 minutes in which the same topic was repeated again. After the last lecture, activity 3 called

"Who Am I" was initiated for 40 minutes. Sheets of paper, marker and tape were used in the experiment. The names of famous personalities were written on each sheet. Two teams were formed and sat in equivalent rows. One individual from each team was asked to come up. One sheet of paper was stick on the back of the participant with the name of the famous personality. Then, the participant faced the back in the direction of the team members. After seeing the name of the personality and without giving away the name, the team helped the individual figure out the name. The participant could only ask the team questions, which would be responded only in a 'yes' or a 'no'. The participant is given exactly 2 minutes to guess the name of the personality. In these 2 minutes the individual can ask as many questions. If the individual takes the right name, the team gets one point. After which the same format is followed by the opposite team. After the last activity all the respondents were given a quiz on the same lecture to access the impact of spaced learning on their performance.

Experiment 2

The second experiment was conducted using spaced learning with the aid of traditional chalk and board to 50 students. In this experiment the repetitions used consistent spacing intervals of 15 minutes with presentations as retrieval practice i.e. explanation of the topic, etc. The lecture was delivered in first 15 minutes, and then a break of 15 minutes was given in which activity 1 (similar to that of experiment 1) was played. After the first activity the lecture was delivered again for 15 minutes. Then activity 2 began which was the "Balloon game" used in experiment 1. After 15 minutes again the lecture was repeated on the same topic for 15 minutes after which activity 3 was performed for the last time. Activity 3 was also same as in experiment 1. At the end of the activity a quiz was taken to the lecture to find the students retention of the learning material.

Experiment 3

Experiment three was conducted using massed learning with the aid of multimedia on 50 students and the same topic of "Motivation and its theories" was taught. The sample respondents of each experiment were different from the other. Lecture for continuous two hours was delivered to the students without any break after which a quiz was taken on the same material.

Experiment 4

The fourth experiment was conducted using massed learning with the aid of chalk and talk on 50 students and the same topic "Motivation and its theories" was delivered. Lecture continued for 2 hours after which quiz on the same was taken to access their performance.

As with any other experiments, this experiment also tried to control threats which are inherent in experimental technique. Therefore it is very important to identify few problems that might distort the experiment or the responses to the quiz which are important to figure out the impact of learning;

- Is the learner focused when a word, presentation is given in class or the mind is diverted by various thoughts which will give error in the results?
- Whether they know that they are being observed and tested or not as behaviors will be different in both cases?
- Have the students learnt or studied these concept of motivation before these lectures in their A levels or in any of the previous course which may nullify the results?

Instrument of Data Collection

In order to measure the performance and retention rate of the students, instrument 1 attached in the appendix was used, which was a quiz on motivation and its theories. Besides this quiz, responses through a feedback questionnaire were also taken from the students to identify the above mentioned problems which may invalidate the results of this study.

Statistical Technique

In this research Independent Sample t-test has been applied. On the other hand Descriptive statistics have been applied to find the feedback responses. Descriptive statistic is used, so that critical features of the statistics can be analyzed and then described in this research.

Research Model
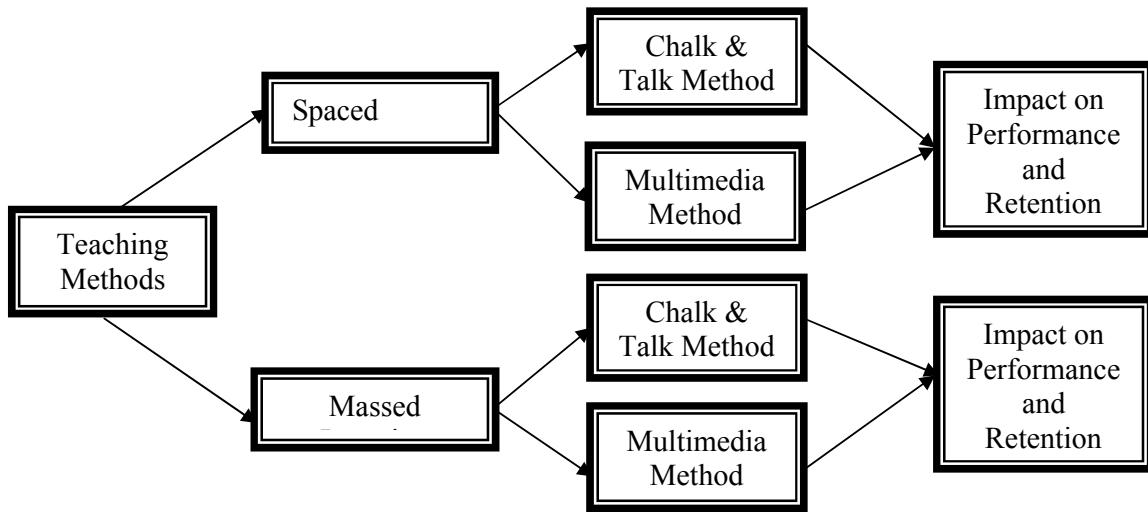
Results

H1: There is more positive impact of chalk and talk teaching method as compare to teaching through multimedia on the academic performance and retention rate of the students.

Table 1: Retention Rate & Teaching Tool

	Teaching Tool	N	Mean	Mean Difference	t	Sig.
Retention Rate	**Chalk n Talk**	100	6.875	0.775	3	0.011
	Multimedia	100	6.1			

H1 has been accepted and the purpose for creating H1 was to determine, which is the most important teaching tool, teaching through chalk and talk method or teaching through multimedia method that has the most positive impact on the academic performance and retention rate of the students. As the mean value of retention rate through the chalk and talk teaching tool (Mean value of Chalk and Talk Teaching Tool =6.8750) is greater than the mean value of retention rate through multimedia teaching tool (Mean Value Multimedia Teaching Tool =6.1000) , the value of mean difference is also positive (Mean Difference Value =.77500) and significance value is also lower than 0.05 (Significance Value = 0.011) , so it has been proved that learning through the chalk and talk method is more effective as

compare to learning through multimedia method, in order to increase and enhance the academic performance and retention rate of the students.

H2: There is a more positive impact of spaced learning method as compare to the massed learning method on the academic performance and retention rate of the students.

Table 2: Retention Rate & Learning

	Learning	N	Mean	Mean Difference	t-value	Sig.
Retention Rate	**Spaced Learning**	100	7.865	2.755	12	0.000
	Massed Learning	100	5.11			

H2 has been accepted and the purpose for creating H2 was to determine, which the most important learning method is, spaced learning or massed learning that has the most positive impact on the academic performance and retention rate of the students.

As the mean value of retention rate through the spaced learning (Mean Value of Spaced Learning=7.8650) is greater than the mean value of retention rate through massed learning (Mean Value of Massed Learning =5.1100), the value of mean difference is also positive (Mean Difference Value = 2.75500) and significance value is also lower than 0.05 (Significance Value = 0.000) , so it has been proved that learning through the spaced method is more effective as compare to learning through massed method, in order to increase and enhance the academic performance and retention rate of the students.

H3: Under spaced learning, chalk and talk teaching method has more positive impact as compare to teaching through multimedia method on the academic performance and retention rate of the students.

H4: Under massed learning, chalk and talk teaching method has more positive impact as compare to teaching through multimedia method on the academic performance and retention rate of the students.

Learning Method		Teaching Tool	N	Mean	Mean Difference	t-value	Sig.
Spaced Learning	**Retention Rate**	**Chalk n Talk**	50	8.27	0.81	2.91	0.005
		Multimedia	50	7.46			
Massed Learning	**Retention Rate**	**Chalk n Talk**	50	5.48	0.74	2.02	0.047
		Multimedia	50	4.74			

H3 and H4 have been accepted and H3 a comparison has been made between chalk & talk teaching method and teaching through multimedia method under spaced learning and in H4 another comparison has been made between chalk & talk teaching method and teaching through multimedia method under massed learning, in order to judge about which method has more positive impact on the academic performance and retention rate of students. From the above analysis and results, it has been proved that under spaced learning, the teaching through the chalk and talk method is more effective as compare to teaching through

multimedia method, as the mean value of retention rate through the chalk and talk teaching tool (Mean Value of Chalk and Talk Teaching Tool =8.2700) is greater than the mean value of retention rate through multimedia teaching tool (Mean Value Multimedia teaching tool =7.4600), the value of mean difference is also positive (Mean Difference Value = 0.81000) and significance value is also lower than 0.05 (Significance Value = 0.004) .On the other hand, it has also been found that, not only under spaced learning but also under massed learning, the teaching through the chalk and talk method is also more effective as compare to teaching through multimedia method, as the mean value of retention rate through the chalk and talk teaching tool (Mean Value of Chalk and Talk Teaching Tool =5.4800) is greater than the mean value of retention rate through multimedia teaching tool (Mean Value Multimedia Teaching Tool =4.7400)), the value of mean difference is also positive (Mean Difference Value = 0.74000) and significance value is also lower than 0.05 (Significance Value = 0.046) .

Discussion and Future Research

From the results and analysis, conclusion can be made that the performance of the students who were taught through spaced learning were better as compared to massed learning. It is very important to identify and test teaching methods that can be helpful in enhancing students' long term knowledge and overall performance. To identify the sensible concerns of classroom teachers, massed and spaced practices were given meaning in the framework of classroom learning and the results were very encouraging. When students were thought through spaced learning, which is a revision technique as an alternative to normal' revision tasks, exam results showed extreme improvement. On the other hand, a comparison between multimedia and chalk & talk teaching tool have shown that chalk & talk is a more effective tool in both spaced learning and massed learning, which increases and enhances the academic performance and retention rate of students.

The general model of teaching does not have a place in contemporary schools anymore. Education is not about students writing down all the words coming from the teachers like a holy order. Times have changed, the same chalk and talk method used 20 years back cannot be used now, and thus schools need to change. Group projects, independent research studies, and technology is used which has created the need for teachers to act like a supervisor, a leader. Students are given a variety of learning experiences which are considered as a personal challenge, for e.g. conducting a seminar or workshop or putting on a play. In the classroom, students do not want constant change in teaching methods or adoption of fads but continuity in a new type of teaching method which helps in retaining their long term memory. The Telegraph (2012) Revealed: new teaching methods that are producing dramatic results. Retrieved from: http://www.telegraph.co.uk/education/5166111/Revealed-new-teaching-methods-that-are-producing-dramatic-results.html

References

Appleton-Knapp, S. L., Bjork, R. A., & Wickens, T. D. (2005). Examining the Spacing Effect in Advertising: Encoding Variability, Retrieval Processes, and Their Interaction. *Journal of Consumer Research, 32*, 266-276.

Austin, S. D. M. (1921). A study in logical memory. *American Journal of Psychology, 32,* 370-403.

Bahrick, H. P., & Phelps, E. (1987).Retention of Spanish vocabulary over 8 years. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 13,* 344-349.

Bahrick, H. P., Bahrick, L. E., Bahrick, A. S., & Bahrick, P. E. (1993). Maintenance of foreign language vocabulary and the spacing effect. *Psychological Science, 4,* 316-321.

Black, P. & Wiliam, D. (2006) Inside the Black Box: Raising Standards through Classroom Assessment. Granada Learning.

Bloom, K. C., & Shuell, T. J. (1981). Effects of massed and distributed practice on the learning and retention of second-language vocabulary. *Journal of Educational Research, 74,* 245-248.

Boud, D. & Feletti, G. (1999). The Challenge of Problem-Based Learning, (2nd Ed.), London: Kogan Page.

Bradley, A. & Kelley, P. (2008). Spaced Learning (aka 'space learning' and '8 minute lessons'). Retrieved from: http://www.monkseaton.org.uk/Making_Minds/Pages/Spaced%20Learning%208%20 minute%20lessons.aspx

Claypool, H. M., Mackie, D. M., Garcia-Marques, T., McIntosh, A., & Udal, A. (2004). The effects of personal relevance and repetition on persuasive processing. *Social Cognition, 22*, 310-335.

Cohen, P. A. (1981). Student Ratings of Instruction and Student Achievement: A Meta-Analysis of Multisection Validity Studies. *Review of Educational Research*, *51*, 281-309.

Cox, D., & Cox, A. D. (2002). Beyond first impressions: The effects of repeated exposure on consumer liking of visually complex and simple product designs. *Journal of the Academy of Marketing Science, 30*, 119-130.

Cull, W. L. (2000). Untangling the benefits of multiple study opportunities and repeated testing for cued recall. *Applied Cognitive Psychology, 14*, 215-235.

Davis, J. R. (1993). Better Teaching, More Learning: Strategies for Success in Post-secondary Settings. Phoenix, A Z: Oryx Press

Dempster, F. N. (1987). Effects of variable encoding and spaced presentations on vocabulary learning. *Journal of Educational Psychology, 79,* 162-170.

Downing, J. W., Judd, C. M., & Brauer, M. (1992). Effects of repeated expressions on attitude extremity. *Journal of Personality and Social Psychology, 63*, 17-29.

Ebbinghaus, H. (1885/1913). *Memory: A contribution to experimental psychology*, (Translated by H. A. Ruger and C. E. Bussenius). New York: Teachers College, Columbia University.

Eble, K. E. (1976). The Craft of Teaching: A Guide to Mastering the Professor's Art. San Francisco, CA: Jossey-Bass

Fields, R. D. (2005). Making Memories Stick. *Scientific American*, 58-63.

Grasha, A. F. (1996). Teaching with Style: A Practical Guide for Enhancing Learning by Understanding Teaching and Learning Styles. Pittsburgh, PA: Alliance Publishers

Grieve, D. (1995). A Handbook for Adjunct/Part time Faculty and Teachers of Adults 3[rd]ed.Cleveland, OH: Info-Tec, Inc

Hilligoss, T. (1992). Demystifying 'Classroom Chemistry': The Role of the Inter-active Learning Model. *Teaching Sociology*, *20*, 12-17.

Krug, D., Davis, T. B., & Glover, J. A. (1990). Massed versus distributed reading: A case of forgetting helping recall? *Journal of Educational Psychology, 82*, 366-371.

Nordhielm, C. L. (2002). The influence of level of processing on advertising repetition effects. *Journal of Consumer Research, 29*, 371-382.

Orlich H, Harder J, Callahan R, & Gibson W (1998). Teaching strategies: A guide to better instruction. Newyork: Houghton Mifflin company

Pashler, H., Rohrer, D., Cepeda, N. J., & Carpenter, S. K. (2007). Enhancing learning and retarding forgetting: Choices and consequences. *Psychonomic Bulletin and Review, 14*, 187-193.

Reynolds, J. H., & Glaser, R. (1964). Effects of repetition and spaced review upon retention of a complex learning task. *Journal of Educational Psychology, 55,* 297-308.

Roediger, H. L., & Challis, B. H. (1992). Effects of exact repetition and conceptual repetition on free recall and primed word-fragment completion. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 18*, 3-14.

Rutland, P. (1990). Some Considerations Regarding Teaching Evaluations. *Political Science Teacher, 3*:1-2.

Shebilske, W. L., Goettl, B. P., Corrington, K., & Day, E. A. (1999). Interlesson spacing and task-related processing during complex skill acquisition. *Journal of Experimental Psychology: Applied, 5,* 413-437.

Singh, S. N., Mishra, S., Bendapudi, N., & Linville, D. (1994). Enhancing memory of television commercials through message spacing. *Journal of Marketing Research, 31, 384-392*.

Smith, D. H. (1996). Developing a More Interactive Classroom: A Continuing Odyssey. Teaching Sociology, 2 (4), 64-75

Teo, R. & Wong, A. (2000). Does Problem Based Learning Create A Better Student: A Reflection? Paper presented at the 2nd Asia Pacific Conference on Problem –Based Learning: Education across Disciplines, 4-7.

Thalheimer, W. (2006). Spacing Learning Events over Time: What the Research Says. Publisher: Work-Learning Research Inc, 21, 54.

Theall, M. & Franklin, J. (2001). *Looking for Bias in all the Wrong Places – A Search for Truth or a Witch Hunt in Student Ratings of Instruction?* In the Student Ratings Debate: Are they Valid? How Can We Best Use Them? The all, P., Abrami, L. and Lisa Mets (Eds.) New Directions in Educational Research, no. 109. San Francisco: Jossey-Bass.

Toppino, T. C. (1991). The spacing effect in young children's free recall: Support for automatic-process explanations. *Memory & Cognition, 19, 159-167*.

Toppino, T. C., &Gracen, T. F. (1985). The lag effect and differential organization theory: Nine failures to replicate. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 11, 185-191*.

Verkoeijen, P. P. J. L.; Rikers, R. M. J. P., Schmidt, H. G. (2005). Limitations to the Spacing Effect: Demonstration of an Inverted u-Shaped Relationship between Interpretation Spacing and Free Recall. *Experimental Psychology, 52*, 257-263.