



GAMIFICATION AND MULTIMEDIA FOR EFFECTIVE LEARNING OF ANATOMY

Dr. Shabana Sultana

Assistant Professor, Department of Anatomy, Apollo Institute of Medical Sciences and Research, Hyderabad, Telangana, India.

Dr. Mrudula Chandrupatla*

Professor & HOD, Department of Anatomy, Apollo Institute of Medical Sciences and Research, Hyderabad, Telangana, India. *Corresponding Author

Dr. Saju Binu Cherian

Associate Professor, Department of Anatomy, Apollo Institute of Medical Sciences and Research, Hyderabad, Telangana, India.

ABSTRACT

Gamification, which is the application of game-design principles to non-game contexts, is an instructional strategy with power to increase learning. In a comprehensive sense, multimedia is the use of more than one media element which includes online text, graphics, sound, animation and video. A fundamental feature of most Web based multimedia is interactivity, which gives user some control over the content. "Tell me and I will forget; show me and I may remember; involve me and I will understand" (Chinese proverb). The use of multimedia like online Anatomy Applications (Apps) allows medical students to learn Anatomy in more interesting and easy way. In fact, research shows that people remember only 20% of what they see, 30% of what they hear. When they see and hear it, they remember 50%, if we include some interaction; they will remember 80% of it.

KEYWORDS : Gamification, Multimedia, Enhance learning, Student Interest and Engagement, Blended learning.

INTRODUCTION:

Each person has his own way of learning in a different fascinating way. Medical colleges are perhaps the most ideal target for multimedia. It has potential for delivering effective teaching. Multimedia equipped education lets the students learn at their own pace and at their own time. It is ideal in distance education and open learning systems wherein students need not be physically present in class. Students can learn while having fun. Medical education is growing fast. Students of Medical college prefer learning in an easy and effective way preferably through multimedia associated with fun at the same time which help them to understand and remember the content easily. As current Students are addicted to multimedia, accordingly if instructional curriculum includes gamification and multimedia, the learning becomes interesting when compared to classical pedagogical model associated with memorization. In response, many medical colleges now incorporate technology, enhanced active learning and multimedia education applications. Education games, medical mobile applications, and virtual patient simulations are gamified training platforms. Empirical research is needed to develop a set of guidelines in teaching and learning of Anatomical sciences that facilitate match with current generation students'. Visualizations mediates difficult aspects of Anatomy to be learnt easily. As students use mobile phones secretly in class rooms, if it's use is modified in constructive way, by introducing the gamification and multimedia technique, by using Anatomy Apps then it becomes boon in learning. This paper presents strategies for teaching and learning of Anatomy which is a basic science for health professions curricula. Recent research has proved that classroom learning plus use of online learning outperforms classical didactic teaching by facilitating effective learning. The study unveils the practicability of adopting combined learning techniques in Anatomy and evaluates the learning experiences of students.

AIMS & OBJECTIVES:

To know the benefits of using gamified and multimedia techniques for teaching and learning Anatomy in an easy and effective way. The aim of this research is to investigate the potential of gamified course design in effective learning of Anatomy from students' perspectives. Particularly, we

explored how students experience engagement, enjoyability and learning of Anatomy by making use of the most 10 popular Anatomy apps.

MATERIAL & METHODS:

100 First MBBS students from Apollo Institute of Medical Sciences and Research, Hyderabad, India were chosen for the study. Peer-reviewed literature, commercially published media, and grey literature were searched to compile an archive of recently published scientific evaluations of gamified training platforms and multimedia in the use of Medical Education. Specific educational games, mobile applications, and virtual simulations useful for learning Anatomy were identified and categorized. Available evidence was summarized as it related to potential educational advantages of the identified platforms for medical education.

The following research questions were addressed and their answers were carefully recorded.

How do medical students evaluate and value the use of gamified and multimedia applications:

1. For triggering interest and enhancing engagement?
2. For enhancing enjoyment?
3. For enhancing Anatomy learning?

A total of 10 Anatomy Apps were identified for preclinical training. The multimedia in the form of Anatomy Apps commonly used by the students for learning Anatomy were as follows

1. Daily Anatomy flash cards
2. Anatomy learning
3. Muscle Skeleton -3D Atlas
4. 3D Bones and Organs
5. Visual anatomy
6. Essential Skeleton -3
7. Skeleton 3D anatomy
8. Teach me Anatomy
9. Gray's Anatomy Atlas (offline)
10. 3D Anatomy for the Artists

RESULTS:

Overall, improved learning outcomes have been

demonstrated with multimedia education applications. Games have the potential to promote learning, increase engagement, allow for real-word application, and enhance collaboration. They can also provide opportunities for distance training, learning analytics, and swift feedback.

1. Learning with the application **Teach me Anatomy** was viewed as fun by 87 out of 100 students .They were enjoying the task which is connected with learning and collaboration.
- A. The best review given was 'My task was to learn a topic and work tasks there; it was fun and developed my vocabulary'.
- B. Another review was 'It was great that I could work independently with the online Anatomy App; I could concentrate better and manage my own time consumption'.
2. Learning with **Gray's Anatomy Atlas (offline) & Anatomy learning** was viewed as live and intresting by 83 students out of 100 students, whereas the rest felt that the virtuals did not offer enjoyable learning experiences.
3. All the students rated **Daily Anatomy flash cards & Essential Skeleton -3** as a fun learning tool. 81 out of 100 students found it useful. Even if they made mistakes, they found them to be fun and educational.
4. Learning with **Visual Anatomy & Skeleton 3D Anatomy** sessions enhanced feelings of learning Anatomy live. 79 out of 100 students found it beneficial.
5. Learning with **3D Bones and Organs** was ranking next provides for rehearsing vocabulary. 74 out of 100 students found it intresting.
6. Learning with **3D Anatomy for the Artists** made them to learn Anatomy easily. 71 out of 100 students found it fruitful.
- 7 **Muscle Skeleton -3D Atlas** was ranking last among the most popular ten apps of Anatomy. 65 out of 100 students found it good.

DISCUSSION :

Many published studies suggest possible benefits from using gamified media in medical curriculum. This is a rapidly growing field. More research is required to rigorously evaluate the specific educational benefits of these interventions. This archive of hyperlinked tools can be used as a resource for all levels of medical trainees, providers, and educators. Gamification should create a game-like feel within the study material and learning activities, which have a tendency to increase time spent on studying and improve actual learning.Using the gamification and multimedia techniques has increased enjoyment and learning. Furthermore, our aim was to explore other factors that are crucial for engaging students in the course. An important effect of gamification is that it engages students, which can lead to improved learning. 96% of participants considered the work to be fostering engagement. They concluded that it helped them with enhanced oral and written skills. To create an ideal learning environment is essential for students to be at the same skill level, and in this case, using of these apps created a fruitful basis for the whole course. The fact that the students found it creative and enjoyable. In addition, 83% of the students considered the course's ove rall atmosphere to be fruitful, engaging and enjoyable from a learning perspective; thus, they appreciated the course's tolerant and positive atmosphere. Our data indicate that gamification added extra value to fostering engagement, enjoyment and learning.

CONCLUSION:

The applications

1. **Teach me Anatomy** was seen as aversatile tool to foster engagement and learning and was widely viewed as fun. The students found it fruitful to concentrate on given field-specific topics and receive immediate feedback in the form of reviews. In addition, they appreciated when their

achievements were shown and discussed in class afterward. **Teach me Anatomy** also was seen as helpful for practicing oral and written language skills.

2. **Gray's Anatomy Atlas (offline) & Anatomy learning** engaging and fun elements were praised, as well as its ability to create a positive, relaxing atmosphere. Furthermore, it especially fostered learning of written language skills.
3. **Daily Anatomy flash cards & Essential Skeleton -3** provided successful vocabulary tasks and made learning fun among the pairs. The participants seemed to be excited and eager to learn, and performing well was desirable after each question enhanced competition.
4. **Visual Anatomy & Skeleton 3D anatomy** -The students appreciated the creative work shared by fellow students and the opportunity to re-watch each other's videos, texts, links and vocabulary study sets, regardless of place or time. It was beneficial to search for terms on the chosen field-specific topic and chart keywords independently, which contributed to both self-regulated and self paced learning, as well as collaboration.

The overall rating of the most popular 10 applications of Anatomy are as follows

1. **Teach me Anatomy – 91% Positive Reviews , 4.7* Rating**
2. **Gray's Anatomy Atlas (offline) & Anatomy learning - 90% Positive Reviews , 4.6* Rating**
3. **Daily Anatomy flash cards & Essential Skeleton -3 - 89% Positive Reviews , 4.6* Rating**
4. **Visual Anatomy & Skeleton 3D Anatomy - 81% Positive Reviews , 4.3* Rating**
5. **3D Bones and Organs - 80% Positive Reviews , 4.2* Rating**
6. **3D Anatomy for the Artists - 76% Positive Reviews , 4.1* Rating**
7. **Muscle Skeleton -3D Atlas - 74% Positive Reviews , 4.0* Rating**

When it comes to general feedback, the gamified elements were considered positive and fun, and versatile methods brought diversity to learning. Some participants viewed the gamified elements as non-academic, while others changed their minds when they reflected upon learning. The new ways to learn languages surprised and challenged a few adult learners, as the learning environment differed from their prior experiences with language learning. The use of educational technology challenged some students when too many new tools distracted them from learning. Otherwise, the new digital skills learned during the study module were appreciated, and the students were provided with technological and collaborative tools and learning skills to be applied in other studies and later in their work lives. When designing gamified elements for learning processes, teachers' competencies are important to note. Teachers should have knowledge of both gamified applications and applicable knowledge about interest and engagement. In addition, they need pedagogical knowledge about learning, particularly how to foster collaborative learning in the gamified learning process and create an atmosphere that cultivates successful learning experiences. Based on the results, raising interest and enhancing engagement play an essential role in course design. The students assessed their engagement, but their understanding of engagement remains unclear. Based on their responses, we could perceive behavioural, emotional and cognitive engagement to some degree, but agentic engagement did not show up This study confirms the effectiveness of online learning (Siklander et al., 2017). Learning is a social, interactive process, although individual learning is also necessary. Collaborative learning involves cognitive-linguistic processes of co-elaborating the issues at hand. By collaboratively elaborating on the

problems, students interact and produce their learning outcomes (Baker, 2015). Then students invest less cognitive effort, compared with working alone, because they can divide information processing across a larger reservoir of capacity (Kirschner, Kirschner & Janssen, 2014). As seen from the results, multimedia elements afforded alternative conditions, situations and practices for students to distribute and use knowledge (e.g., Hyvönen, 2008; Lantolf & Thorne, 2006; van Lier, 2010). This research enabled focusing on promoting educational technological and pedagogical possibilities to support efficient blended learning and to experiment on the use of gamified tools that suit Anatomy learning in higher education.

REFERENCES:

1. K. Kapp, *The Gamification of Learning and Instruction: Game-Based Methods and Strategies for Training and Education*. San Francisco: John Wiley & Sons. 2012.
2. Zichermann G, Cunningham C. *Introduction. Gamification by Design: Implementing Game Mechanics in Web and Mobile Apps*. Sebastopol, CA: O'Reilly Media, Inc; 2011:xiv.
3. Baker, M. J. (2015). Collaboration in collaborative learning. *Interaction Studies*, 16(3), 451–473. DOI 10.1075/is.16.3.05bak
4. D. Tapscott, *Grown up Digital. How the net generation is changing your world*. New York: Mc Graw Hill, 2009.
5. Aldrich C. *Learning Online With Games, Simulations, and Virtual Worlds: Strategies for Online Instruction*. San Francisco, CA: John Wiley & Sons; 2009.
6. Johnson L, Adams Becker S, Estrada V, Freeman A. *NMC Horizon Report: 2015 Higher Education Edition*. Austin, TX: The New Media Consortium; 2015. <http://cdn.nmc.org/media/2015-nmc-horizon-report-HE-EN.pdf>. Accessed November 19, 2015.
7. Caponetto, I., Earp, J., & Ott, M. (2014). Gamification and education: A literature review. In *ECGBL2014-8th European conference on games based learning: ECGBL2014* (pp. 50–57). Academic Conferences and Publishing International.
8. Hamari, J., Koivisto, J., & Sarsa, H. (2014). Does gamification work? – A literature review of empirical studies on gamification. In *47th Hawaii international conference on system sciences (HICSS)* (pp. 3025–3034). IEEE
9. Kron FW, Gjerde CL, Sen A, Fetters MD. Medical student attitudes toward video games and related new media technologies in medical education. *BMC Med Ed*. 2010;10:50. doi:10.1186/1472-6920-10-50.
10. Wagner DA. *M4R: A Landscape Research Review of Mobiles for Reading* [draft technical report]. Philadelphia: University of Pennsylvania; 2013
11. *Gamification and Multimedia for Medical Education: A Landscape Review* Lise McCoy, EdD, Joy H. Lewis, DO, PhD, David Dalton, DO, *The Journal of the American Osteopathic Association* January 2016 | Vol 116 | No. 1
12. Teachers' engagement and students' satisfaction with a playful learning environment April 2017, *Teaching and Teacher Education* 63:274-284, DOI: 10.1016/j.tate.2016.12.018 Marjaana Kangas, Pirkko Tellervo Siklander, Justus Randolph, Heli Ruokamo.
13. Avoiding split attention in computer-based testing: Is neglecting additional information facilitative? Halszka Jarodzka, Noortje Janssen, Paul A. Kirschner, Gijsbert Erkens, First published: 03 June 2014
14. The ecology of language learning: Practice to theory, theory to practice, December 2010 *Procedia - Social and Behavioral Sciences* 3:2-6, DOI: 10.1016/j.sbspro.2010.07.005, License, CC BY-NC-ND 3.0, Leo Van Liera