Leveraging Mobile Communication App to Enable off Classroom Learning-Anatomy

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Abstract

Introduction: The study of Medicine is one of the primarily taxing and tedious disciplines of study. Aassimilation of intense knowledge and acuminating various skills in a short tenure is one of the challenges faced by students making learning more by rote, short-term and exam oriented. This study intended to explore an alternative innovative method for ensuring off classroom teaching-learning process. Aim and objectives: To study response of students towards learning with the aid of mobile communication app. To analyse both the impact of this teaching mode on self-directed learning and academic performance. To compare the academic performance of Blended Learning group with Traditional Learners. **Subjects and Methods**: Single observer interventional study was carried out among First year MBBS students. Group I students received traditional teaching (TL group n=80) while Group II students included Blended learners (BL group n=120) who received Traditional teaching and Mobile teaching. Both the groups were evaluated at periodic intervals by same assessment methods, mean of their academic scores were compared using t- test. In addition BL group was also administered an online questionnaire using five-point Likert scale to assess their perception with regards to the mobile teaching-learning process. **Results:** BL group students agreed that this mode of teaching-learning was beneficial encouraged them to read more than their regular also helped in developing their analytic skills. The academic results of the BL group though higher than TL group did not show statistical significant difference. **Conclusion:** This innovative method can be adapted in teaching other subjects at different levels of medicine curriculum.

Keywords: Blended Learning, Traditional teaching, Mobile learning, Anatomy.

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Introduction

The study of medicine is one of the primarily taxing and tedious disciplines of study. Learning theories arising from behaviourist, cognitivist, humanist and social learning traditions have guided improvements in curriculum design and instruction, understanding of memory, expertise with clinical decision making, and self-directed learning approaches. Although these remain useful, additional perspectives which recognise the complexity of education that effectively fosters the development of knowledge, skills and professional identity are needed. In the contemporary epoch it can be empirically noted that phones are evolving as an increasingly axiomatic platform with respect to the delivery of health education and medical interventions. The central aim of the present study is to explore alternate innovative method , as to ensure the teaching- learning process occurs off classroom using mobile communication application, in particular the communication application of 'WhatsApp' as a tool for teaching. Furthermore, the present study has been an attempt to reach out to the learners in their preferred medium of communication and raise their interest levels in learning Human Anatomy while trying to ignite the analytical thought process.

Aim

This study aimed to implement innovative teaching method that includes the use of a mobile communication app in teaching Human Anatomy, ensuring off classroom teaching learning process.

Objectives

- To study the response of students towards learning Human Anatomy with the aid of mobile communication application.
- To analyze the effectiveness of mobile learning on self-directed learning and their academic performance.
- To compare the academic performance of blended learning group with traditional learners.
- To study students' response towards Learning Human Anatomy by traditional teaching modes

Subjects and Methods

Study design: single-observer interventional study
Study population: Preclinical Medicine undergraduate students
Sample size: total number of students - Two hundred.

Group I- traditional teaching (TL n=80)
Group II- blended learning (BL group, n=120)
Inclusion Criteria: Volunteered students possessing smart phones with internet connection.
The current study is approved by Institute Ethics committee.

Methodology:

- Students were sensitised regarding the study and written consent was obtained for participation from volunteered students.
- Group I (TL) students received traditional teaching comprising of didactic lectures, cadaveric dissections, lecture-cum-demonstrations and microanatomy practical while Group II (BL) the blended learners received traditional teaching and off-classroom mobile learning using mobile communication application-'Whats App' Three subgroups of forty students each were created in the BL category on 'Whats App' messenger.
- Ninety mobile learning sessions were conducted where in Anatomy questions framed from topics covered in lectures, practical and dissection were posted daily on group chat at a convenient time decided by the students. Recall, analytic and problem-based questions were incorporated in the form of multiple choice questions, images of clinical conditions and videos of dissected parts.
- The students had the freedom to look up for the solutions in textbooks, surf the web or any other references they desired. The responses of students were received individually. Appropriate solutions were broadcasted by the researcher with an immediate feedback and queries were addressed. Open forum discussions were held on clinically significant topics. Performance incentive offered to earliest and best response encouraged the student's involvement and infused competitive spirit.
- Academic performance of both TL and BL groups were evaluated at periodic intervals using the same type of formative assessments through multiple choice questions (MCQ) short answer questions (SAQ), long answer questions (LAQ) and practical examination (PE) The mean academic scores of the two groups were compared and evaluated using paired t-test.
- At the end of sessions online questionnaire using five point Likert scale was applied to both the study groups using a recognised survey website to assess their perception and level of satisfaction with the teaching-learning process. Department Faculty's perspective regarding m-learning was also considered.
- Data was analysed using SPSS 20

Results

Academic performance of both the groups was evaluated at periodic intervals. The mean academic score of TL group and BL group out of 200 marks was 153.63 ± 28.21 and 161.57 ± 29.72 respectively. A difference of 7.9 in mean scores and improvement of 3 percent in the score by the BL group was a significant accomplishment for the student. The scores were compared using paired t-test where (P 0.063)
Student's response and feedback (BL): (Graphs I to V)

The BL group students exhibited enthusiasm and would eagerly wait for the session at the allotted time. A consistent student's response rate was noted throughout the study period. When questioned about the following:
Level of Interest in subject- 69% of students agreed while 27% students strongly agreed that mobile learning was fascinating and made the Anatomy subject more interesting. [Figure 1]
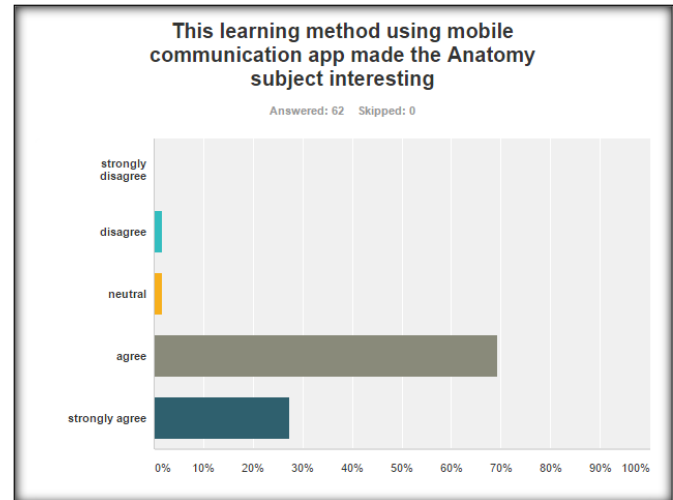

Figure 1: Graphical representation: Student's response-Level of interest generated in the subject by m-learning.

Encourage reading habits in students- 65 % of the respondents were of the opinion and 22% strongly opined that this form of teaching encouraged them to read more than usual and study on a regular basis. While 8% of students said they could provide solutions from the knowledge gained from lectures and demonstrations. [Figure 2]
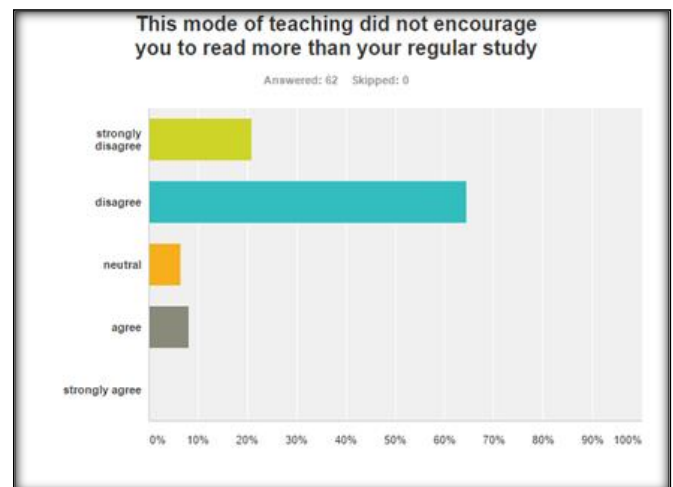

Figure 2: Graphical representation: Student's response-Reading habits adapted by m-learning.

Effectiveness of clinical based questions- 38% agreed while 60% strongly opined that case based discussion was beneficial in better understanding and retention of the subject while helped improve their analytic skills as well. [Figure 3]

Primary source of reference among students- While providing solutions to the problems 14 % referred to Anatomy text books, 3% to Reference books, and 13 % used the internet while 70% utilized all resources. Thus the entire class was unanimous that the questions put forth had generated enough curiosity in consulting information other than regular course books [Figure 4]
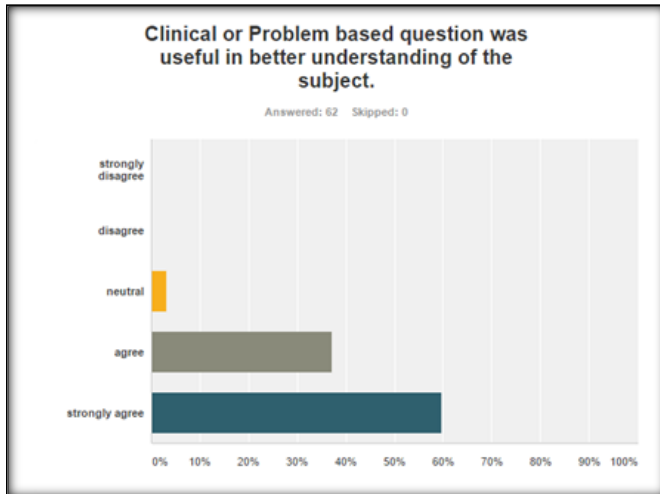

Figure 3: Graphical representation: Student's response- Development of analytic skills by m-learning
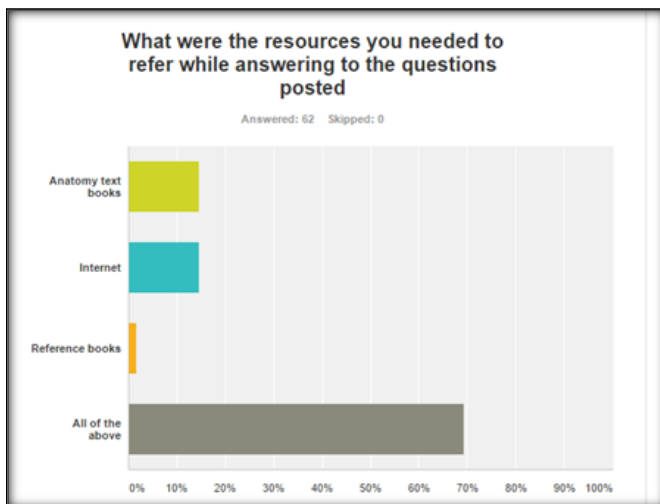

Figure 4: Graphical representation: Student's response- Resources used by students while providing solutions in m-learning.

An overall satisfaction level with the program- students have unanimously rated this learning method as a good experience and met to their highest satisfaction. [Figure 5]

Student's response and feedback (TL group) - students were satisfied with the curriculum and teaching methodology and found cadaveric dissection most fascinating. However some students have reported that at times the curriculum got stressful and experienced cognitive overload with retention difficulty. Some were also of the opinion that over a period the traditional face -face teaching got monotonous and dull.

Faculty perception-majority of the faculty stated that m-

learning is an amalgam of different medium like text chat, graphics, live video and audio, photographs, 2D and 3D images. It could help break the monotony of conventional teaching and reduce the face to face contact time. Thus they endorsed the blended learning model; where in the core components can be taught during contact sessions while, partly teaching with reinforcement could occur at m-learning platform.
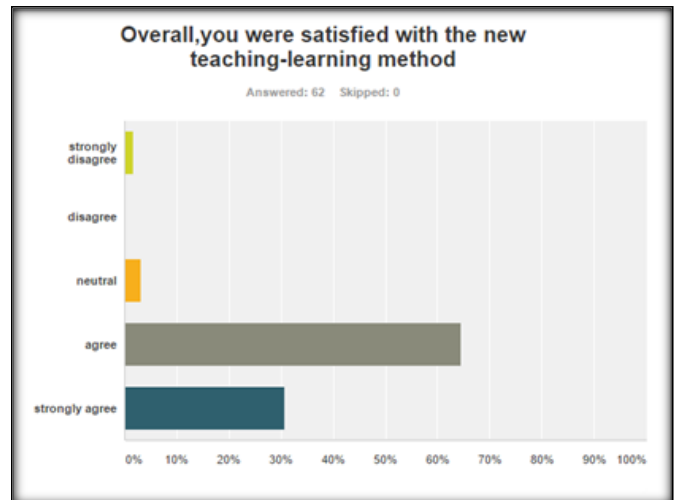

Figure 5: Graphical representation: Student's response - Overall satisfaction level with m-learning.

Discussion

The implementation of digital technologies in the teaching and learning process has happened at a dramatic pace over the last few decades, uncovering new dimensions of learning and personal growth. Online learning environments either on campus or at a distance have come to the forefront of higher education. Using portable computing devices such as laptops, tablet, PCs and smart phones with wireless networks enables mobility and mobile learning, allowing teaching and learning to expand to spaces beyond the traditional classroom. These devices have framed the emergence of a new learning modality; mobile-learning (m-learning) that is defined as "the processes of coming to know through conversations across multiple contexts among people and personal interactive technologies".[1] The definition of m-learning has metamorphosed since early 2000s and various characteristics have been tagged by several authors such as immediacy and convenience,[2] mobility,[1] and contextuality.[3]

The new generation smart phones are viewed as handheld computers rather than just phones, due to their powerful on-board computing capability, personal management tools and open operating systems that encourage application (app) development. In the present study the blended learners received traditional teaching and off-classroom mobile Anatomy sessions using 'Whats App' mobile communication application. 'Whats App' is a cross-platform mobile messaging app founded in 2009 by US citizens Brian Acton and Jan Koum. What's App has crossed 50 million monthly active users in India which allows us to create groups and exchange of audio and video messages using

internet.[4]

There has been a paradigm shift from textbooks, lectures, worksheets, high-stakes tests to learning anywhere, whenever learning can occur best. How we do daily tasks as an educator is changing; what we do though stays the same.[5] Anatomy is appreciated as being among the significant component of medical education. The m-learning thus enabled off classroom teaching learning process to occur beyond the limitations of the lecture and dissection halls while generating interest in the subject, speaking to the students in their preferred medium.

In the contemporary epoch, be it in the workplace or within the domain of an academic setting, the employees as well as the students respectively have been suffering with the psychological situation of cognitive overload. What is implied by the condition of cognitive overload? According to Kirsh David et al, cognitive overload in any sector of engagement, can be seen as a situation within which the educators provides the learners with an immense proportion of information, resulting in the learner being unable to process this information. Cognitive overload, therefore, culminates with the outcomes of the behavioural patterns inclusive of parameters such as anxiety and stress affecting learning in the due course.[6] Also, in a plethora of nations that abide by the principle of meritocracy,[7] the idea of cognitive overload is coterminous with the notion of rote learning as well as more intrinsically exam oriented learning.

In a study conducted by Jose.A Pereiram et al, significantly high academic scores and higher passing percentage was observed in a group of students who were provided with non-attendance-based hours using purpose-designed computerised materials in addition to conventional teaching of Human Anatomy at Pompeu Fabra University, Barcelon.[8] Concurring with the above findings in our study, the mean academic scores of BL group, was found to be higher than TL group. Attewell and Gustaffson, emphasised on the role played by m-learning in attracting the students to the otherwise drab process of learning, and also assisting in the development and achievement of lifelong learning objectives.[9] As per the present study analysis, as tabulated through the graphical representation of the Likert scales which were distributed among the students of the Blended Learning group, it was taken into account that 69% of students agreed while 27% students strongly agreed that mobile learning was fascinating tool of pedagogy and rendered the discipline of Anatomy comparatively interesting, as against when taught by the conventional teaching materials.

Technology is changing the way Medicine is learnt and practiced and Internet is widely used in medical education.[10] Presently smart phones are also becoming an increasingly important platform for the delivery of health education and medical interventions. In a regional survey conducted which included 257 medical students and 131 junior doctors by Karl Frederick et al in United Kingdom, observed 79% medical students and 74.8% of junior doctors owned smart phones with high usage of medical related apps like drug related app disease and management app and have endorsed the development of more apps to support medical education and clinical practice.[11]

Criticising digital learning Minjuan Wang et al noted that the Chinese classrooms, whether on school grounds or online, had long suffered from a lack of interactivity. Most of the online classes simply provided recorded instructor lectures, which only reinforced the negative effects of passive non-participatory learning.[12] Moreover, according to Fozdar, Bharat Inder, and Lalita S. Kumar, student retention in open and distance learning (ODL) is comparatively poor to traditional education.[13] In the current study the academic performance of the BL group was higher with better retention of content than TL group and as per the analysis of the answers provided by the respondents and this programme was catalytic in enabling one to think out of the box and a better way to know the clinical aspect of which they could apply in the future. Furthermore, as per the analysis of the present study, 38% agreed while 60% strongly opined case based discussion was beneficial in better understanding and retention of the subject while helped improve their analytic skills as well. The students also opined that the m-learning mode made the subject more interesting, as this mobile learning system delivered increased interactivity in large blended classes. Along with short text messaging and instant polls the students could ask questions and undertake suggestions and solutions in real time. The potential short- term and long-term benefits of blended learning have been summarised [Table 1 & 2]

Table 1: Potential benefits of m-learning - Short term.

Generation of interest in the subject, as this study was an attempt to speak in preferred medium of the students.
Enhanced Learner- Teacher interaction through regular feedbacks and discussions.
Infused healthy competitive spirit among learners.
Improved analytical skills through case based scenarios.
No fear of errors/mistakes as programme was individual tailored and not graded.
Understanding application of Anatomy rather than just know it (rote learning.)
Better understanding and retention of knowledge.

In a survey study conducted at the National University of Singapore by George YIP et al, it was observed that undergraduate students were taught human Anatomy using cadaveric prosections and multimedia software. Majority of students preferred cadaveric prosections to multimedia learning, however all students preferred multimedia learning to cadaveric prosections for self-guided independent study. All students favoured adjuncts to Anatomy instructions i.e. cadaveric prosections coupled with multimedia software.[14]

In convergence with the effectiveness of such a learning method, it has been observed in our study that 40% students were of the opinion that mobile- learning was of an excellent experience while 60 % rated the mobile learning as good. About 65% of the respondents were of the opinion and 22% strongly opined that m-learning encouraged them to read more than usual and study on a regular basis. Thus the entire BL group was unanimous in its stand that the questions put forth through digital learning had generated substantial curiosity in consulting information other than regular course books and majority of the students have asked for continuance of this study methodology in the future.

Table 2: Potential benefits of m-Learning-Long term

Cultivation of self driven learning attitude.
Resource Bank: solid, reliable, updated, accessible material.
This innovative method can be adapted in teaching other subjects at undergraduate and post graduate level.

Table 3: Challenges of the study.

Higher cost of smart phones
Dependency on data connectivity
Small size device screens; can lay eye strain
24/7 event for faculty member
Private space and time of the teacher and learner needs to be negotiated
Increased faculty workload-juggling websites, books to design content and execution
The sessions need to be interesting, consistent, interactive and tailored to learners needs; as the students are a just a click away.

Geoff Wong et al, in their review study of 249 primary studies on Internet based medical education have put forth certain key findings; wherein the learners would use technology which was easy to access, not cumbersome, highly interactive and course-context interaction that fits between technical attributes and learners' needs and priorities.[15]

Learning does not occur passively, there is greater learning when students engage in active learning which involves students in talking and listening, reading, writing, and reflection all possible through the use of a mobile device.[16]

Conclusion

Students have requested continuation of mobile learning and approved this Hybrid model- a blend of technology and conventional teaching as an enjoyable learning experience. However due to high cost of data-enabled smart phone all students were unable to participate in current study. This innovative method can be adapted in teaching other subjects at both under-graduate and post-graduate levels.

Learn Anything, Any Time, Any Place!

Abbreviations

TL- Traditional Learners
BL-blended learning
m learning- mobile learning
app- application

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