



RESEARCH PAPER

Effect of Synchronous Videos on Academic Achievement in Health and Physical Education at the College Level in Rawalpindi during Covid-19

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The major purposes of this experimental research had been to find out the effect of Synchronous Videos on academic achievement in Health and Physical Education at the College level and to compare the effect of Synchronous video on girls' and boys' academic achievement in Health and Physical Education at the College level in terms of hockey, cricket, football, athletics and indoor games. The design of this study was Quasi Experimental (Pretest Posttest Non Equivalent Control Group Design). The two government Colleges, one boys' College and one girls' College were selected for experimentation. There were four groups of class 11 from two Colleges comprising experimental and controls in each college. There were fifty items in pre/posttest to assess three levels of cognitive domain namely, knowledge; comprehension and application Synchronous Videos were treatment. After intervention, the posttest was given to the participants. The data analysis was done by the software SPSS 22. The t-statistics were used for each control and experimental group separately. The results showed that Synchronous Videos had a noteworthy influence on academic achievement in terms of knowledge, comprehension and application skills of the students. The girls performed better than boys via Synchronous Videos. SV is recommended to teach field/practical work for Health and Physical Education students for their motivation and interest of the College students.

Introduction

The health education has a distinct place in educational system with its content, consist of three main disciplines named physics, biology and Health and Physical Education. (Kaptan, 1996). Health and Physical Education contains lots of

abstract concepts and the place where students can understand these concepts are videos/animations. (Ayas et. al, 2005; Tasdelen, 2004). The practical work is an essential element for understanding abstract concepts of Health and Physical Education, it cannot be carried out properly due to certain reasons, such as safety concerns in COVID 19, lack of self-confidence and an excessive amount of time and effort to conduct accurate practical.(Hofstein& lunette,2004; Durmus &Bayraktar, 2010).

Synchronous videos are computer simulations that contain specific instructions, procedures, methods of data analysis, and data presentation algorithms (Flowers, Moore, & Flowers, 2011).Synchronous videos provide students with virtual experiences, and present important concepts, principles and processes. AV helps students by enriching their experiences, conducting and repeating experiments and improving their experimental skills such as manipulation of materials and equipment, data collection, completion of experiments in interactive way and preparation of experimental reports (Subramanian & Marsic, 2001).

Researchers showed that instructions carried out with Synchronous videos significantly increase students achievement levels. Synchronous videos let students observe the process in detail, compared to board and chalk activities of the traditional classroom or partially completed experiments of the real environment. In addition, Synchronous videos foster attention and motivation towards the course by supporting a discussion platform among partners, peers, and among students and teacher (Hounshell& Hill, 1989). Researches argue that performing experiments within a virtual environment is more effective than performing experiments in real videos/animations (Browne, 2002). The above cited situations motivated the researchers to see the effect of AV on academic achievement in Health and Physical Education at the College level.

Literature Review

Sciences like Sports learning are better on the basis of AV (Tatli, 2009). Sports Science education should be focused on educating the young ones with AV (Yang &Heh, 2007). The same opinion had been given by Rusten(2004). IT/Computers are vital to support the teaching of sports science (Fetaji et al., 2007). In our country, a need for virtual learning environments has been felt day by day. Synchronous Videos or materials, which allow training free from location and time, can rescue education from the walls of the class and spread it to all kinds of environments and thus applications are more dynamic with simulations (Yang &Heh, 2007). Synchronous videos involve technology-mediated instruction. Use of Synchronous Videos in sports can upsurge understanding of concepts, and scientific skills related to sports/sciences (Flowers, Moore, Flowers, & 2011).

Synchronous videomay be used for promotionof quality teaching and innovative learning like sportsrelated subjects (Subramaniam,R. & Marsic,I.2001). Use of AV in teaching may be challengingin developing countries (Habracken,

C.2004). Therefore, they may need to experiment it firstly and then use it due to being expensive (Tracey, A. & Bridget, D.2007). It might be useful in sports if implemented well. In the same perspective Josephsen and Kristensen (2006) were of the same viewpoint, that is, it was undertaken in sports as well as in this study.

Research Hypotheses

H₀: There is no significant effect of Synchronous Videos(SV) on academic achievement of 11th graders in Health and Physical Education.

H₁: There is significant effect of Synchronous Videos(SV) on academic achievement of 11th graders in Health and Physical Education.

H₀: There is no significant effect of Synchronous Videos(SV) on academic achievement of 11th graders in Health and Physical Education in terms of knowledge.

H₂: There is significant effect of Synchronous Videos(SV) on academic achievement of 11th graders in Health and Physical Education in terms of knowledge.

H₀: There is no significant effect of Synchronous Videos(SV) on academic achievement of 11th graders in Health and Physical Education in terms of comprehension.

H₃: There is significant effect of Synchronous Videos(SV) on academic achievement of 11th graders in Health and Physical Education in terms of comprehension.

H₀: There is no significant effect of Synchronous Videos(SV) on academic achievement of 11th graders in Health and Physical Education in terms of application.

H₄: There is significant effect of Synchronous Videos(SV) on academic achievement of 11th graders in Health and Physical Education in terms of application.

H₀: There is no significant effect of Synchronous Videos(SV) on academic achievement of 11th graders in Health and Physical Education in terms of gender.

H₅: There is significant effect of Synchronous Videos(SV) on academic achievement of 11th graders in Health and Physical Education in terms of gender.

H₀: There is no significant effect of Synchronous Videos(SV) on academic achievement of 11th graders in Health and Physical Education in terms of hockey.

H₆: There is significant effect of Synchronous Videos(SV) on academic achievement of 11th graders in Health and Physical Education in terms of hockey.

- H₀: There is no significant effect of Synchronous Videos(SV) on academic achievement of 11th graders in Health and Physical Education in terms of cricket.
- H₈: There is significant effect of Synchronous Videos(SV) on academic achievement of 11th graders in Health and Physical Education in terms of cricket.
- H₀: There is no significant effect of Synchronous Videos(SV) on academic achievement of 11th graders in Health and Physical Education in terms of football.
- H₉: There is significant effect of Synchronous Videos(SV) on academic achievement of 11th graders in Health and Physical Education in terms of football.
- H₀: There is no significant effect of Synchronous Videos(SV) on academic achievement of 11th graders in Health and Physical Education in terms of badminton.
- H₁₀: There is significant effect of Synchronous Videos(SV) on academic achievement of 11th graders in Health and Physical Education in terms of badminton.
- H₀: There is no significant effect of Synchronous Videos(SV) on academic achievement of 11th graders in Health and Physical Education in terms of table tennis.
- H₁₁: There is significant effect of Synchronous Videos(SV) on academic achievement of 11th graders in Health and Physical Education in terms of table tennis.
- H₀: There is no significant effect of Synchronous Videos(SV) on academic achievement of 11th graders in Health and Physical Education in terms of athletics.
- H₁₂: There is significant effect of Synchronous Videos(SV) on academic achievement of 11th graders in Health and Physical Education in terms of athletics.
- H₀: There is no significant effect of Synchronous Videos(SV) on academic achievement of 11th graders in Health and Physical Education in terms of indoor games.
- H₁₃: There is significant effect of Synchronous Videos(SV) on academic achievement of 11th graders in Health and Physical Education in terms of indoor games.

Material and Methods

The details regarding method and procedure are as under:

Design

The design/plan of this research used had been a quasi-experiment alone. If precise, a Pretest-Posttest-Non-Equivalent-Control-Group-Design had been in use. Two Colleges from public-sector had been carefully chosen for the purpose of experimental process.

Sample

There, in experimentation, were 160 participants. The "convenient sampling" was used.

Instrument

The tool used for the data collection was academic achievement test to measure cognitive domain skills of Knowledge, Comprehension and Application according to the Bloom's Taxonomy. The same had been validated, piloted and administered as pre/posttest.

Data Analysis

The data were examined in the subsequent ways by using t-statistics with the help of SPSS.

Results and Discussion

Table 1
Comparison of the Gain Scored by Control and Experimental Groups

Group	Pre-Test Mean	SD (Pre-Test)	Post-Test Mean	SD (Post-Test)	Gain	df	t-value	Sig (2-tailed)
Control (N=68)	11.43	3.20	18.28	4.60	7.25	67	15.344	0.000***
Experimental (N=92)	11.17	3.48	21.82	5.65	10.55	91	14.444	0.000***

$p < 0.05$

It is evident from the data analyzed above that among controls, average scores in pre-test was 11.43 and in the post test it was 18.28. The gain in the scores from pretest to posttest had been 7.25 as analyzed by SPSS. The t-value calculated was as displayed in the table 15.344 significant at ($p < 0.05$) 0.000 significance level. In the experimental group, the average performance in pretest was 11.17 and in the post test it was 21.82. The improvement in mean scores was 10.55. The t-value was calculated as 14.444 significant at ($p < 0.05$) 0.000 significance level. From the gain scores comparison, it is evident that experimental group performed better in comparison with the controls.

Table 2
Comparison of the Gain Score by Control and Experimental Groups (Knowledge)

Group	Pre-Test Mean	SD (Pre-Test)	Post-Test Mean	SD (Post-Test)	Gain	df	t-value	Sig (2-tailed)
Experimental (N=68)	7.897	2.770	14.55	4.008	6.661	67	2.918	0.000
Control (N=92)	7.771	2.568	12.90	3.169	5.130	91	1.980	0.005

p<0.05

It is evident from the data analyzed above that in the experimental group, average scores in pre-test had been 7.89 and the average performance in the post test had been 14.55. Gain in the average performance from pretest to posttest had been 6.66 as analyzed by SPSS. The t-calculated had been 2.918 as displayed in the table 4.2. In the control group, the average performance in pretest was 7.77 and the average performance in the post test had been 12.90. The gain in the average performance had been 5.13. The t-calculated had been 1.980. It is evident from the gain scores that there is an improvement in the knowledge of the experimental group students which is statistically significant in comparison with the control group students.

Table 3
Comparison of the Gain Score by Control and Experimental Groups (Comprehension)

Group	Pre-Test Mean	SD (Pre-Test)	Post-Test Mean	SD (Post-Test)	Gain	df	t-value	Sig (2-tailed)
Experimental (N=68)	3.029	1.485	6.279	2.093	3.25	67	5.181	0.000***
Control (N=92)	3.163	1.462	4.695	1.764	1.53	91	1.901	0.054

p<0.05

It is evident from the data analyzed above that in the experimental group, average scores in pretest had been 3.029 and in the post test the average performance had been 6.279. The gain in the average performance from pretest to posttest had been 3.25 as analyzed by SPSS. The t-calculated had been 5.181 as displayed in the table 4.3. In the control group, the average performance in pretest had been 3.163 and in the post test the average performance had been 4.695. The improvement in the average performance had been 1.532. The t-calculated had been 1.90. It is evident from the gain scores that there is an improvement in the comprehension of the experimental group students which is statistically significant in comparison with the average performance of controls in comprehension.

Table 4
Comparison of the Gain Scored by Control and Experimental Groups (Application)

Group	Pre-Test Mean	SD (Pre-Test)	Post-Test Mean	SD (Post-Test)	Gain	df	t-value	Sig (2-tailed)
Experimental (N=68)	.0588	.2933	.4853	.7226	.4265	67	2.02	0.000***
Control (N=92)	.1304	.3386	.3696	.5490	.2392	91	1.511	0.051

p<0.05

It is evident from the data analyzed above that in the experimental group, average scores in pretest had been 0.0588 and average performance in the post test had been 0.4853. The gain in the average performance from pretest to posttest had been 0.4265 as analyzed by SPSS. The t- calculated had been 2.02 as displayed in the table 4.4. In the control group, the average performance in pretest had been 0.1304 and average performance in the post test had been 0.3696. The gain in average performance had been 0.2392. The t- calculated had been 1.511. It is evident from the gain scores that there is an improvement in the application level of the experimental group students which is statistically significant in comparison with the application level of the controls.

Table 5
Gender wise Comparison of the Gain Scored by Control and Experimental Groups

Group	Pre-Test Mean	SD (Pre-Test)	Post-Test Mean	SD (Post-Test)	Gain	df	t-value	Sig (2-tailed)
Girls (N=100)	11.91	3.3153	20.14	5.53	8.23	99	2.947	0.004
Boys (N=60)	10.35	3.1127	19.20	5.04	8.85	59	2.786	0.005

p<0.05

It is evident from the data analyzed above that girls' average scores in pretest had been 11.910 and average performance in the post test had been 20.14. Gain in the average performance from pretest to posttest had been 8.23 as analyzed by SPSS. The t- calculated had been 2.947 as displayed in the table 4.5. The average performance of boys in pretest had been 10.35 and average performance in the post test had been 19.20. The gain in average performance had been 8.85. The t- calculated had been 2.786. It is evident from the data analyzed above that there is statistically significant improvement in gain scores of girls/boys from pretest to post test but there is no significant difference in girls and boys achievement. Both the genders showed the similar average performance. However the girls performed relatively better.

Table 6
Comparison of the Gain Scored by Control and Experimental Groups (Hockey)

Group	Pre-Test Mean	SD (Pre-Test)	Post-Test Mean	SD (Post-Test)	Gain	df	t-value	Sig (2-tailed)
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Experimental (N=68)	1.30	1.14	2.50	1.50	1.20	67	2.87	0.00***
Control (N=92)	1.67	1.40	1.70	1.12	0.03	91	0.12	0.15

p<0.05

The above displayed table 6 shows that the t-value (2.87) along with *df*(67).was significant at p<0.05, therefore it is obvious now that experimental group got a better gain score (M=1.20) and had statistically significant improvement in average score of academic achievement than control group (M=-0.03). In case of control group, the t value (0.12) with *df*(91) was insignificant at p<0.05, therefore it is obvious now that experimental group had statistically significant improvement in academic achievement than control group participants in the topic namely Teaching of Hockey.

Table 7
Comparison of the Gain Scored by Control and Experimental Groups(Cricket)

Group	Pre-Test Mean	SD (Pre-Test)	Post-Test Mean	SD (Post-Test)	Gain	Df	t-value	Sig (2-tailed)
Experimental (N=68)	1.84	0.85	2.94	1.10	1.10	67	3.31	0.00***
Control (N=92)	1.82	0.75	2.17	1.35	0.35	91	1.31	0.11

p<0.05

The above displayed table 7 shows that the t-value (3.31) along with *df*(67).was significant at p<0.05, therefore it is obvious now that experimental group got a better gain score (M=1.10) and had statistically significant improvement in average score of academic achievement equal to the control group (M=0.35). In case of control group, the t value (1.31) with *df*(91).was insignificant at p<0.05, therefore it is obvious now that experimental group had statistically significant improvement in academic achievement equivalent to control group participants in intervention topic "Teaching of Cricket".

Table 8
Comparison of the Gain Scored by Control and Experimental Groups(Football)

Group	Pre-Test Mean	SD (Pre-Test)	Post-Test Mean	SD (Post-Test)	Gain	df	t-value	Sig (2-tailed)
Experimental (N=68)	0.60	0.36	1.10	0.81	0.50	67	2.78	0.00***
Control (N=92)	0.47	0.33	0.59	0.49	0.12	91	0.15	0.25

p<0.05

The above displayed table 8 shows that the t-value (2.78) along with *df*(67).was significant at p<0.05, therefore it is obvious now that experimental group got a better gain score (M=0.50) and had statistically significant improvement in

average score of academic achievement than control group ($M=0.12$). In case of control group, the t value (0.15) with $df(91)$ was insignificant at $p<0.05$, therefore it is obvious now that experimental group had statistically significant improvement in academic achievement than control group participants in teaching Football through AV.

Table 9
Comparison of the Gain Scored by Control and Experimental Groups (Badminton)

Group	Pre-Test Mean	SD (Pre-Test)	Post-Test Mean	SD (Post-Test)	Gain	df	t-value	Sig (2-tailed)
Experimental (N=68)	0.55	0.54	1.10	0.72	0.55	67	2.36	0.00***
Control (N=92)	0.49	0.07	0.71	0.67	0.22	91	1.00	0.058

$p<0.05$

The above displayed table 9 shows that the t -value (2.36) along with $df(67)$.was significant at $p<0.05$, therefore it is obvious now that experimental group got a better gain score ($M=0.55$) and had statistically significant improvement in average score of academic achievement than control group ($M=0.22$). In case of control group, the t value (1.00) with $df(91)$ was insignificant at $p<0.05$, therefore it is obvious now that experimental group had statistically significant improvement in academic achievement than control group participants in teaching of Badminton via AV.

Table 10
Comparison of the Gain Scored by Control and Experimental Groups(Athletics)

Group	Pre-Test Mean	SD (Pre-Test)	Post-Test Mean	SD (Post-Test)	Gain	df	t-value	Sig (2-tailed)
Experimental (N=68)	0.25	.43	.63	.48	0.38	67	4.31	0.00***
Control (N=92)	0.35	.48	.39	.49	0.04	91	1.66	0.09

$p<0.05$

The above displayed table 10 shows that the t -value (4.31) along with $df(67)$.was significant at $p<0.05$, therefore it is obvious now that experimental group got a better gain score ($M=0.38$) and had statistically significant improvement in average score of academic achievement than control group ($M=0.04$). In case of control group, the t value (1.66) with $df(91)$ was insignificant at $p<0.05$, therefore it is obvious now that experimental group had statistically significant improvement in academic achievement than control group participants in teaching of Athletics Preparation via AV.

Table 11
Comparison of the Gain Score by Control and Experimental Groups (Table Tennis)

Group	Pre-Test Mean	SD (Pre-Test)	Post-Test Mean	SD (Post-Test)	Gain	df	t-value	Sig (2-tailed)
Experimental (N=68)	0.80	.49	2.47	0.59	1.67	67	2.31	0.00***
Control (N=92)	1.17	.90	2.01	0.72	0.84	91	1.31	0.07

p<0.05

The above displayed table 4.11 shows that the t-value (2.31) along with *df*(67). was significant at $p<0.05$, therefore it is obvious now that experimental group got a better gain score ($M=1.67$) and had statistically significant improvement in average score of academic achievement equal to the control group ($M=0.84$). In case of control group, the t value (1.310) with *df*(91). was insignificant at $p<0.05$, therefore it is obvious now that experimental group had statistically significant improvement in academic achievement than control group participants in teaching of Table Tennis via AV.

Table 12
Comparison of the Gain Score by Control and Experimental Groups (Indoor Games)

Group	Pre-Test Mean	SD (Pre-Test)	Post-Test Mean	SD (Post-Test)	Gain	df	t-value	Sig (2-tailed)
Control (N=92)	0.53	0.40	1.93	.50	1.40	67	5.34	0.00***
Experimental (N=68)	0.39	0.35	.66	.49	.27	91	1.44	0.05

p<0.05

The above displayed table 4.12 shows that the t-value (5.34) along with *df*(67). was significant at $p<0.05$, therefore it is obvious now that experimental group got a better gain score ($M=1.40$) and had statistically significant improvement in average score of academic achievement than control group ($M=0.27$). In case of control group, the t value (1.44) with *df*(91) was insignificant at $p<0.05$, therefore it is obvious now that experimental group had statistically significant improvement in academic achievement relatively to control group participants in teaching of other Indoor Games Formation via AV except already mentioned above, that is Table Tennis and Badminton.

Findings

These findings were observed from the analysis of the data:

1. There is significant effect of Synchronous Videos (SV) on academic achievement of 11th graders in Health and Physical Education.

2. There is significant effect of Synchronous Videos (SV) on academic achievement of 11th graders in Health and Physical Education in terms of knowledge.
3. There is significant effect of Synchronous Videos (SV) on academic achievement of 11th graders in Health and Physical Education in terms of comprehension.
4. There is significant effect of Synchronous Videos (SV) on academic achievement of 11th graders in Health and Physical Education in terms of application.
5. There is no significant effect of Synchronous Videos (SV) on academic achievement of 11th graders girls and boys in Health and Physical Education in terms of gender. However, girls are slightly better in gain scores.
6. There is significant effect of Synchronous Videos (SV) on academic achievement of 11th graders in Health and Physical Education in terms of hockey.
7. There is significant effect of Synchronous Videos (SV) on academic achievement of 11th graders in Health and Physical Education in terms of cricket.
8. There is significant effect of Synchronous Videos (SV) on academic achievement of 11th graders in Health and Physical Education in terms of football.
9. There is significant effect of Synchronous Videos (SV) on academic achievement of 11th graders in Health and Physical Education in terms of badminton.
10. There is significant effect of Synchronous Videos (SV) on academic achievement of 11th graders in Health and Physical Education in terms of table tennis.
11. There is significant effect of Synchronous Videos (SV) on academic achievement of 11th graders in Health and Physical Education in terms of athletics.
12. There is significant effect of Synchronous Videos (SV) on academic achievement of 11th graders in Health and Physical Education in terms of indoor games.

Conclusions

The following conclusions were made from the findings and data analysis:

1. The AV has a significant effect on academic achievement in terms of *knowledge* increase among the College Health and Physical Education students in comparison with the traditional teaching methodology used in Pakistani Health and Physical Education classroom.
2. The AV has a significant effect on academic achievement in terms of *comprehension* increase among high the College Health and Physical Education students in comparison with the traditional teaching methodology used in Pakistani Health and Physical Education classroom.
3. The AV has a significant effect on academic achievement in terms of *application of the concepts* increase among high the College Health and Physical Education students in comparison with the traditional teaching methodology used in Pakistani Health and Physical Education classroom.

4. There is no significant difference between the performance of girls and boys taught via AV.
5. The AV has a significant effect on academic achievement in terms of *hockey* among the College Health and Physical Education students in comparison with the traditional teaching methodology used in Pakistani Health and Physical Education classroom.
6. The AV has a significant effect on academic achievement in terms of *cricket* among the College Health and Physical Education students in comparison with the traditional teaching methodology used in Pakistani Health and Physical Education classroom.
7. The AV has a significant effect on academic achievement in terms of *football* among the College Health and Physical Education students in comparison with the traditional teaching methodology used in Pakistani Health and Physical Education classroom.
8. The AV has a significant effect on academic achievement in terms of *badminton* among the College Health and Physical Education students in comparison with the traditional teaching methodology used in Pakistani Health and Physical Education classroom.
9. The AV has a significant effect on academic achievement in terms of *table tennis* increase among the College Health and Physical Education students in comparison with the traditional teaching methodology used in Pakistani Health and Physical Education classroom.
10. The AV has a significant effect on academic achievement in terms of *athletics* increase among the College Health and Physical Education students in comparison with the traditional teaching methodology used in Pakistani Health and Physical Education classroom.
11. The AV has a significant effect on academic achievement in terms of *indoor games* among the College Health and Physical Education students in comparison with the traditional teaching methodology used in Pakistani Health and Physical Education classroom.

Recommendations

On the basis of the observations made during the study, the following recommendations are suggested:

1. AV might be used by the sports science teachers in Science Teaching classrooms at Pakistani College.

2. For a significant improvement in knowledge, comprehension and application skills of the students in Pakistani Public and Private Sector College, AV is recommended for girls and boys rather than the traditional methods in teaching of theoretical concepts of Health and Physical Education.
3. For a significant improvement in knowledge, comprehension and application skills of athletics, major games and indoor games, AV is recommended.
4. For a significant improvement in knowledge, comprehension and application skills of the students in Pakistani institutions, AV is recommended for girls and boys rather than the traditional methods in teaching of theoretical concepts of all the sports science subjects at other levels that is from early grade sports science comprehension to the varsity level.

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