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RESEARCH PAPER

Effect of Digital Learning Style on Academic Achievement at Secondary Level

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ABSTRACT

Aim of this study was to find an effect of Digital Learning Style on academic achievement at secondary level. A quasi-experimental design was used. Pretest was conducted. Convenience sampling technique was used. Experimental group was given a treatment of six weeks by using Digital Learning Style. Instrument used for collection of data was pre-test and post-test. Twenty lessons were delivered by using Digital Learning Style. Same pre-test was used as post-test. The t-test was used for analysis of data. The results showed that experimental group scored significantly higher than control group. Some recommendations were made for teachers and students to use online quiz for better teaching and learning. Government of Pakistan should take an initiative to raise the standards of education by introducing the use of Digital Learning Style in the government high schools of Pakistan.

Introduction

The COVID-19 pandemic has affected all aspects of life, especially education. Closing of school and stay at home has affected the learning process of students. Digital Learning Style is one of the tools which can replace the school. In this tough time digital resources are good supplement for our students to continue their educational process in a smooth way. Different countries have adopted various technologies in education sector according to their requirements, culture, and level of teaching and student's expertise. In Pakistan, many schools are finding it difficult to adopt the Digital Learning Style due to various reasons which include lack of teachers training and motivation. Economic and technical constraints add to icing on the cake to adopt. The integration of Digital Learning Style can make traditional methods much more effective as well as interesting. But more inculcation of information Digital Learning Style in traditional method does not eliminate the

significance and the need of teachers. It just changes the role of teacher as facilitator from instructor. Students still need to be guided but the source of knowledge does not remain the teacher and the outdated curriculum. This technique not only creates interest of students in a topic but also save students time in getting right and up to date knowledge on the topic.

No one can progress at the same rate until they learn all the content. Before going to the new instructional material student get support and time, they need to become proficient in academic content. The implementation plan for using Digital Learning Style should be developed effectively because it built the path before passing through it. Budget, resources, use of space and time are the key elements while developing framework (Schaffhauser, 2018). According to a report by Michael & Susan Dell Foundationmajority of the teachers reported that they and their students face many problems with blended learning. These issues are like technical issues, connectivity issues, software problems and insufficient bandwidth for running these programs. Many coordinators and teams of blended learning sites provide help to administration and teachers (Wei, 2014). According to John F. Pane (2013) if any institution adopted any new Digital Learning Style positive results will not emerge out immediately. Teachers and decision makers must be prepared to spend appropriate time and money to get the better results. It is difficult for educators to know that blended learning has positive impact on the achievement of student (Davis, 2015). According to Grieve the goals of school and course should be identified at the time of creating or collecting content. There should be a strong collaboration between students, teacher, and parents (Grieve, 2018). Innovative Educator Prizes (IEP) 2018, will be offered to educators for developing the innovative program for boosting the engagement of students (Schaffhauser, 2018).

In research article by Schaffhauser(2018) a researcher Bini use video game in her calculus class. In this game main character rescue the planet by using calculus problem. Students took interest in game and have tendency to clear the levels of game before the next concepts. Students give 100% results, their attitude about math changes. They retain information and get deeply involved with concepts (Schaffhauser, 2018). Pierce (2017) in his research article tell that 75% of U.S schools have implemented some form of blended learning and about ten million students are benefitting from it. Teachers in this way know about the progress of their students well (Pierce, 2017). In research report Gemin (2018) tell that students of rural areas faces many challenges like high cost of transportation, lack of facilities like internet and computers, few teachers with very low pay, and availability of very few courses. Online and blended learning options help schools and students of rural areas. In research article the researcher Bolkan(2018) said that digital learning tools allow students to learn from anywhere in the world to boost the academic and career achievement of remote communities. Nowadays students learn themselves by using Digital Learning Style and use classroom to enhance their understanding. Students spend less time in listening lectures and spend more time in online or collaborative work.

Hypotheses

Following hypotheses of research were tested:

$^1H_0$: There is no significant difference between mean scores of experimental group and control group on academic achievement in Biology at secondary level in knowledge.

$^1H_1$: There is significant difference between mean scores of experimental group and control group on academic achievement in Biology at secondary level in knowledge.

$^2H_0$: There is no significant difference between mean scores of experimental group and control group on academic achievement in Biology at secondary level in comprehension.

$^2H_1$: There is significant difference between mean scores of experimental group and control group on academic achievement in Biology at secondary level in comprehension.

$^3H_0$: There is no significant difference between mean scores of experimental group and control group on academic achievement in Biology at secondary level in application.

$^3H_1$: There is significant difference between mean scores of experimental group and control group on academic achievement in Biology at secondary level in application.

Literature Review

Digital learning has become more popular. Teachers use social media or educational apps to help their students after school hours. Students ask questions about the content from teachers after the class from their home (Lynch, 2017). Today students do not memorize facts and dates. Now more emphasize is on higher order thinking. At higher order thinking level students create something new from their understanding. Students of almost all the classes are asked to solve the higher order thinking tasks. Today students learn the skills to become a critical thinker which is the demand of job market today. Digital learning has become a part of curriculum now. By using Digital Learning Style teacher spend more time in helping their students to understand the topic. The more emphasize of digital learning is on collaborative work. Students collaborate online with one another and work on different projects together (Lynch, 2017). Data collected through test enables objective analysis of hypotheses under study. The results of research findings showed that the improvement of performance of female students is more than male students. While there is no clear impact of ICT applications on student's academic achievement (Basri, 2018). Research was conducted on 231 students of five different health colleges. Online survey was conducted on the use of Digital Learning Style

and its impact on the achievement in physiology course was observed. It is concluded in this study that the use of Digital Learning Style produces significant increase in academic achievement. Many students rely on Digital Learning Style to fulfil their academic needs. This study demonstrated that laptops and cell phones are most used devices which are about 50% and 42% respectively. PCs and tabs are most least used devices which are about 0.5% and 7% respectively(Al-Hariri & Al-Hattami, 2017).

Many applications like video-based programs, use of Google and Wikipedia allow the learners to interact with other students through this virtual learning environment. They collaborate in groups by sharing text, videos, pictures, and links of web pages through internet. The confidence and knowledge skills of students can be improved through Digital Learning Style (Ragad M. Tawafak, 2018). The use Digital Learning Style in learning environment has transformed from labs with single computer to highly equipped labs with computers, projectors, internet connection and with the facility of communication Digital Learning Style. Purpose of integrating Digital Learning Style in learning process is to increase the quality of education (Ozerbas & Erdogan, 2016). Some students in class are less proficient they face many difficulties in using Digital Learning Style for learning because they are less motivated and less proficient. Blended learning approach must be tailored to suit the cognitive level of students and different learning styles (Yusoff, Yusoff, & Hidayah, 2017).

Many sorts of remedies were tried by school administration and officials for promoting student's engagement in class and for the success of students one of the best remedies is the implementation of Digital Learning Style in curricula (Harris & Al-Bataineh, 2016). During the last two decades the government of Saudi Arabia, university management and researchers have invested millions of dollars for the adoption of Digital Learning Style in their educational system. Many universities of Saudi Arabia have fully adopted Digital Learning Style in their educational setup. Adoption of learning and management system has facilitated the process of education to great extent. All universities of Saudi Arabia have put restriction on boys and girls to study together. Girls students are restricted to attend seminars and workshops. With the use of Digital Learning Style there is no such restriction. The use of Digital Learning Style is higher in girls than boy students (Basri, Alandejani, & M.Almadani, 2018). The learning in math and science at primary and secondary age learners can be improved when digital tools and equipment are effectively used. Numeric skills and basic literacy skills of primary students can be improved by using digital technologies. Digitals tools built collaborative skills, interactive skills leadership skills and critical thinking of secondary age learners. These tools support the students in learning and provide help to employer.

In the process of learning meaningful intrinsic feedback is very important. Digital learning provides better opportunities for feedback related to the achievement of goals. There are many ways of using Digital Learning Style. Creative

teachers use tools and apps according to their needs (Kenny Williams, 2018).According to Blubaugh (2016) future Biology teachers should be versatile. They are aware about the use of Digital Learning Style and issues related to it. In many math classrooms Digital Learning Style become the prominent feature. Computers or Digital Learning Style is not effectively used for instructional purposes. For the use of Digital Learning Style in 21st century pre service teachers should be prepared to use different tools like graphing calculator. Learning about the use of Digital Learning Style how and where to use Digital Learning Style properly and according to the need of math classroom. Misuse of Digital Learning Style should be discouraged (Blubaugh, 2016). Roehrig (2016) reported in his research article that teaching science is a complex and dynamic profession. Continuous effort is required for science teachers to grow professionally and to become a better science teacher. Science teachers can utilize different Digital Learning Style tools in their inquiry-based science classrooms. By using such tools problem solving skills and thinking skills of students can improved and students work as scientist (Roehrig, 2016). Reiten (2016) in his research created a multi representation environment which contains the content in visual form of different dynamic objects of Biology and along with numerical and text information. Numerical and visual information are simultaneously linked to make patterns clear for students. Tutorial, gaming, and simulation environment was used in this research. In tutorial environment text and numerical information is processed in the form of tutorials. In gaming environment user play a game with object to reach his destination. In simulation environment images of dynamic mathematical objects, texts and numeric are embedded. One way to support and motivate teacher is to use Digital Learning Style in an innovative and effective way. By linking technological tools and tasks directly to curricula strengthens the connection of teachers with curricula (Reiten, 2016).

Material and Methods

The method and procedure adopted in this study is mentioned here in below:

Design

This experimental study adopted "Quasi-Experimental" design and more precisely "The Pre-test, Post-test non-equivalent control group Design" was followed.

Sampling/Sample

Convenience sampling technique was adopted to select the sample of the study. The sample of study comprised students of class 10th studying in GHS, Rawalpindi. The researchers did not disturb the timetable of respective school so whole classes were selected for the purpose of this research.

Instrument

The data of this study was collected from achievement test scores by administering same test as Pre-test and Post-test. Beside basic cognition/knowledge area, the test also contains questions that assess comprehension and application skill of the students. The reliability of test was calculated as .86 and the test was validated by a group of specialists.

Procedure

The intervention of lesson study was applied for eight weeks covering three lessons in a week. Total 24 lessons were delivered following the "online quiz" pattern. The success of the intervention was determined by comparing both groups on the basis of their performance in pre-test and post-test. The data were obtained in quantitative form (test scores of students).

Results and Discussion

The t-test was executed for analysis of data through SPSS software. The data were analyzed in the table below:

Table 1
Overall Comparison of Gain Scores of Academic Achievement from Pre-test to Post-test of Control and Experimental Groups

Group	Variables	Mean (Pre-Test)	S.D (Pre-Test)	Mean (Post-test)	S. D. (post-test)	Gain Scores	t-value	df	Sig. (2-tailed)
Control (N=30)	Knowledge	3.47	1.50	4.17	1.315	0.70	2.17	29	0.03
	Comprehension	3.63	1.49	4.23	1.870	0.80	2.14	29	0.04
	Application	3.27	2.34	4.50	3.462	1.23	2.60	29	0.01
Total		10.37	3.73	13.10	4.957	2.73	3.43	29	0.00
Experimental (N=30)	Knowledge	3.57	1.47	6.30	1.557	2.73	6.67	29	0.00
	Comprehension	1.87	1.47	6.73	1.856	4.86	12.33	29	0.00
	Application	4.90	3.20	9.63	3.873	4.73	4.98	29	0.00
Total		10.33	3.88	22.67	5.701	12.33	9.34	29	0.00

Table 1 shows comparison of mean scores, standard deviation and gain scores of experimental group and controlled group. The results of the table show that controlled group improved significantly in knowledge, comprehension, and application. In the comparison of both groups experimental group showed more significant improvement. The effect size and gain score of experimental groups is high than that of controlled group.

Findings

These findings were observed from the analysis of the data:

1. The results of data analysis revealed that in pre-test, the two groups were at the same mean score so should be treated as equal before the online quiz style exposure.
2. Overall attainment of the high school math students taught with visual learning style was significantly better than the students taught without lesson study. Consequently, null hypothesis $H_0$1 was discarded.
3. On knowledge based test items, experimental group appeared on better mean score than control in posttest. Therefore, the null hypothesis $H_0$2 was discarded.
4. The performance of experimental group remained better on comprehension based test items than control group. So the null hypothesis H_0 3 was discarded.
5. The data analysis revealed that the performance of experimental group remained better than control group on application based test items. So the null hypothesis H_0 4 was discarded.

Conclusion

Results of both groups revealed that the scores of students which were taught by using Digital Learning Style were significantly higher than the post-test results of the students which were taught without Digital Learning Style. Use of Digital Learning Style in classroom had positive result on academic achievement of students in Biology. Students can learn in an innovative and interactive way more effectively in Digital Learning Style implemented class.

Recommendations

1. Schools in Pakistan remain closed during coronavirus crisis and students remain home for extended period. Government should take measures to build simple Digital Learning Style which students from low-income household and low-resourced schools can easily use to continue learning during this period and to take action to provide availably of data for educational purpose. Current online educational system is not enough to improve academic achievement of students. It is recommended that online Digital Learning Style should be improved, for example, mobile phone or offline videos should be introduced. Such offline apps should be used that facilitate students without the use of internet.
2. It is advised that online education support students by providing additional opportunities of learning. Online learning increase enhance motivation level of students, flourish students thinking abilities, support student's problem-solving skills, and enhance student's creativity.

References

Al-Hariri, M., & Al-Hattami, A. (2017). Impact of students' use of Digital Learning Style on their learning achievements in physiology courses at the University of Dammam. *Journal of Taibah University Medical Sciences, 12*(1), 82-85.

Basri, W. S., Alandejani, J. A., & M.Almadani, a. F. (2018). ICT Adoption Impact on Student's Acadamic Performance: Evidence from Saudi University. *Education Research International*, 9(2) 60-65

Blubaugh, R. P. (2016). Digital Learning Style in Biology Education: Preparing Teachers for the Future. *CITE Journal*, 12-1

Bolkan, J. (2018). Foundation for Blended and Online Learning Report Examines Tech Solutions to Rural Ed Challenges. *The Journal*

Davis, M. (2015). Blended Learning Research: The Seven Studies You Need to Know. *Digital Education*.

Gemin, B., Smith, B., Vashaw, L., & Watson, J. (2018). *Digital Learning Strategies for Rural America.* Evergreen Education group. ERIC

Grieve, D. (2018). 7 Key Considerations for Online and Blended Learning Programs. *The Journal*

Harris, J. L.-B.-B. (2016). One to One Digital Learning Style and its Effect on Student Academic Achievement and Motivation. *Contemporary Education Digital Learning Style, 7(1)*, 368-381.

Lynch, M. (2017). Why Digital Learning is Reshaping Education. *The TEC EVOCATE*.

Minero, E. (2020). 8 Strategies to Improve Participation in Your Virtual Classroom. *Edutopia*.

Nagel, D. (2018). *Teaching with Digital Technology in 2018*. PageLines

Nazarenkoa, A. L. (2015). Blended Learning vs Traditional Learning: What Works? *Procedia - Social and Behavioral Sciences, 200*, 77 - 82.

Ozerbas, M. A., & Erdogan, B. H. (2016). The Effect of the Digital Classroom on Academic Success and Online Technologies Self-Efficacy. *Educational Technology & Society*. 19 (4) 203-212

Perry, D. R., &Steck, A. K. (2015, June 10). Increasing Student Engagement, Self-Efficacy, and Meta-Cognitive Self-Regulation in the High School Geometry Classroom: Do iPads Help? *Computers in the Schools*, *32(2)*122-143.

Pierce, D. (2017). What Effective Blended Learning Looks Like. *The Journal*.

Ragad M. Tawafak, A. B. (2018). Assessing the Impact of Digital Learning Style Learning and Assessment Method on Academic Performance: Review Paper. *EURASIA Journal of Biology, Science and Digital Learning Style Education*, 14(6) 2241-2254.

Reiten, L. (2016). Why and How Secondary Biology Teachers Implement Virtual Manipulatives.*CITE Journal*.20(1).

Roehrig, S. G. (2016). Teaching Science with Digital Learning Style: Case Studies of Science Teacher's Development of Digital Learning Style, Pedagogy, and Content Knowledge. *CITE Journal*.9(1).

Schaffhauser, D. (2018). Flipped Learning Global Launches Lesson Planning Credential. *The Journal.*

Schaffhauser, D. (2018). Grant Spotlight: $10,000 Teacher Grants for Blended Learning. *The Journal.*

Schaffhauser, D. (2018). The Real Role of Blended Learning in Instruction. *The Journal.*

Schaffhauser, D. (2018). Why Game-Based Learning Works for This Math Teacher. *The Journal.*

Stakkestad, S. V., & Størdal, G. F. (2017). The Effects of Jazz Smart Classroom's Online Quiz on Students' Academic Performance.

Wael Sh. Basri, J. A. (2018). *ICT Adoption Impact on Student's Acadamic Performance: Evidence from Saudi University*. Education Research International, 9.

Yusoff, S., Yusoff, R., & Hidayah, N. (2017). *Blended Learning Approach for Less Proficient Students.* SAGE.