

Educational outcome in scenario and power point presentation based learning strategies among undergraduate physical therapy students

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Objective: To compare before and after change in knowledge and perception of first year Doctor of Physical Therapy students regarding lower extremity pathologies in biomechanics, using scenarios and power point presentation based learning.

Methodology: In this quasi-experimental study, a sample of 50 students was selected from Lahore Medical and Dental College, Lahore, Pakistan. The group was assessed before (pretest) and after (post-test) implementing both teaching methodologies. The perception of students was assessed on five-point Likert scale i.e. strongly disagrees to strongly agree. The knowledge was assessed by multiple choice questions.

Results: Scenario based learning was thought to be better teaching method by 96% students as compared to the conventional one ($p=0.016$). 66% reported that power point presentation held their attention ($p=0.003$). They did not prefer traditional lectures using black board or white board

($p=0.002$). The power point presentation helped to emphasize key points ($p=0.000$). The Professors using presentations were more organized (0.003). There was no significant change in the knowledge of the students when compared Pre and Post Scenario based sessions. Overall, there was significant change in knowledge for only two variables that is number 11 and 14 ($p=0.015$, $p=0.026$, respectively). Rest of the knowledge variables showed no statistical significance after implementation of presentation based learning.

Conclusion: There was a significant change in some variables of perception and knowledge among first year Doctor of Physical Therapy students while using power point presentations based learning but no change in perception and knowledge was seen while using scenario based learning. (Rawal Med J 201;43:146-150).

Keywords: Education, problem-based learning, perception, computer-based learning.

INTRODUCTION

The teaching methodologies have evolved over the time and there is a lot of advancement in teacher-student interaction and learning styles. Conventionally, there was a passive use of learning styles i.e. lecture based learning, where teachers conveyed lecture without any active participation from the students.¹ Now, more active learning strategies such as scenario based learning are being used.²

A scenario is a story about how the future might turn out.³ The scenario based learning (SBL) or case-based learning is innovative and instructional use of cases or scenarios that can teach problem solving skills and generate critical thinking,⁴ using contextual cognition among students and learners.⁵ The three main objectives of SBL are gaining essential knowledge, using gained knowledge in clinical or practical aspects and inducing independent learning.⁶

Recently, the use of power point presentation (ppt)

based learning in classroom has significantly increased globally without knowing the effects of this methodology on studies, learning and attitudes of the students.⁷ The presentation based learning skills are recognized as central professional skills, that play a vital role in students independent learning process.⁸ So far, studies have been conducted separately on both teaching methodologies or in comparison with other teaching styles such as lecture based learning.⁹ The basis of current investigation is to compare the outcome of SBL and ppt based learning on student's learning outcomes in terms of their change in knowledge and perception of students about these methodologies.

METHODOLOGY

The quasi-experimental study lasted 6 months and included 93 first year students of Doctor of Physical Therapy students of Lahore Medical and Dental College, Lahore, Pakistan using Non-probability

Convenience sampling. The Sample Size was estimated by using the formula below, considering 5% level of significance, power of the test was 80%, anticipated population P1 is 7% and anticipated population P2 is 5%. But as sample feasibility was 50 so sample size was selected as 50.¹⁰

$$N = \frac{\left(Z_{\alpha/2} \sqrt{2p(1-p)} + Z_{1-\beta} \sqrt{p_1(1-p_1)p_2(1-p_2)} \right)^2}{(p_1 - p_2)^2}$$

Total twenty lower limb pathologies were included.¹¹ The group was assessed before (pretest) and after (post-test) implementing both methodologies. The perception of the students was evaluated on five-point Likert scale i.e. strongly disagrees to strongly agree using multiple choice questions.^{12,13} The questionnaire was validated by ten expert physical therapists. After validation, revision of mcqs was done by considering α coefficient as 0.65. The study was approved by ethical review board of the institution and written informed consent was taken from each individual. The data were analyzed by SPSS version 20.

Before/after comparisons was done using non-parametric or parametric methods i.e. Wilcoxon Rank-Sum test since the data were obtained as scores. The test results for multiple choice questions were compared before and after by means of a Chi-square test. An alpha level of 0.05 was selected for significance.

RESULTS

All 50 students were present for both Pre-and Post SBL sessions. The numbers of the girls were 43 (88.0%) and the boys were only 7 in number (12%). Table 1 shows that the majority (96%) of the students were of the opinion that SBL was better teaching method as compared to the conventional one ($p=0.016$). The mainstream (66%) of the students were of view that ppt holds their attention ($p=0.003$). The students didn't prefer traditional lectures using black board or white board to power point presentations ($p=0.002$). The student's reviews showed that ppt helped to emphasize key points during lecture ($p=0.000$). The Professors using ppt were more organized (0.003).

Table 1. Change in perception of Students Pre & Post-Scenario and power point presentation based learning (n=50).

Sr. no	Statement	Pre SBL Mean +/-SD	Post SBL Mean +/-SD	Mean Difference	P value
1	Scenario based learning (SBL) is better teaching method.	4.28±0.671	4.50±0.647	-0.22	0.016
2	SBL encourages self-study and problem solving skills	4.10±0.863	4.24±0.744	-0.14	0.507
3	SBL helps in ability to remember.	4.04±0.856	4.26±0.723	-0.22	0.180
4	SBL helps in improved withholding of the knowledge	4.00±0.969	4.16±0.650	-0.16	0.886
5	SBL helps in refining communication skills.	4.20±0.728	4.06±0.978	0.14	0.501
6	SBL deprive students of any chance to gain knowledge from experience educators	3.80±0.833	3.62±1.159	0.18	0.225
7	SBL facilitates a healthy teacher-student relationship.	4.02±0.937	4.20±0.782	-0.18	0.221
8	SBL is time consuming and not applicable in our setups.	2.70±1.182	2.46±1.129	0.24	0.330
9	Power Point Presentation holds my attention.	3.00±1.030	3.56±1.033	-0.56	0.003
10	PBL increases the probability of inappropriate class conduct.	3.30±0.953	2.96±1.009	0.34	0.056
11	I favor traditional lecture system using a black or white board	3.56±1.215	2.84±1.131	0.72	0.002
12	Power Point presentations support to highlight key points.	3.30±1.055	3.98±0.589	-0.68	0.000
13	Lecturers who use pptx are more systematized during their presentation.	3.22±1.055	3.82±0.962	-0.6	0.003
14	I favor bullet-point, text-only pptx over presentations with audio, video, or graphics.	2.80±1.262	3.16±1.218	-0.36	0.92
15	Visual images presented in pptx lectures assist me to recall content during examinations.	3.84±0.976	4.02±0.769	-0.54	0.237
16	I am less interested to join class when pptx are used during the lecture.	3.32±1.168	3.00±1.107	0.32	0.161

Wilcoxon Rank sum test was employed (significance level set at 0.05).

Table 2. Change in knowledge of Students Pre & Post scenario and power point presentation based learning (n=50).

Sr. no	Statement	Pre SBL Mean +/-SD	Post SBL Mean +/-SD	Mean difference	P value
1	Compressive forces at patella-femoral joint have been found to be one-half of the body's mass during walking, it rises up to over _____ time's the body weight during stair climbing.	1.74±0.443	1.32±0.471	0.42	0.819
2	A runner comes to you with pain on lateral aspect of the knee. There is no bony pathology. The examination revealed femoral anteversion, increased Q angle, excessive pronation and imbalance of vastus medialis obliquus and vastus lateralis. Patient is suffering from	1.80±0.404	1.56±0.501	0.24	0.203
3	The ankle sprains are the most common of all sports associated injuries with additional feature	1.66±0.479	1.16±0.370	0.5	0.616
4	The structural factors believed to enhance the development of plantar fasciitis is/are	1.88±0.328	1.28±0.454	0.6	0.868
5	In a knock knee position, there is	1.84±0.370	1.68±0.471	0.16	0.894
6	A 15 years old female participated in one leg race, her right leg was tied with the help of a rope in full knee flexion and foot in neutral position. While running, someone behind pushed her and she fell down on her tied leg. MRI of right leg revealed isolated ligamentous tear of	1.94±0.240	1.18±0.388	0.76	0.403
7	The 17% of medial and lateral loads on the knee joint are sustained by _____ and 83% by _____.	1.80±0.404	1.22±0.418	0.58	0.296
8	Even though walking normally involves approximately 6–8° of subtalar pronation, people with pes planus suffer from pronation.	1.70±0.463	1.26±0.443	0.44	0.849
9	The most common fracture of lower limb among elderly individuals with osteoporosis is	1.12±0.328	1.32±0.471	-0.2	0.391
10	The professional ice hockey players are seventeen times more prone to attain Hip_____ sprains if adductors muscles strength was less than 80% of abductors muscle strength.	1.52±0.505	1.56±0.501	-0.04	0.164
11	Dancing en pointe is predominantly traumatic to the _____ metatarsal, because of the tension in the peroneus longus and tibialis posterior muscle of the foot.	1.88±0.328	1.16±0.370	0.72	0.015
12	Stress fracture of the lower extremity are highest of which bone	1.74±0.443	1.28±0.454	0.46	0.329
13	Hallux valgus is	1.68±0.471	1.68±0.471	0	0.746
14	In unholly tried, damage to which structures in the knee takes place	1.26±0.443	1.18±0.388	0.08	0.026
15	Breaststroke kinematics showed that the angles of hip abduction of less than _____ or greater than _____ at the beginning of the kick resulted in an intensely increased incidence of knee pain.	1.68±0.471	1.22±0.418	0.46	0.704
16	The Achilles tendinitis involves inflammation and micro-rupturing of the tendon, Possible mechanisms for tendinitis are/is	1.58±0.499	1.26±0.443	0.32	0.764

Chi square test was employed with the significance level set at 0.05.

Table 2 shows there was no significant change in the knowledge of the students when compared Pre and Post SBL sessions. Overall, there was significant change for only two mcqs i.e 11 and 14 ($p=0.015$, $p=0.026$, respectively). Rest of the mcqs showed no statistical significance after implementation of pptx based learning.

DISCUSSION

The students perceived SBL as a superior methodology when compared to ppt based learning, although there was no change in knowledge when SBL was used. The change in knowledge was seen during implementation of ppt based learning, more passive learning methodology.

A study on SBL in physiology showed that there was significant upgrading in pre and post test scores.¹² But this study showed that there was no significant change in pre/post scores except that student's reviews showed that they prefer SBL over power point presentation based learning. This can be due to several factors, and one of them was small sample size.

SBL is important teaching methodology and it helps students to clinically orient and enhance problem solving skills so it should be more suitable for higher academic years as compare to first year. A study showed positive effects of ppt on lectures and most students preferred it over blackboard or whiteboard, as it held their attention on the subject.¹³ A survey showed significant relationship between student preference regarding ppt and their theoretical performance as observed in their examination score but it also showed that integrating software did not necessarily provided with a simple solution to improving the effectiveness of students learning outcomes.¹⁴ Despite the passive teaching methodology ppt presentations are basic source of lecture delivery in our educational setups. The students feel more comfortable and relaxed in this setup.

The strengths of the study were that it helped us to improve our current power point presentation based learning. Students taught by both teaching methodologies have also got first and second positions in the subject of Biomechanics in the University of Health Science, Lahore. It may help us

to improve the educational outcomes effectively and more efficiently. The limitations of this study were less sample size. It was not conducted in multiple educational institutions due to lack of resources. Same instructor taught both groups in back to back classes, this raises the possibility of instructor fatigue as an issue that biases toward null hypothesis overall. Infrastructure was weak there were no set guidelines to follow specific teaching methodology as it was new to our setup.

CONCLUSION

There was significant change in perception and knowledge of first year Doctor of physical therapy students regarding lower extremity pathologies using power point presentations based learning. There was no change in perception and knowledge of students regarding lower extremity pathologies using scenario based learning.

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