



Vidhyayana - ISSN 2454-8596

An International Multidisciplinary Peer-Reviewed E-Journal

www.j.vidhyayanaejournal.org

Indexed in: ROAD & Google Scholar

Effect of Web Based Instructions on Students Attitude towards Mathematics

| | |
|---|--|
| <p>Dr. (Mrs) Vipinder Nagra Associate Professor DAV College of Education, Hoshiarpur</p> | <p>Jiwanjot Kaur Research Scholar PU Chandigarh</p> |
|---|--|



Abstract

This study was purposed to investigate the effect of web-based instructions on the students' attitude towards mathematics. This study was of pre-test and post-test experimental design. The study was conducted on 100 students studying in seventh grade at government schools of Gurdaspur district. The sample was randomly divided into two groups via 50 students in the experimental group and 50 in the control group. The two treatments were employed in this study in which the experimental group was taught with web based instructions and the control group was instructed through the traditional classroom method. The data was collected using the attitude towards mathematics scale prepared by an investigator and analysed by applying appropriate statistical techniques. The findings of the study revealed that there exists a significant difference in students' attitude towards mathematics taught through web based instructions and traditional classroom instructions.

Keywords: Attitude towards mathematics, web based instructions, traditional teaching.

Introduction

The society which gave due weightage to mathematics is now the witness to tremendous progress as it contributes to the development of science and technology. It helps to inculcate logical skills, abstract thinking, reasoning, problem-solving ability, etc. among humans. In spite of its never-ending benefits for individual and society many people feel anxious when they think about mathematics as they perceive mathematics as a difficult subject. It requires high mental abilities and intelligence. According to Yang (2014) "MATH" appears to be a scary four-letter word to many people; they do not like it or they feel that they are not good at it. Students develop prejudices towards this discipline which hinders them to learn the concepts in right manner; this negative attitude creates a state of anxiety which in turn impedes learning and achievement in mathematics (National Mathematics Advisory Panel, 2008) and individual loses his self-confidence (Tobias, 1993).

Attitude plays a crucial role in learning mathematics (Neale, 1989). A Positive/negative attitude towards mathematics is described as a positive/negative emotional disposition (McLeod, 1994). Attitude towards mathematics as an aggregate measure of a liking or disliking mathematics, a tendency to engage in or avoid mathematical activities, a belief that one is good or bad at mathematics, and a belief that mathematics is useful or useless (Ma & Kishor, 1997). Frequent failures and interruptions of planned actions in mathematical tasks develop a negative attitude among pupils (Mandler, 1989). Ma and Kishor (1997) found that most of children begin their schooling with positive attitude towards mathematics but as children grow up this attitude becomes less positive and gradually change to negative at high school. This happens due to many reasons as increase in pressure on students, difficult instructions, pace beyond their ambition and non-positive attitude of teacher (Philippou & Christou, 1998).



With the advancement in technology students have started using the electronic gadgets more frequently; also they are now using technology more for their education with computer being the dominating instrument. With the evolution of internet, the scenario of education has totally changed from past, the teacher and students are involving in web-based instructions (WBI) using websites and various gadgets like PC, laptops, tablets and mobile phones. Web based instruction is more appropriate supplementary tool in education. Web-based instruction is creating a learning environment using internet and its resources. It provides students with a new and rich style of learning (Relan & Gillani, 1997). It permits the new way of learning by making learning process more interesting and meaningful, communicating beyond the four walls of classroom. Web-based instructions help to fulfill the needs of individual learners. Every individual can learn according to their potential and ability. Different from traditional instruction, web-based instruction breaks the restrictions of time, space, peers and instructors, collaborative learning, provide motivation (Chen & Hung, 2010). It offers interactive, authentic, self-directed learning opportunities (Perlman, Weston & Gisell, 2005), enhance learning experience by providing visual and audio stimuli (Winfield, Mealy & Scheibel, 1998), creates active learning environment (Parker, 1998), develops scientific skills like reporting, interpretation, reasoning and problem solving especially for higher secondary students (George, 2013), is more efficient or less costly than other vehicles (Clark, 1994). Teacher can make efforts to use different teaching methods and techniques to develop positive attitude among students towards mathematics as it facilitates the more learning.

Review of Literature

Kannan, Sivapragasam and Senthilkumar (2015) investigated the attitude of secondary school students towards mathematics in Palani Educational District of Tamil Nadu, India. The study was conducted on a sample 200 ninth standard students. The sample divided into three types of institute which are Government, Government –Aided and Self-finance secondary schools. A tool used was Attitude scale towards mathematics (ASTM) for secondary school students, in order to carry out the present investigation. The investigator had adopted the normative survey method and random sampling technique was used. The results showed that the secondary school, female students has a better attitude towards mathematics than that of male students.

Sudha and Amutha (2015) studied the higher secondary learners' effectiveness towards web-based instruction on chemistry. Experimental method was adopted in the study. Sample of 58 chemistry students was taken and was divided into control having 24 students and experimental groups with 24 students. Control group was taught by traditional method and experimental group with web based instruction. Pre-test and post-test was administered to both the groups. The findings of the study revealed that there was no significant mean difference between achievements of pre-test and post-test scores taught by traditional method and there was significant mean difference between the achievements of pre-test and post-test scores in web-based instructional method since it provided multisensory experience to the students.



Haridi and Wurijanto (2016) analyzed the influence of web-based cooperative learning strategy and achiever motivation on school study outcome. The research was quasi-experimental design having subjects of undergraduate students. Two groups were involved in investigation. Experimental group comprised of 34 students and taught through web-based cooperative learning method whereas control group was of 33 students taught through textual cooperative method. The result of research indicated that there was a difference in outcome study of organization behaviour courses was significant between two groups of students who studied with web-based cooperative learning strategy and textual cooperative learning strategy.

Kaur (2017) purposed a study to find the Effect of Web based instructions on achievement in Social Studies. 100 students of grade 8 from CBSE affiliated schools of Ferozepur, Punjab was taken as sample. There are two groups-control group (taught by traditional method) and experimental group (taught by Web based instruction). Pre-test and post-test was conducted on both the groups. Findings of the study indicated that there exists significant difference in achievement in Social Studies based on Web based instructions and conventional method. The achievement of students taught through web based instructions was higher as compared to traditional teaching group.

Supriyono (2018) determined the reading learning performed by English Foreign Language Learners (EFL Learners) when web based instructions was integrated into reading classroom. The study was explored the process, performances and quality of the subjects during the course. The steps followed by the process of instructions were orientation, discussion, material exploration, action, test and reflection. The participants of the study were three students of the fourth semester of English Department at University of Siliwangi Tasikmalaya Indonesia who followed the instruction of reading through web based reading learning model.

Mazana, Montero and Casmir (2019) studied the performance in mathematics and learning of students' was affected by a several factors, which includes students' and teachers attitude towards the subject, instructional practices of teachers and school environment. This study was conducted in Tanzania to examine students' attitudes towards learning mathematics. The study also found the reasons for the liking or disliking of mathematics and also the relationship between attitude and performance of students. The findings revealed that students initially display a positive attitude towards mathematics, but their attitude changes to less positive as they moved to higher levels of education. There exist significant positive weak correlation between students' attitude towards mathematics and their performance. Students' performance in mathematics was predicted by enjoyment and attitude towards it.

Berger, Mackenzie and Holmes (2020) studied that positive attitudes towards mathematics and science are mutually beneficial for student achievement. In this study sample of 10,051 Australian students of grade 8 were taken to find the relationship between attitudes towards both subjects by using latent profile analysis and exposed six discrete groupings. The study revealed that most of students were least attitudinally receptive to both subjects, whereas many students either resisted both or have a strong preference for one over other. Study also showed that positive attitude



towards both subjects were mutually beneficial that means better attitudes towards both subjects were related with higher achievement in both.

Objectives

To compare the effect of web based instructions and traditional method on students' attitude towards mathematics.

Hypothesis

There exists significant difference in scores of mathematics attitude of students taught through web based instructions and traditional method.

Design

The nature of present study was pre-test and post-test experimental. Two groups were made one was Experimental group which was taught through web based instructions and other was Control group taught through traditional classroom method.

Sample

The sample for the study was taken from the government schools. 100 students of 7th class were selected from the government schools. The students were randomly assigned into two groups. The experimental group comprised of 50 students who were taught through web based instructions and remaining 50 students were assigned to control group which was taught through traditional teaching.

Tools used

- (1) Mathematics Attitude Scale (prepared by investigator) used as both pre-test and post-test.
- (2) Web-based Instruction Package (prepared by investigator).

Web-based instruction package was prepared by the investigator. The content was selected from the 7th class book. The content which was to be used in package was thoroughly analysed to check for any error or any left out information. In order to develop, convert and redesign the content, rectifying and editing of the errors the substantial time was spent. The package was made in such a way that it makes the learning of mathematics easy and enjoyable for students so that they can develop positive attitude towards mathematics. The content was planned keeping in mind that it was meant for the 7th class students.



Treatment

The sample of 100 students was selected randomly from the government schools of Gurdaspur district of 7th grade. After selecting the sample the students were randomly divided into two groups: experimental and control group. The experimental group comprised of 50 students was taught through web-based instructions and control group consisted of 50 students was taught through traditional teaching. The groups were assigned randomly to students. Attitude towards mathematics scale was administered both as a pre-test and post-test to check the attitude of students towards mathematics whether it was positive or negative, also to find that whether teaching through web based instruction was helpful in changing the attitude of students towards mathematics or not.

Phase 1 (pre-test)

In this phase, the attitude towards mathematics scale developed by investigator was conducted as pre-test on both the groups. The test was of Likert five point scale having options strongly agree, agree, undecided, not agree and strongly not agree. The scores obtained by both the groups on pre-test were recorded.

Phase 2 (Experimental phase)

In this phase, the experimental group was taught through web based instructions i.e. with the package made by the investigator and the control group was taught through the conventional method. Both the groups were taught the same content.

Phase 3 (post-test)

In this phase, the same attitude towards mathematics scale was administered on both the groups as post-test and their scores were recorded.

Data Analysis

The scores of pre-test and post-test of both the groups (experimental and control group) were recorded. From the score list of pre-test and post-test of each group the mean, standard deviation and difference of the mean scores were calculated. By applying t-test, significance of difference between the mean scores on pre-test and post-test of the experimental and control groups were tested at both 0.05 and 0.01 level.

Results of the Study

The data obtained through the scores of pre-test and post-test of each group (experimental group and control group) were analysed and interpreted. It was found that there was a significant difference between the mean scores of pre-test and post-test of the experimental and control group in the selected topics of mathematics. Also, the results of the study



revealed that there was no significant difference in the pre-test of experimental and control group related to the attitude towards mathematics whereas there was a significant different in the scores of post-test related to mathematics attitude which was obtained after the application of treatment.

Attitude of students towards Mathematics after pre-test and post-test

Attitude of students in mathematics was administered by the pre-test and post-test. The entry behaviour of students was assessed by pre-test and then the group was randomly divided into two groups: experimental group and control group. Web based instructions was given to the Experimental group whereas control group was taught through traditional method and after that to see the difference in attitude the post-test was administered. The following table illustrates the found result:

Table 1 Showing difference in the mean scores of students in attitude towards mathematics after pre-test and post-test:

| Category | N | Mean | SD | t-value | Result |
|-----------|-----|-------|------|---------|------------------------------|
| Pre-test | 100 | 9.56 | 2.03 | 10.35 | Significant at 0.01 level |
| Post-test | 100 | 13.09 | 2.74 | | |

From the above table 1, the mean score of pre-test was 9.56 and S.D was 2.03 and the mean score of post-test was 13.09 and S.D was 2.74 and calculated t-value was come out 10.35. The calculated t-value was more than the table value i.e. 1.661 at 0.05 level and 2.365 at 0.01 level which was significant at both levels. It shows that there was significant difference in students' attitude towards mathematics in pre-test and post-test.

Hypothesis Testing

Attitude of students towards mathematics of control group and effect of web based instructions on the students of experimental group:

As stated earlier, students of experimental group (taught with web based instructions) and control group (subjected to traditional instructions) were administered to attitude test in mathematics. The raw scores obtained of each student of both the groups were compared by using the appropriate statistics. The following table shows the results:



Table 2 Showing difference in the mean score of attitude towards mathematics in pre-test and post-test of control group and experimental group:

| Test | Category | N | Mean | SD | t-value | Result |
|-----------|--------------------|----|------|------|---------|-------------------------------|
| Pre-test | Experimental Group | 50 | 2.39 | 0.74 | 0.88 | Not Significant at 0.01 level |
| | Control Group | 50 | 2.56 | 1.14 | | |
| Post-test | Experimental group | 50 | 3.83 | 0.89 | 2.68 | Significant at 0.01 level |
| | Control Group | 50 | 3.26 | 1.21 | | |

The above table 2 clarify that mean score of experimental group was 2.39 and S.D was 0.74 related to mathematics attitude before the application of treatment that was web based instruction whereas the mean score of control group was 2.56 and S.D was 1.14 and t-value 0.88 was obtained. The calculated t-value was less than the table value i.e. 1.66 at 0.05 level and 2.36 at 0.01 level which was not significant at both the levels. It indicates that at the starting there was no significant difference in mathematics attitude of experimental and control group. Secondly the scores obtained by students after the treatment were also compared. The scores related to mathematics attitude after the application of treatment to experimental and control group was compared. The mean and S.D of experimental group were found 3.86 and 0.89 whereas the mean and S.D of control group which was taught using traditional method were 3.26 and 1.21 respectively. The t-value was calculated to be 2.68 which was more than the table value i.e. 1.66 at 0.05 level and 2.36 at 0.01 level. It indicated that the result was significant. Hence, hypothesis which states that “There exists significant difference in students’ attitude towards mathematics based on web based instructions and traditional method” is accepted.

Conclusions

There was significant difference between web-based instructional group (WBI) and traditional group on attitude towards mathematics. Students who were taught by using web based method develops better attitude towards mathematics as compared to the students taught by traditional classroom method. Hence, with Web-based instructions the students gain variety of teaching learning experience. Web-based instructions are more innovative, interactive and activity focused. It involves all the senses of students and also stimulates their senses. It helps to create more interactive environment between the students, student and teacher which promotes the active participation of student



in the learning process by breaking the old monotonous environment.

Educational Implications

Web based instructions are more flexible as it helps student to learn according to their speed and place. It provides more opportunity to repeat same task at any number of times as it addresses the individual differences. Web based instructions make student more active to involve in the teaching learning process by making leaning content more attractive. It helps students in better learning material as it provides multisensory experiences and also increases the self-confidence among students which helps in the development of positive attitude towards mathematics among students. The students having positive attitude towards mathematics are more capable and interested in solving mathematical problems and also pursue it for higher studies. It also improves the students' knowledge regarding the use of computers and internet and also develops positive attitude towards the usage of technology. Due to its numerous benefits the teachers should be trained and motivated to use the web-based instructions in classroom to encourage the students for effective learning.

References

- Berger, n., Mackenzie, E. & Holmes, K. (2020). Positive attitudes towards mathematics and science are mutually beneficial for student achievement : a latent profile analysis of TIMSS 2015, *The Australian Educational Researcher*, 47, 409-444.
- Chen, N.H. & Hung, H.F. (2010). K12 e-school: e-learning fundamentals and application., Kaohsiung: Shih-lu.
- Clark, R.E. (1994). Media will never influence learning. *Educational Technology Research and Development*, 4(2), 21-29.
- George, A. (2013). Effectiveness of web-based instruction in learning scientific skills among higher secondary students. Ph.D thesis, Department of Education, Coimbatore: Karunya University. Available at <http://Shodhganga.inflibnet.ac.in>
- Haridi, B. & Wuriyanti, T. (2016). Influence of web based cooperative learning strategy and achiever motivation on students study outcome. *International Journal of Evaluation and Research in Education (IJERE)*, 5(3), 189-199.
- Kannan, B.S., Sivapragasam, C. & Senthilkumar, R. (2015). Attitude of secondary school students towards mathematics. *International Journal of Multidisciplinary Research and Modern Education (IJMRME)*, 1(2), 211-216.
- Kaur, R. (2017). Effect of web based instructions on achievement in social sciences, *Scholarly Research Journal for*



Humanity Sciences & English Language, 4(24) 6459- 6467.

- Ma, X. & Kishore, N. (1997). Assessing the relationship between attitude towards mathematics and achievement in mathematics: A meta-analysis. *Journal for Research in Mathematics Education*, 28(1), 26-47.
- Mandler, G. (1989). Affects and learning: causes and consequences of emotional interactions. In McLeod, D.B. & Adams, V.M. (Eds.). *Affect and mathematical problem-solving: A new perspective*, New York: Springer-verlag.
- Mazana, M.Y., Montero, C.S. & Casmir, R.O. (2019). Investigating Students Attitude towards Learning Mathematics, *Intenational Electronic Journal of Mathematics Education*, 14(1), 1-25.
- McLeod, D.B. (1994). Affect and learning: causes and consequences of emotional interactions. In McLeod, D.B. & Adams, V.M. (Eds.). *Affect and mathematical problem-solving: A new perspective*, New York: Springer-verlag.
- National Mathematics Advisory Panel.(2008). *Foundations for Success: The Final Report of the National Mathematics Advisory Panel*, Washington, DC: U.S. Department of Education.
- Neale, D. (1969). The role of attitude in learning environments. *The Arithmetic Teacher*. 631-641.
- Parker, P. (1998). Piloting exercise physiology in web-based environment. *T.H.E Journal*, 26, 62-64.
- Perlman, C. Weston, C. & Giselt, E. (2005). A web-based tutorial to enhance students learning of activity analysis, *Can J Occup Thera*, 72(3), 153-163.
- Philippou N.G. & Christon, C. (1998). The effects of a preparatory mathematics program in changing prospective teachers' attitude towards mathematics. *Educational Studies in Mathematics*, 35, 189-206.
- Relan, A. & Gillani, B.B. (1997). Web-based instruction and traditional classroom: similarities and differences. In Khan, B. (Ed.) *web-based instruction*. New Jersay: Educational Technology Publications. Retrieved from <http://www.C31.Uni-oldenburg.de/cde/support/reading/relan97.pdf> 27/01/2017 at 10:15 am
- Sudha, A. & Amutha, S. (2015). Higher secondary learners' effectiveness towards web based instruction (WBI) on Chemistry. *University Journal of Educational Research*, 3(7), 463-466.
- Supriyono, Y. (2018). EFL Learners' Reading learning in web based instruction setting, *Edulite*, 3(1), 91-100.
- Tobias, S. (1993). *Overcoming math anxiety revised and expanded*. New York: Norton Publishing.
- Winfield, W., Mealy, M. & Scheibel, P. (1998). *Design consideration for enhancing confidence and participation in web based courses*. Distance learning '98. proceding on the Annual Conference on distance Teaching and



Vidhyayana - ISSN 2454-8596

An International Multidisciplinary Peer-Reviewed E-Journal

www.j.vidhyayanaejournal.org

Indexed in: ROAD & Google Scholar

Learning. ERIC Document: ED 422885.

Yang, J. (2014). Math Anxiety: Can teachers help students reduce it? *American Educator*, 28-43. Retrieved from <https://hpl.uchicago.edu/sites/hpl.uchicago.edu/files/uploads/American%20Educator,%202014.pdf>