Available online at **www.ijmrhs.com**

ISSN No: 2319-5886

International Journal of Medical Research & Health Sciences, 2022, 11(9): 63-70

Supplementing Traditional Cadaveric Teaching with Video-Based E-Learning for Learning Gross Anatomy-An Observational Perceptual Study

Rachna Magotra, Ashwani K Sharma, Shahnaz Choudhary, and Simriti*

Department of Anatomy, Government Medical College Jammu, Jammu and Kashmir, India

**Corresponding e-mail: simritibias20@gmail.com*

Date of Submission: 06-May-2022, Manuscript No. ijmrhs-22-63035; **Editor assigned:** 09-May-2022, PreQC No. ijmrhs-22-63035 (PQ); **Reviewed:** 03-June-2022, QC No. ijmrhs-22-63035 (Q); **Revised:** 24-July-2022, Manuscript No. ijmrhs-22-63035 (R); **Published:** 30-September-2022, J-invoice: J-63035

ABSTRACT

Background: *Anatomy, a building block for safe medical practice is in the midst of a downward spiral in the current education system. The traditional teaching of Gross Anatomy is done by cadaveric dissection which is insidiously being supplemented or substituted by novel modalities like e-learning. E-learning facilitates learning through the online delivery of course content using new electronic technologies via the internet. The rising costs of ensuring cadaver availability, health risks associated with formalin, psycho-religious biases, dearth of trained personnel, and time constraints have led to this paradigm change. Moreover, the new Competency-Based Medical Education (CBME) curriculum has also advocated the use of multiple teaching-learning methods.* ***Objectives:*** *The present study was undertaken to evaluate the perception of students and faculty on supplementing traditional cadaveric dissection with a prior session of a video-based e-learning module.* ***Methods:*** *A prevalidated set of five videos concerning lower limb dissection was shown before actual cadaveric dissection, one video every week, to 150 medical students of first phase MBBS in GMC Jammu. After completion of the above-mentioned module, prevalidated feedback questionnaires were given to students and faculty, as well as a focus group discussion among students was organized to observe the prevalent perception. The analysis was done using Microsoft Excel.* ***Results:*** *The majority of the students (83%) agreed that the video content was clear and easy to understand. About three-fifths (59%) of participants found the content helpful in addressing their revision needs. Two-thirds of respondents (66%) found the narration video helpful to their learning. In general, students favoured the expansion of e-learning course access for other topics in the future (61%). The faculty also found video-based e-learning feasible and useful.* ***Conclusions:*** *Most of the students thought that supplementary video-based e-learning had a positive impact on their learning of Gross Anatomy. They wanted these sessions to be conducted twice (i.e., both before and after the dissection) and also suggested some infrastructural improvements. The faculty observed that supplementing e-learning modules to traditional cadaveric dissection helped create interest, and motivation and improve the learning of students.*

Keywords: E-learning, Formalin, Psycho-religious bias, Gross anatomy

INTRODUCTION

Anatomy is considered the cornerstone of medical education as it forms the base of all other branches of medicine. Amongst its many branches, Gross Anatomy dealing with macroscopic structures of tissues and organs is taught by dissecting a human cadaver layer by layer since time immemorial [1]. Cadaveric dissection is expensive and its maintenance requires some ethical and safety considerations [2]. An increase in the number of students, mushrooming of medical colleges and less availability of cadavers is leading to an increase in the student-cadaver ratio. Every student can't perform or even observe cadaveric dissection from close quarters. Therefore, supplementing cadaveric dissection with alternative methods like videos of dissection is the need of the hour. Moreover, the new Competency-Based Medical Education (CBME) curriculum envisages the use of multiple teaching methods to improve learning. Cadaver dissection is a major activity in the process of learning anatomy, wherein students can gain an accurate perspective of

the size and location of an organ and understand the context of surrounding organs and tissues that cannot be taught via textbook. The designs of several commercially available e-learning platforms are well suited for learning [3].

Several experts in the system space have paid attention to e-learning. For example, Hao et al. provided an interesting model to evaluate e-learning courses using the systemic approach. Some experts argue that network learning i.e., learning using the internet is the best way to build an application-oriented perspective [4]. The contemporary educational platform has to quickly go through the three stages of analysis, design, and evaluation for smooth incorporation of the concept into medical education [5].

Several teaching/learning methods are being incorporated into the prevalent medical education system due to advancements in electronic media, the easy availability of the internet, and ever-evolving knowledge. E-learning in the form of videos has become an important tool for learning by students and a large number of online resources are available to learn Anatomy which can be used judiciously to enhance teaching outcomes [6]. Authors like Mukhopadhyay et al, consider applications like youtube as important study resource materials for students, due to them being easily accessible and user-friendly [7].

A library of modules of videos on cadaveric dissection will also help learn gross anatomy in emergencies where close gatherings are restricted and inadvisable. The present study was conducted to observe the perception of students as well as faculty to video-based e-learning in gross anatomy.

Objectives

To improve the teaching of Gross Anatomy in the dissection hall by complementing cadaveric dissection with video-based e-learning.

Specific objectives:

- To implement video-based e-learning modules in gross anatomy.
- To study the perception of students after visualization of videos on anatomical dissection.
- To study the perception of faculty on the feasibility of video-based e-learning.

METHODOLOGY

1. This was an observational perceptual study carried out on a total of 150 first-phase MBBS students and the Faculty of the Department of Anatomy, Government Medical College (GMC), Jammu.
2. The students were in the age range of 18 years to 25 years and both sexes were included in the study.
3. The study was done in the Dissection Hall of the Department of Anatomy, GMC Jammu over 5 weeks.
4. The study tools used were a pre-validated feedback questionnaire and a focus group discussion.
5. Students and faculties not willing to fill out the feedback questionnaire were excluded.
6. After International Electrotechnical Commission (IEC) clearance, an e-learning module consisting of 5 videos on dissection of the lower limb was made.
7. These videos were downloaded from YouTube and validated by 5 senior faculty members from the Department of Anatomy, GMC.
8. The module of five videos of Dissection was as follows:

- Dissection of the front of thigh 14.48 min.
- Adductor compartment of the thigh and popliteal fossa 14.68 min.
- Gluteal region and back of thigh 6.30 min.
- Anterior and back of the leg with the dorsum of foot 16.12 min.
- Lateral compartment of the leg with sole of foot 11.00 min.

9. Both students, as well as the faculty members from the Department of Anatomy, were sensitized and informed

consent was taken.

10. Feedback questionnaires to be used as a study tool were made and validated by three anatomists who were not included in the study.
11. The above-mentioned module of five videos was implemented from the second week of October to the third week of November aligning with the cadaveric dissection of the lower limb.
12. In the timetable of the first phase MBBS approved by NMC, the time allotted for cadaveric dissection was 7.5 hours per week, i.e., 1.5 hours per day (from Monday to Friday). Each video of the dissection of a region was shown every week, before the actual cadaveric dissection of that region.
13. At the end of 5 weeks, the students as well as the faculty were asked to rate each of the items of the feedback questionnaire on a Likert scale.

Focal Group Discussion (FGD)

FGD was held and the details are given below. An open-ended questionnaire consisting of 7 questions regarding the perception of students toward e-learning was formulated. A focus group of students consisting of eight students was identified. The roles of a moderator and an assistant moderator, who were selected before the discussion, were earmarked. Availability of A-V equipment, selection of place, and arrangement for refreshments were finalized. It was conducted in the Seminar room of the Department of Anatomy [8-13].

Steps

- The students were seated comfortably, and the initials of the name cards were placed in front of each.
- Moderator welcomed all the participants and introduced himself and the assistant moderator to them.
- Moderator gave an overview of the topic and the purpose of conducting the FGD. The ground rules of the focus group were explained to the participants by the moderator. Their participation was considered as their consent.
- Moderator initiated the discussion with the first question and the entire session continued up to 40 min to 45 min.
- The summary of the proceedings was given by the assistant moderator.
- Debriefing of the session was done between the moderator and the assistant moderator for about 10 min to 15 min.
- Transcription of the FGD was prepared within 2 days to 3 days of discussion. Full word-to-word transcription was prepared using an audio recording of a focus group.
- The transcripts were supplemented by notes from the moderator and the debriefing sessions. The cut and paste method was employed to identify codes. The constant comparison method was used to draw themes and categories.

RESULTS

Out of 150 students of 1st-year MBBS, only 100 participated in the study. All ten members of the faculty of Anatomy participated. Perception of both students and the faculty was collected by a prevalidated, open and closed-ended structured feedback questionnaire (Figures 1 and 2). The student's and faculty's perceptions of the feasibility of videos were then entered in Microsoft Excel and analyzed (Table 1).

Table 1 Distribution of perception of the MBBS students about the introduction of video-based e-learning in teaching Gross Anatomy

S.No.	Questions	SD	D	N	A	SA
		N (%)	N (%)	N (%)	N (%)	N (%)
1	I enjoyed learning Gross Anatomy by this method.	1	3	10	41	43
		-1.02%	-3.06%	-10.2%	-41.8%	-43.9%

2	This method provided enough learning resources for Gross Anatomy.	1	11	26	37	23
		-1.02%	-11.2%	-26.5%	-37.8%	-23.5%
3	This method helped me to clear subject doubts.	1	5	30	42	20
		-1.02%	-5.1%	-30.6%	-42.9%	-20.4%
4	It motivated me to study more about the topic.	3	9	27	37	22
		-3.06%	-9.18%	-27.6%	-37.8%	-22.5%
5	It boosted my confidence in the dissection Hall.	7	3	25	41	22
		-7.14%	-3.06%	-25.5%	-41.8%	-22.5%
6	I would prefer this method of learning in other regions of gross Anatomy.	3	5	12	33	45
		-3.06%	-5.1%	-12.2%	-33.7%	-45.9%
7	It helped in better retention of the topic.	1	4	21	38	34
		-1.02%	-4.04%	-21.4%	-38.8%	-34.7%

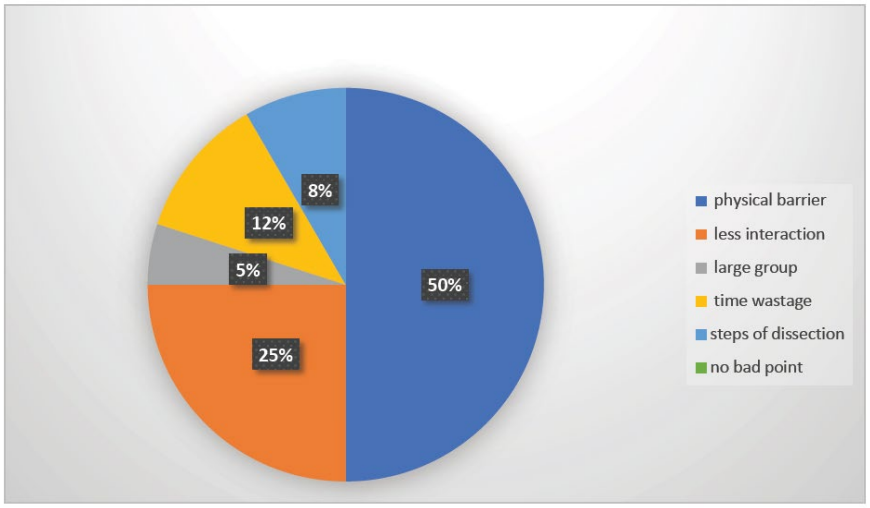

Figure 1 Disadvantages of video-based e-learning

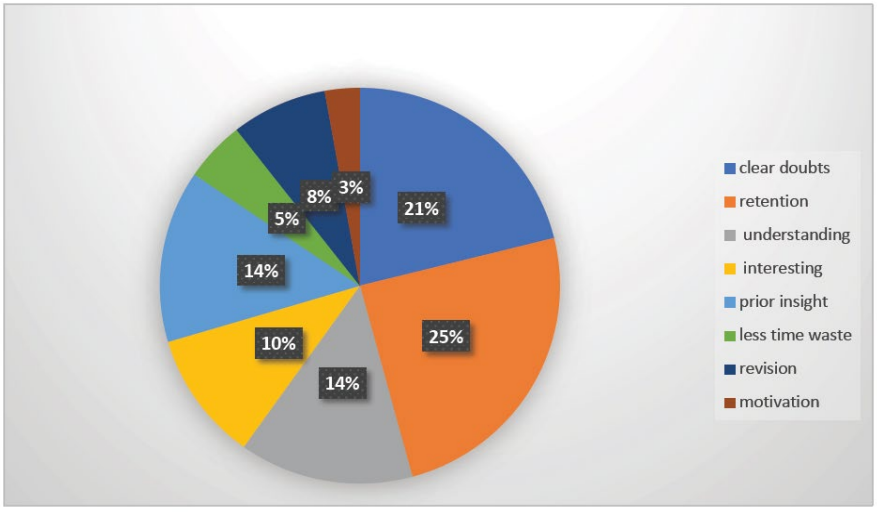

Figure 2 Advantages of video-based e-learning

Table 2 Distribution of perception of the faculty about the introduction of video-based e-learning in teaching Gross Anatomy

S.No.	Questions	SD	D	N	A	SA
		N (%)	N (%)	N (%)	N (%)	N (%)
1	E-learning stimulates students' desire to learn.	0	0	2	6	2
				-20%	-60%	-20%
2	E-learning is time-consuming and hinders the normal speed of learning.	5	2	2	1	0
		-50%	-20%	-20%	-10%	
3	Other topics in Gross Anatomy should also be taught by this method.	0	0	2	5	3
				-20	-50	-30
4	The preparation of e-learning requires a lot of effort.	1	2	1	6	0
		-10%	-20%	-10%	-60	
5	It is feasible to conduct e-learning classes.	0	0	4	5	1
				-40%	-50%	-10%
6	It can be used as a TLM for future batches.	0	0	2	5	3
				-20%	-50%	-30%
7	Students are more confident while dissecting and identifying prosecuted specimens.	0	0	3	6	1
				-30%	-60%	-10%

Table 3 Content analysis of focal group discussion

Question	Comments	Themes
E-Learning in teaching.	E-learning is electronic learning and when we see the visuals of a thing in videos, we remember it for a longer time and it creates an impact on the mind.	Perceived benefits.
	It is better than conventional teaching	
	Eyes don’t see what your mind doesn’t know.	
	It creates a long-lasting impression in our minds.	
	It helps in actual cadaveric dissection.	
Video-based learning as a tool to learn Gross Anatomy.	The steps of dissection are seen clearly.	Presensitization and reinforcement.
	Supplementing cadaveric dissection with e-learning is more helpful than only cadaveric dissection.	
	It leads to reinforcement of learning.	
	Watching the videos of dissection before actually dissecting that region leads to reinforcement of learning.	
	Knowing the orientation of the structures before actual cadaveric dissection.	
Contents of video-based e-learning and its impact on understanding Gross Anatomy.	Matching the video with dissection.	Acceptability.
	A better understanding of the topic creation to interest.	
	Motivation to learn more.	
Timing of video-based e-learning during dissection.	Before the dissection as then, we get a holistic view of structures beforehand	Pre and Post dissection.
	After the dissection as then we can see what structures, we were not able to see.	
	Before and after as then we see what, we are going to dissect before dissection and after the dissection, our knowledge is reinforced.	
	Before and after to create more impact just after the theory lecture.	
E-Learning is to be used as a tool in the curriculum on a regular pattern.	Can be used to learn embryology.	Preference for regional anatomy.
	Other topics of Gross Anatomy can be taught by video-based e-learning.	
	No need for e-learning in histology as satisfied with microscopes	
Planning and implementation of E-Learning.	Videos are shown in large groups.	Lack of infrastructure.
	Only one screen was there.	
	The sound quality was not good.	

The way forward and further suggestions.	Should be shown in small groups.	Interactive small group teaching.
	Audio quality should be improved.	
	More screens should be there.	
	Subtitles could be used.	
	The facilitator should make it interactive.	

Most of the students thought that video-based e-learning had a positive impact on their learning of Gross Anatomy (Table 2). The module of 5 videos of dissection which were shown was prevalidated by the faculty of Anatomy who did not take part in the study. It was decided beforehand that more stress would be on the identification of structures in gross anatomy rather than on the steps of dissection. The response of the students, in the end, showed that the description of steps would have led to a better understanding. We just have one screen in the dissection hall so it was large group teaching but the students preferred small group teaching with multiple screens. A few other points that they highlighted for improvement were better sound quality, interactive sessions, and videos with subtitles. In short, prior exposure to video-based e-learning before conducting dissection was acceptable to the students but they wanted these sessions to be conducted twice (i.e., both before and after the dissection) and also suggested some infrastructural improvements (Table 3).

DISCUSSION

We tried to analyze the perception of students and faculty on the introduction of video-based e-learning before actual cadaveric dissection, through the feedback of students and faculty received via questionnaires and a focus group discussion with students. It was observed that it was a very useful, feasible, uniform, and effective method. It created a lot of interest in the subject and increased student participation. The findings indicated that using the e-learning videos helps promote active learning and suggests wider dissemination of blended learning pedagogy. Many studies have shown that supplementing traditional learning with e-learning could increase students' motivation, interest, and engagement. Mironov et al, believed that traditional and online learning and teaching alone can't lead to the desired quality, however, an appropriate combination of both is a flexible approach to learning [14].

Graham pointed out that a framework should be sought to conduct blended learning [15] (Figure 3).

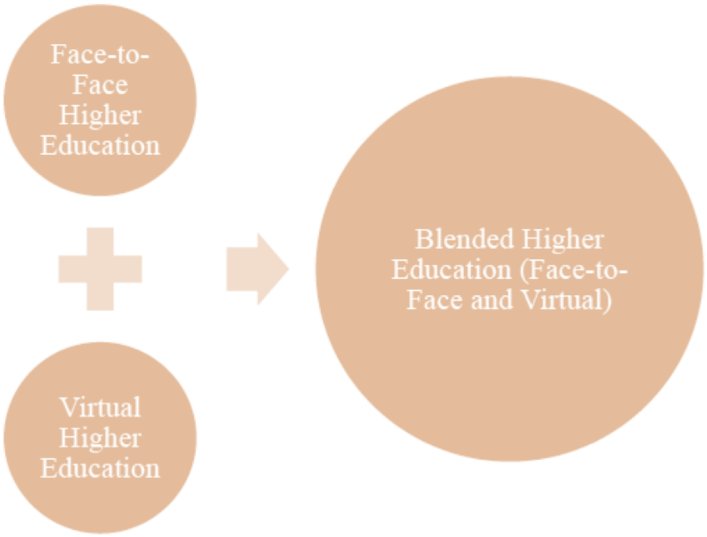

Figure 3 Graham's model of Blended higher education

The component of perception of the student, as well as the faculty, is important in teaching and learning. Kint et al, showed that the students' characteristics and environmental features are two major factors in the design of a learning environment. Liaw et al, concluded that the learners' readiness in terms of characteristics such as motivation, attitude,

belief, and confidence should be determined to implement and develop e-learning. Sadic, concluded that three factors attitude, experience, and competence affect the development and implementation of e-learning. Malic, concluded that there is a direct relationship between the student's motivation and education continuation in e-learning [16-19]. Hart concluded that a set of required behaviours, attitudes, and skills for students helps the complete success of online training courses and encourages them to continue their education in this system of learning [20, 21].

Statistical Analysis

The present study was an observational perceptual study using a prevalidated questionnaire. The data were entered in Microsoft Excel for ease of analysis and the results were represented as percentages of the study population for further evaluation. No other statistical tool was used.

CONCLUSION

E-learning in India's higher education is a relatively new phenomenon. Medical education faces a lot of internal and external challenges as we change our traditional education system to e-learning methods but still, it has become a standard teaching approach in medical education. The experience of this type of teaching and learning has included successes and failures, in the past. The results of this research have shown that in general, the possibility of implementing video-based e-learning in teaching Gross Anatomy is welcomed by the students and the faculty. A sudden change in the teaching of Gross Anatomy by prior exposure to videos of dissection before actual cadaveric dissection did not raise many eyebrows. The training imparted by videos grabbed the attention of the learners and helped in building self-confidence in them by encouraging them to take responsibility for their learning. The faculty also found this method feasible and has quick delivery of learning objectives. It seems that selection, customization, and implementation of video-based e-learning will lead to the gradual success of learning Gross Anatomy besides actual cadaveric dissection. Moreover, it was observed that this method of teaching was interesting, uniform, engaging motivating, and with revision facility. This study is limited in several ways. Firstly, most data are self-reported feedback and limited to a small sample size which may prevent the findings from being extrapolated. Population biases are possible because of the smaller size and homogeneous characteristics. Results cannot be representative of students in other disciplines, but many similarities are evident. Further studies with a larger sample size are crucial before making a further inference. Secondly, as it covers a single topic (lower limb) so it does not fully reflect the effectiveness of the entire course. It was a Qualitative study focusing only on the perception of students and faculty on the introduction of video-based e-learning in teaching Gross Anatomy and did not focus on their pre and post-test understanding of the subject

DECLARATIONS

Conflict of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

REFERENCES

[1] Jones, Gareth D. "Reassessing the importance of dissection: a critique and elaboration." *Clinical Anatomy: The Official Journal of the American Association of Clinical Anatomists and the British Association of Clinical Anatomists,* Vol. 10, No. 2, 1997, pp. 123-27.

[2] Raja, Dewan S., and Bahar Sultana. "Potential health hazards for students exposed to formaldehyde in the gross anatomy laboratory." *Journal of Environmental Health,* Vol. 74, No. 6, 2012, pp. 36-41.

[3] Ngan, Olivia Miu Y., et al. "Blended learning in anatomy teaching for non-medical students: An innovative approach to the health professions education." *Health Professions Education,* Vol. 4, No. 2, 2018, pp. 149-58.

[4] Hao, Yungwei, and Gary Borich. "A practical guide to evaluate the quality of online courses." *Web-Based Education: Concepts, Methodologies, Tools, and Applications*. *IGI Global*, 2010. Pp. 228-48.

[5] Mirzamohammadi, M. H. "The Feasibility of E-Learning Implementation in an Iranian University." *Electronic Journal of e-Learning,* Vol. 15, No. 5, 2017, pp. 424-433.

[6] Ellis, Harold. "Teaching in the dissecting room." *Clinical Anatomy,* Vol. 14, No. 2, 2001, pp. 149-51.

[7] Mukhopadhyay, Sanjana, Estie Kruger, and Marc Tennant. "YouTube: a new way of supplementing traditional methods in dental education." *Journal of dental education.* Vol. 78, No.11, 2014, pp. 1568-71.

[8] Johnson, Elizabeth O., Antonia V. Charchanti, and Theodore G. Troupis. "Modernization of an anatomy class: From conceptualization to implementation. A case for integrated multimodal–multidisciplinary teaching." *Anatomical sciences education,* Col. 5, No. 6, 2012, pp. 354-66.

[9] Drake, Richard L. "A retrospective and prospective look at medical education in the United States: Trends shaping anatomical sciences education." *Journal of Anatomy,* Vol. 224, No. 3, 2014, pp. 256-60.

[10] Rizzolo, Lawrence J., et al. "Design, implementation, and evaluation of an innovative anatomy course." *Anatomical sciences education,* Vol. 3, No. 3, 2010, pp. 109-20.

[11] Biasutto, Susana N., Lucas I. Caussa, and Luis E. Criado del Río. "Teaching anatomy: cadavers *vs*. computers?." *Annals of Anatomy-Anatomischer Anzeiger,* Vol. 188, No. 2, 2006, pp. 187-90.

[12] Liu, Qian, et al. "The effectiveness of blended learning in health professions: systematic review and meta-analysis." *Journal of medical Internet research,* Vo. 18, No. 1, 2016, p. e4807.

[13] Morton, Caroline E., et al. "Blended learning: how can we optimise undergraduate student engagement?." *BMC medical education,* Vol. 16, No. 1, 2016, pp. 1-8.

[14] Mirzamohammadi, M. H. "The Feasibility of E-Learning Implementation in an Iranian University." *Electronic Journal of e-Learning,* Vol. 15, No. 5, 2017, pp. 424-33.

[15] Graham, Charles R. "Emerging practice and research in blended learning." *Handbook of distance education. Routledge*, 2013, pp. 351-68.

[16] Kintu, Mugenyi J., and Chang Zhu. "Student characteristics and learning outcomes in a blended learning environment intervention in a Ugandan University." *Electronic Journal of e-Learning,* Vol. 14, No. 3, 2016, pp. 181-95.

[17] Liaw, Shu-Sheng, and Hsiu-Mei Huang. "An investigation of user attitudes toward search engines as an information retrieval tool." *Computers in human behaviour,* Vol. 19, No. 6, 2003, pp. 751-65.

[18] Sadik, Alaa. "The readiness of faculty members to develop and implement e-learning: The case of an Egyptian university." *International Journal on E-learning,* Vol. 6, No. 3, 2007, pp. 433-53.

[19] Malik, Mahwish W. "Factor effecting learner's satisfaction towards e-Learning: A conceptual framework." *International Journal of Sustainable Development,* Vol. 2, No. 3, 2010, pp. 77-82.

[20] Hart, Carolyn. "Factors associated with student persistence in an online program of study: A review of the literature." *Journal of interactive online learning,* Vol. 11, No. 1, 2012.

[21] George, Pradeep P., et al. "Online eLearning for undergraduates in health professions: a systematic review of the impact on knowledge, skills, attitudes and satisfaction." *Journal of global health,* Vol. 4, No. 1, 2014.