Blended learning : Is it required in Human Physiology ?

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Abstract : **Introduction:** The present study was aimed to understand the effectiveness of blended learning in comparison with the traditional class room teaching .In addition, it also focused on understanding the student's views and perceptions regarding the two knowledge delivering systems. **Method:** After the approval from Institutional Ethics committee, the project was conducted with 50 first MBBS students at the K.J. Somaiya Medical College, India. 4 topics in haematology and Gastro-intestinal Physiology were selected. Out of which, 2 haematology and 2 Gastro-intestinal Physiology topics were taken as blended learning and the remaining 2 haematology and 2 Gastro-intestinal Physiology topics were taken as a traditional class room teaching with no additional recourse material being provided. After the entire session, a written exam was conducted for the topics taught in blended learning and class room teaching and answers were corrected by the senior faculty. The marks obtained were then analysed using SPSS 16.0 software. The students were asked to fill the questionnaire regarding their experience about blended learning and class room teaching. **Results :** The marks obtained by the students in blended learning (p=0.000*)were significantly better compared to classroom teaching .The questionnaire showed 60-80 % students believing that blended learning helps in reinforcement and concept building process, it helps in revising the concepts as their own ease and time. **Conclusion :** The present study showed that the integration of blended learning has a better impact on students performance. In addition, it also showed a better acceptability of blended learning among the students concluding the need of incorporating blended learning in medical curriculum in India on a wider basis. [Wani P et al NJIRM 2013; 4(6) : 79-83]

Key Words: Blended learning, class room teaching, e-learning

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Introduction: The main aim of the medical education is to equip medical students with all the necessary medical knowledge and skills and provide them with the strategies for its application in medical practice[1]. Medical education has evolved from a material based process, where the instructor focused on presenting information to a more student (learner) centered process where students are able to learn at their own pace. Furthermore, the student's role has changed from being a receiver to a being a learner and the instructor's role has changed to being a mentor, guiding students to acquire knowledge and improve their learning skills which has offered a stronger learning motivation and interactivity. Interactivity maintains learner interest and provides a means for personalized learning and reinforcement[2]. During the last two decades, the scene in education is rapidly changing by the development of Information and Communication Technologies (ICT). Smart classes, virtual classrooms, online collaborative educational experiences and emerging WEB 2.0 applications are increasingly used, either as stand alone or blended with conventional education[3]. Blended learning combines the best pedagogical practices of two teaching methods—online and face-to-face instruction. The integration of blended -learning into undergraduate, graduate and continuing medical education has a significant impact on the delivery and performance of medical education. Josh Bersin's (2004) book, The Blended Learning Book: Best Practices, Proven Methodologies and Lessons Learned defines blended learning as the combination of different training "media" (technologies, activities, and types of events) to create an optimum training program for a specific audience. Bersin uses the term blended learning as traditional instructor-led training being supplemented with other electronic formats where blended learning programs use many different forms of e-learning, perhaps complemented with instructor-led training and other live formats. In Thorne's book Blended learning: how to integrate online & traditional learning, blended learning is defined as the mix of traditional forms of classroom training and one-to-one coaching with:

- Multimedia technology
- CD ROM video streaming
- Virtual classrooms
- Voicemail, email and conference calls
- Online text animation and video-streaming[4]

Blended learning combines e-learning tools with traditional classroom training to ensure maximum effectiveness. Students can prepare for, consolidate and recall classroom experiences online, while gaining the benefits of interaction with teachers and students via an actual or virtual classroom. Student learning and retention rates improve without sacrificing the convenience, cost-effectiveness and customisation of self-paced Web-based coursework. Evidence suggests that blended -learning is more efficient in most cases because learners gain knowledge, skills, and attitudes faster than through traditional instructor-based methods. This efficiency translates into improved motivation and performance.[5,6]

Blended learning offers some benefits such as:

- Individualization benefits of self-paced, online learning for content that requires minimum interaction.
- Cost savings through minimizing the time in travel/classroom/instructor expenses.
- Improved retention and reinforcement through follow-up mechanisms on the Web.
- Greater flexibility to meet the different learning styles and levels of the audience
- Ease of updating information: if changes need to be made to a courseware after the first implementation, these changes are made on the servers storing the program or courseware. Everyone worldwide can instantly access the update of information.
- Training efficiency is increasing significantly. Not only from a qualitative standpoint (i.e. pedagogical by the use of a new method, personalization, learner autonomy, memorization and follow-up, operational by learning by opportunity and the speed of the learning updates, and organizational by creation of knowledge sharing community) but also from a quantitative standpoint (i.e. learning elapse decreases, learning cost may be reduced and learning effectiveness is increasing).

Limitations of blended learning are as follows:

- Bandwidth limitations. Limited bandwidth means slower performance for sound, video and intensive graphics, causing long waits for download that can affect the ease of the learning process. Future technologies will solve the problem however.
- Loss of human contact. There is a general concern that as we move towards more computer usage, a terminal will replace a friendly face. Gradual introduction of e-learning or the use of blended learning may be the answer to this concern.
- Not all courses are delivered well by computer. Some training topics are not best served by computer based training and require a more personal touch. Team building issues and dealing with emotional issues are two examples.
- Confusion about technology.[7,8]

The present study was aimed to understand the effectiveness of blended learning in comparison with the traditional face to face class room teaching .In addition, it also focused on understanding the student's views and perceptions regarding the two knowledge delivering systems.

Methods and Materials: After the approval from Institutional Ethics committee for Research on Human Subjects, this pilot project was conducted in the Department of Physiology at the K.J. Somaiya Medical College and Research Centre, Mumbai, India. A total of 50 first MBBS medical students (14 males and 36 females with the mean age of 18.6± 2.4 yrs) in their 2nd term in Physiology participated in the study after signing a written informed consent. All these students had ≥ 65 % marks in state common entrance test for admission in the medical university. Two topics in Human Physiology namely Haematology and Gastro-intestinal Physiology were selected as 2 modules for blended and face to face learning. The websites were developed using 'Google sites' and the material to be posted on these websites were moderated by the senior experienced faculty members. A total of 8 topics, 4 topics in haematology and 4 topics in Gastro-intestinal Physiology were selected. Out of which, 2 topics in haematology and 2 topics in Gastro-intestinal Physiology were taken as blended learning topics where the power-point presentations of the topics covered in the classroom along with various other resources material were posted on the website on the same

day along with the questions and multiple choice questions for further concept building. The remaining 2 topics in haematology and 2 topics in Gastro-intestinal Physiology were taken as a traditional face to face class room teaching with no additional recourse material being provided. Each of the lectures in both blended and class room format were taken for 1 hour each. After the entire sessions on blended learning and face to face class room teaching was over, a written exam was conducted for the topics in haematology and Gastro-intestinal Physiology where questions pertaining to the topics from the portions taught in blended learning and face to face class room teaching were asked and answers were corrected by the senior expert faculty from the department of Physiology. The marks obtained were then analysed using SPSS 16.0 software. In addition, at the end of the teaching sessions and the exams, the students were asked to fill the questionnaire regarding their experience about blended learning and face to face class room teaching which included their perception, quality and the opinion regarding blended learning were asked.

Results: There is significant difference between the average marks from the portions taught by blended -learning and in class room teaching. Since the average marks obtained through blended - learning is more than that of class room teaching method .Hence blended-learning method is more appropriate than classroom teaching.

Table 1: Data Analysis of the marks obtained by the students in Blended learning and class room teaching portion

Learning Process	N	Mean Average Marks	Standard Error of difference	T	P-Value	Result
Blended –learning	50	13.40	0.325	15.568	$1.33 * 10^{-20}$	**Significant**
Class room teaching	50	11.84				

Table 2: Response of the Student's questionnaire regarding their experience with Blended learning

Is Blended learning a better learning experience?	**1. Strongly disagree**	**2. Disagree**	**3. Neither agree or disagree**	**4. Agree**	**5. Strongly agree**
The blending of lectures in class room and Power-points on website was reinforcing the concepts in a better way	0(0%)	1(2%)	2(4%)	5(10%)	42(84%)
Images and texts together help in retention of memory	1(2%)	2(4%)	1(2%)	7(14%)	39(78%)
Helps to revise the topics at our convenience	0(0%)	2(4%)	1(2%)	7(14%)	40(80%)
Blending the lectures in class room and Power-points on website makes better understanding	1(2%)	3(6%)	2(4%)	10(20%)	34(68%)
Encourages in more self and active learning	2(4%)	2(4%)	5(10%)	10(20%)	31(62%)
Only face to face lectures are sufficient for understanding	**22(44%)**	**12(24%)**	**8(16%)**	**4(8%)**	**4(8%)**
Only E- learning are sufficient for understanding	**22(44%)**	**12(24%)**	**8(16%)**	**4(8%)**	**4(8%)**
Quality of blended learning					
The topics chosen for blended learning were relevant	2(4%)	4(8%)	2(4%)	12(24%)	30(60%)
The questions posted helped to reinforce our understanding	1(2%)	3(6%)	2(4%)	10(20%)	34(68%)
The material / contents provided in Blended learning was relevant and useful and adequate	2(4%)	4(8%)	2(4%)	12(24%)	30(60%)

Opinion regarding blended learning as a innovative learning method					
Medical Curriculum should have blended learning	2(4%)	4(8%)	2(4%)	12(24%)	30(60%)
The blended learning website interface is user-friendly and simple	3(6%)	3(6%)	2(4%)	12(24%)	30(60%)
Satisfied by the contents	3(6%)	5(10%)	2(4%)	10(20%)	32(64%)
Comfortable in handling the Internet and blended learning modules	2(4%)	4(8%)	2(4%)	12(24%)	30(60%)
Provides immediate feedback on the matters not clearly understood	3(6%)	3(6%)	2(4%)	12(24%)	30(60%)

Discussion: Traditionally, education has been based on attending classes day after day, listening to a lecturer providing the necessary course work information and going through exams to assess knowledge. Medical education focused on the material itself rather than the learner. However with the evolution of the e-learning environments, the systems have changed the way medicine is being taught. Medicine, as a complex multidisciplinary field, has been implementing computerized technologies, with e-learning being a central point of the process in many cases. Blended learning is an approach that combines e-learning technology with traditional instructor-based education. There has been a general trend in education towards the blended learning approach employing both e-learning, and traditional face-to-face classroom teaching with self-directed learning. This enables medical educators to design programs that use the most appropriate learning modalities and technologies to stimulate and promote an effective learning process. Examples includes a lecture supplemented with an online tutorial, a group assignment using a wiki, surgical procedures (e.g. laparoscopy) via video streaming or the use of virtual online patients and robot technology[9].

The present study showed that there was a significant difference in the marks obtained by the students in blended learning course material versus face to face classroom teaching course material. Also the marks obtained by the students in blended learning course were significantly better as compared to classroom teaching suggesting that the course covered in blended learning had a better impact in terms of concept building, revision and retention of the matter .The questionnaire focusing on student's perception about blended learning showed that almost 60-80 % students believe that blended learning helps in reinforcement and concept building process, it helps in revising the concepts as their own ease and time. It helps in better retention of the course. They perceived it as a self directed active learning process. Regarding the quality of the blended learning, approx. 75 % students felt that the topic chosen, the questions posted for discussion and the additional material provided for further study was relevant and adequate. Almost 60-80 % students felt that the blended learning is simple, user friendly, satisfactory and comfortable to use, they also felt that blended learning should be incorporated in medical education as new learning method in addition to the traditional classroom teaching. Blended learning approach may add wider dimensions to the teaching learning experiences of both the learners and the facilitators. Students indulging in blended learning by the addition of computers and internet in their learning processes use more resource material and broaden their understanding and revision attempts to a greater extend. Using effective resource materials in multiple formats may reduce the gap in reaching different students with different understanding and grasping levels catering wider intellectual levels[10].

Limitations of the study: The study was conducted as a pilot project with limited course material with a moderate study group; hence the results can differ for other course materials and a different set of students. Although, the present study had these limitations, however it was important to understand the effectiveness of blended learning in medical curriculum along with the understanding of the student's perception about the teaching

method. The traditional and blended-learning sections were taught by the same instructor which can influence the outcomes. However, future studies can be carried out in the concerned areas for a better insight about the two learning methods.

Conclusion: The present study showed that the integration of traditional classroom teaching with e- learning ie. Blended learning has a better impact on student's performance as compared to the traditional classroom teaching. In addition, the study also showed a better acceptability of blended learning among the students concluding the need of incorporating blended learning in medical curriculum in India on a wider basis.

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