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RESEARCH PAPER

Effect of Visual Learning Style on Academic Achievement at Secondary Level

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ABSTRACT

Progress in this world can be achieved by improving the quality of education. Closing schools and staying home during the COVID19 pandemic affected the educational process of students. Academic activities were transferred to digital resources. They are the only tools for students to continue their educational process. The Pakistani government has taken initiatives to raise educational standards by introducing visual learning styles through online learning in government agencies in Rawalpindi. The purpose of this research is to discover the influence of visual learning styles on high school academic performance through online learning. 30 students from 10 classes are selected as a sample. Sample selection uses convenient sampling techniques. A quasi-experimental design is adopted and two groups are selected, one is the control group and the other is the experimental group. The experimental group used visual learning styles during six weeks of treatment through online learning. The tools used to collect data are pretest and posttest. 20 lessons are provided through online learning using visual learning styles. Use the same pre and posttest. The test was verified by experts. The reliability of the test is determined by the SPSS reliability analysis. The t test is used to compare the data of the control group and the experimental group. The experimental results show that the average scores of students who use visual learning methods to teach through online learning are significantly higher than those who use traditional methods to teach. Some suggestions are made for teachers to use visual learning methods through digital mode.

Introduction

The world has become a global village. According to Dludla (2016), half of the world's population has been using the Internet, around 3.5 billion people. This century is considered the era of the visual learning style through online learning, because it has

brought revolutionary changes in various fields of life, such as medicine, engineering, telecommunications and business. No one can deny its importance in the field of education. For the development and progress of society, education is very necessary. To advance in this world, the quality of education must be improved. E-learning is an emerging educational concept. Education has moved from board cards to multimedia systems.

The use of visual learning styles in education through online learning has revolutionized the learning process and teaching methods. Now, textbooks are being digitized by making knowledge evaluated, searched, and accessed with just a few computer commands. Significant changes have occurred in the student assessment process, not only reducing teachers' efforts, but also statistically analyzing student progress and then adopting teaching strategies based on student responses and performance. students. In this rapidly developing computer age, traditional teaching and education methods alone cannot capture the interest of students. Students use visual learning styles through online learning to learn more in less time.

The commonly used teaching method in Pakistan is reading. It is found that students are passive in this way of learning. Today, visual learning through online learning is used for many educational purposes because it makes the work of students and teachers easier and more time-saving. Due to lack of training, Pakistani teachers avoid using visual learning methods through online learning. The main purpose of the teacher is for students to recite good grades. Students gather the topic without understanding the topic to get a good grade or pass an exam. There is a great need to combine visual learning methods through online learning with traditional teaching methods. Students' conceptual learning can be enhanced through online learning using digital visual learning methods. Discovered different educational activities and projects to engage students in useful things. In order to let every student participate in the learning process, teachers and students released their short introduction video of one or two minutes. Students can also watch the videos of their classmates. Most students complain that online courses are unflattering. In order to attract the attention of students, teachers should use super bright colored charts, pictures or diagrams that they do not normally use in class. Organizing things when teaching online is very frustrating. In the classroom, all necessary materials are placed on the table. Graphic organizers are used to organize things. Keep in touch with students and provide relevant feedback via email. A discussion forum will be designed for students to share ideas. Learning based on digital games is also a good use strategy. Teachers should ensure that students play games only for learning, not for entertainment.

Literature Review

The Scottish government reviewed the literature and explored how to use digital visual learning styles to improve outcomes through online learning for students, teachers and parents. Research results show that the realization of learning outcomes depends on the teacher's ability to use digital tools. Digital tools can help students improve their skills and abilities, increase parental involvement, and increase the efficiency of the education system. The literature provides strong evidence that, when used effectively, digital resources can help students and teachers in the fields of mathematics and science. The results of Diana's (2017) research show that the use of visual learning styles through

online learning alone does not guarantee the benefits of learning. Appropriate teaching methods, such as content selection, organization and information integration, make it easy for students to learn. The National Mathematics Examination is part of the vocational education curriculum designed to help students learn mathematics related to their career. It is not a comprehensive fashion, but is taught as a collection of independent elements. The algorithm has flaws, causing disappointing results. Due to differences in age, cognitive ability, and prior knowledge, it is difficult to teach mathematics to all students in a "one size fits all" manner. The mathematics teacher used another method to support him in teaching mathematics through online learning using visual digital learning, but did not receive direct research results (Diana P. Zwart, 2017). Researcher Chen (2017) believes that the design of flexible tools and activities for teachers to teach with the help of visual learning methods is the main problem of online learning in current visual learning methods. Their research results concluded that the effects of digital learning have a positive impact on motivation and learning outcomes.

According to a 2013 European Commission report, Norway is one of the countries that uses the most digital education system. Compared to other OECD countries, the Norwegian government spends 60% more money per high school student. But student performance in math and science is not much better than any OECD. Launch of an individual laptop program for secondary education in Norway. University students conducted research to analyze the effects of the program. The results show that through online learning, no significant effect of visual learning methods on students' academic performance has been found. The International Student Assessment Program (PISA) is carried out in 70 countries. The results of the program show that students from countries that have invested heavily in information and communication visual learning through online learning (ICT) do not perform as well as students from other countries (Stakkestad&Størdal, 2017). According to Anna Wing Bo Tso (2015), presentation skills are very important in science education. If there are too many students in the class, the traditional classroom setting will be insufficient. According to Anna Wing Bo, using mixed mode is a better option. In the article, blended learning is used to teach college students presentation skills. The researchers shared presentation skills via video lectures on online learning assessments and offered a comparison between the hybrid model and traditional teaching methods. According to the researchers, it is impossible to correctly observe facial expressions and vocalization skills in a classroom with a large number of students. But the use of video can minimize this impact. Freeze and play functions help students observe the presentation carefully (Tso, 2015).

Skills such as ICT, information processing skills, and critical thinking are required by today's students. These skills and abilities should increase student abilities by integrating the visual learning style of online learning into student learning. Young people use visual learning styles in a responsive and sensitive way through online learning. Visual learning methods through online learning should be used to motivate them to use it for learning purposes. A balance between text and visual learning materials should be maintained according to the age and needs of the students. Professional and creative teachers motivate students based on their personality. Recommend fun and challenging activities to your students to improve their learning. The government should adopt appropriate academic policies to use visual learning styles through online learning in education (Nazarenkoa, 2015). According to Fade (2014), online blended learning is the most prominent change in blended learning. Face-to-face learning can be improved by

adding a combination of synchronous and asynchronous learning. You can add synchronized learning through web conferencing. Effective hybrid online courses require the right software, the right training, and technical support. Online activities must be affordable and within the capabilities of the teacher. The activities must satisfy the needs and preferences of the students (Fadde, 2014).

Ceylan (2017) conducted a study on the control and experimental groups of sixth grade students in 2014/15 in Turkey. According to him, effective learning outcomes are achieved through blended learning. The experimental group uses network technologies such as video conferencing, discussion blogs, and learning management systems for teaching. The control group used traditional teaching methods to teach. Researchers must effectively select the content of the curriculum, because to design an effective curriculum, the proportion of methods and techniques used must be very important (Ceylan, 2017). According to Kenny (2011), due to the limited resources of early users, implementing a new visual learning style through online learning is a difficult task. According to Boissell (2014), learning must be flexible. Students can use part-time, part-time online and digital learning. The Malaysian Ministry of Higher Education has introduced digital learning into the teaching process. They have designed digital learning plans for less skilled students, such as those who are unmotivated and hesitant, and those who have difficulty learning in visual learning styles through online learning. Identify students' learning styles and then use visual learning styles to create a supportive learning system through online learning. Students with low academic grades and repeat grades were given a semester to improve their courses. Research results show that generally skilled students can quickly adopt digital learning methods. His level of motivation has improved. They care about helping other students. A good learning system provides many opportunities for students. Digital learning modules provide easy access to course materials; provide immediate feedback and a conducive environment (Yusoff, Yusoff, & Hidayah, 2017).

Distance education is used for learning at all levels of education due to its deep background in Turkey. The Turkish Ministry of Education and the Higher Education Commission are responsible for all these educational activities in schools and universities. The private sector offers many online IT courses. The university organizes many courses on project management, time management, language courses and university entrance exam preparation online. Student satisfaction is an important factor in the success of any course, and it is a combination of many factors. Students' performance in the education field, their satisfaction and confidence are indicators of the e-learning team's achievement. The goal of blended learning is to develop materials or tools that reach a satisfactory level. This level varies with age and gender (Kamal, 2017). Jennifer Hofmann's (2018) research results show that blended learning plans can be successful if they are appropriately designed according to the needs of students and the goals of the plan. When planning the challenges faced by the organization, the source of teaching and technical issues must be considered. In the initial stage, time, resources and a well-equipped manpower must be used appropriately. Teachers must also participate in the development of plans (Hofmann, 2018).

Research Hypotheses

The following research hypotheses were tested:

1H0: There was no significant difference between the experimental group and the control group in the average scores of high school mathematics.

1H1: The average scores of the experimental group and the control group are significantly different in mathematics learning scores of knowledge.

2H0: There is no significant difference between the experimental group and the control group in the average performance of high school mathematics learning achievement in comprehension.

2H1: The average scores of the experimental group and the control group are significantly different in the comprehension ability of high school mathematics.

3H0: In the application, there was no significant difference in the average scores of the experimental group and the control group in high school mathematics.

3H1: In the application, there is a significant difference in the average scores of the experimental group and the control group in high school mathematics.

Material and Methods

The methods and procedures used in this study are as follows:

Design

This experimental study adopts a "quasi-experimental" design, or more exactly, follows the "pre-test and post-test non-equivalent control group design". The research was conducted in the middle of the meeting, so the classroom was used as is to conduct the research. This design is preferred because the institution director does not allow random selection of courses between courses. Choose one class as the control group and the other class as the experimental group.

Sampling/Sample

Use convenience sampling techniques to select research samples. The research sample included 10th grade students studying at a high school in Rawalpindi. The researchers did not interrupt their school schedules, so the entire class was selected for this study.

Instrument

The data for this study was collected from the performance test results by performing the same tests as the pre-test and post-test. In addition to the basic areas of cognition/knowledge, the test also contains questions to assess students' comprehension and application abilities. The reliability of the test is calculated to be 0.86, and the test is verified by a group of experts.

Procedure

The curriculum learning intervention lasted for eight weeks, covering three lessons in a week. A total of 24 lessons were delivered in accordance with the model of "visual learning through online learning mode". The research aims to discover the impact of "visual learning through online learning mode" on secondary school academic performance. Two groups of students were selected. Among these two groups, one group was randomly selected as the experimental group, and the other group as the control group. The experimental group received treatment for 8 weeks. Students in this group teach through the use of technology. After the treatment, the two groups were tested, that is, after the test. The t test was used to compare the results of the two groups.

The tests used for pre- and post-test purposes are the same and verified by expert opinions from the faculty and staff of Allama Iqbal Open University in Rawalpindi. A pilot test was conducted with 60 students before practical application of the tests selected in this study. The students selected for the pilot test are different from the sample, but belong to the population. Use SPSS to evaluate the test results. Calculate the reliability of the test according to the Kudd Richardson formula (KR21). It is found that the value of KR21 is 0.751.

After 08 weeks of treatment, students from both classes were admitted. The researchers used the developed meter to mark the pre and posttest of the two classes. Use ttest to compare the performance of the two groups in the pre and posttest. Use SPSS software to analyze the data collected in the pre and posttest.

The success of the intervention depends on comparing the performance of the two groups in the pre and posttest. The data is obtained quantitatively (student test scores).

Results and Discussion

Data Analyses

The t-test is used for data analysis by SPSS software. The data analysis is as follows:

Table 1
The overall comparison of the academic performance scores of the control group and the experimental group from pre-test to post-test

Group	Variables	Mean (Pre-Test)	S.D (Pre-Test)	Mean (Post-test)	S. D. (post-test)	t-value	Sig. (2-tailed)
Control (N=30)	Knowledge	3.41	1.51	4.15	1.31	2.10	0.03
	Comprehension	3.61	1.48	4.25	1.87	2.15	0.04
	Application	3.21	2.34	4.51	3.46	2.65	0.00
Total		10.33	3.73	13.11	4.95	3.41	0.00

Experimental (N=30)	Knowledge	3.55	1.47	6.31	1.55	6.67	0.00
	Comprehension	1.89	1.47	6.72	1.85	12.33	0.00
	Application	4.90	3.20	9.63	3.87	4.98	0.00
Total		10.33	3.88	22.67	5.70	9.34	0.00

Findings

These findings are observed from the data analysis:

1. The data analysis results show that in the pretest, the average scores of the two groups are the same, so they must be considered equal before the test is exposed to visual learning style.

2. The overall performance of high school math students who were taught by visual learning methods was significantly better than that of students who did not attend class. Therefore, the null hypothesis H01 is discarded.

3. On the knowledge-based test, the mean post-test score of the experimental group is higher than that of the control group. Therefore, the null hypothesis H02 is discarded.

4. The experimental group still outperformed the control group on the items of the comprehension-based test. Therefore, the null hypothesis H0 3. is discarded.

5. Data analysis shows that in application-based test items, the performance of the experimental group is still better than that of the control group. Therefore, the null hypothesis H04 is discarded.

Conclusion

The results of the two groups showed that the performance of students who taught visual learning styles through online learning was significantly higher than the post-test results of students who taught visual learning styles through online learning. The use of visual learning styles through online learning in the classroom has a positive impact on students' math learning performance. Through the implementation of online learning courses, students can learn visually more effectively in an innovative and interactive way

Recommendations

During the coronavirus crisis, Pakistan’s schools remained closed and students stayed at home for a long time. The government should take measures to establish a simple visual learning method through online learning so that students from low-income families and low-income schools can easily continue to study during this period, and take measures to provide data that can be used for educational purposes. The current online education system is not enough to improve students' academic performance. It is recommended to improve online visual learning methods through online learning, such as video input to mobile phones or offline. These offline applications should be used to facilitate students without using the Internet. It is recommended that online education

support students by providing additional learning opportunities. Increasing online learning has improved students' enthusiasm, strengthened their thinking skills, supported their problem-solving skills, and enhanced their creativity.

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