ORIGINAL ARTICLE

Gamification in Psychiatry: Design and Development of Native Model and the Innovate Strategy in Medical Education as a Funny and Exciting Learning

LEILIMOSALANEJAD, SAEED ABDOLLAHIFARD

ABSTRACT

Background: Gamification is defined as the application of typical elements of game playing (rules of play, point scoring, and competition with others) to other areas of activity, specifically with the aim of engaging users in learning. The present study aimed at the designing, implementation, and evaluation of gamification in psychiatric course.

Methods: This gamification was developed to design, develop and assess gamification in psychiatric course in 13 parts in the web and android based mobiles. Gamification was developed in 3 dimensions **mechanisms**, **dynamics** and **components,** in 3 phases including design, implementation and evaluation). This gamification was developed for the acquisition of learning goals in nursing and para medical students in mental illness (psychology or psychiatry) using **Octaysis 8 core drivers** . Gamification arranged in 3 categories included multiple choice, extended matching and case base learning. Evaluation was based on students (quantitative), interview from professors (qualitative) and IT engineers .

Results: Data gathering was from interview and questionnaire with 8 items in 5 continuum in order to evaluate students' satisfaction (n=42), teacher evaluation (n=5), and technical evaluation from IT engineers (n-=10). The students reported this software as funny and interesting. Most of them reported the positive effect of gamification on learning (average mean score of items). The teachers also described the software as an efficient tool for achieving students' higher level of learning in psychiatry, funny and innovative method, also a new way to teach psychiatry. IT engineers positively reported the technical characteristics. Most of them reported the positive effect of gamification on learning (average mean score of items).

Conclusion: Due to the efficacy of gamification in students' satisfaction and learning indicators, it is suggested that gamification should be used in the design and development of medical course as an innovative, interactive and exciting method**.**

Key words: Gamification, psychiatry, student learning.

INTRODUCTION

Presentation of healthcare services will be possible if graduates can adapt themselves to the progressive development of medical science, the complexities of the clinical environment and rapid technological changes and its effect on the scientific needs of the society.

The potential increase in the volume of information is considered a major educational problem. In response to this information explosion, the maximum percentage of objectives in each training course is concentrated on the knowledge area[1]

Medical science education is associated with complexities of the theoretical and clinical training environment. Accordingly, to achieve a successful and efficient education as well as qualitative and quantitative dynamic development of majors of medical sciences, with effective planning, a platform to promote the productivity of education should be provided[2].

Inappropriate of educational opportunities as well as the educational gap between clinical situation and theoretical principles, on the other hand. This affects the utility and quality of healthcare services[3-9].

[1]Associated Professor, Mental Health Department ,Virtual Learning Center, Jahrom University of Medical sciences, Jahrom, [2]Medical Student, student Research Committee , Shiraz University of Medical Sciences , Shiraz, Iran

Correspondence to Leilimosalanejad, Email: mosallanejad@jums.ac.ir

Adult learning principles also imply that adult training management whether on macro or micro scales, as one of the infrastructures of the national educational system needs access to education and promotion of the quality of education(10).

Students, in particular Asian students, do not participate actively in the classroom. Generally speaking, Asian students demonstrate a low level of class activity(11). It reveals that this is a typical obstacle in the classroom, particularly in Asian countries. A study has been carried out on Asian students highlighting some characteristics shared by all students such as being silent and inactive, dependent on lecturers, concentrated on results, lack of awareness of plagiarism, and rewarding experience[12].

Gamification is the administration of game-design components and game values in non-game contexts(13). Gamification commonly employs game design elements to boost user involvement[14,15,16,17].

Theoretical Background for Gamification: The assessment step in phases one and two led to the following list of 11 theories

- Behavioral Decision Theory
- Behavioral Intention and Actual Behavior
- Cognitive Load Theory
- Elaboration Likelihood Model
- Flow Theory
- Homo Ludens
- Information Processing Theory

- Keller's Motivational Model
- Organizational Learning Theory
- Self-Determination Theory
- Social Cognitive Theory and Social Learning Theory[18].

Different design components for gamification of education are highlighted inthese documents, along with their impact on the learners, which we referred to as learner in varied field (Engagement, Satisfaction, enthusiasm, Enjoyment, Productive learning experience, Sense of accomplishment, Sense of achievement, Interest in course and presentation[19,20,21,22].

Use of educational games is one of the most entertaining and effective educational methods that can be applied in the current era of education[23].

Some scholars believe that educational games are in line with the general cycle of learning and can be an effective method for transferring learning experiences in the learning cycle with the phases of objective experience, reflective observation, abstract conceptualization, and active experimentation. With its special conditions, games can provide the possibility of developing active experience in this cycle of learning[20,24].

Jayasinghe & Dharmaratne[25].who analyzed game based learning and gamification in higher education, conclude that students who use gamified learning materials, will automatically follow the learning process of Bloom Taxonomy.

Other concluded that gamification can be potential to increase student motivation.They also concluded that the gamification itself is not trivial to achieve that effect, and a big effort is required to design and implement the system for the students to be able to fully motivate them. Both researches were using computer-basedplatform as their media for gamification[26].

The use of this method in medical sciences education also has many advantages, which include active simulation of learning and enhancing the student's understanding. Further, this method increases the chance of greater interaction and participation of students and enjoying the class, not to mention that the use of photos, sound, and animation adds more variety and helps students to participate more easily.

Considering the importance of active strategies in learning and retention for students, given the variety and multitude of learning contents in the course of psychological diseases, and regarding the similarity of disease signs and symptoms in this course, which makes learning and recollecting difficult for students, efforts were made to design a new course through a new method and using gamification.

METHODS

The method will be stated in three sections: design – implementation – and assessment.

Study Design: In this plan, attempts were made to make the complex concepts of the course of psychiatry in the section of psychological diseases for the target students (all bachelors' groups) understandable, enjoyable, and simple through gamification. The aim was to enhance the willingness of students to learn by making the content interesting and attractive through psychological games. In this research, after investigating the study framework, experts consisting of virtual learning and engineering were benefitted from. Also, the design and its requirements were developed by an assessment team which performed the primary planning.

Fig. 1: Model of intervention in gamification

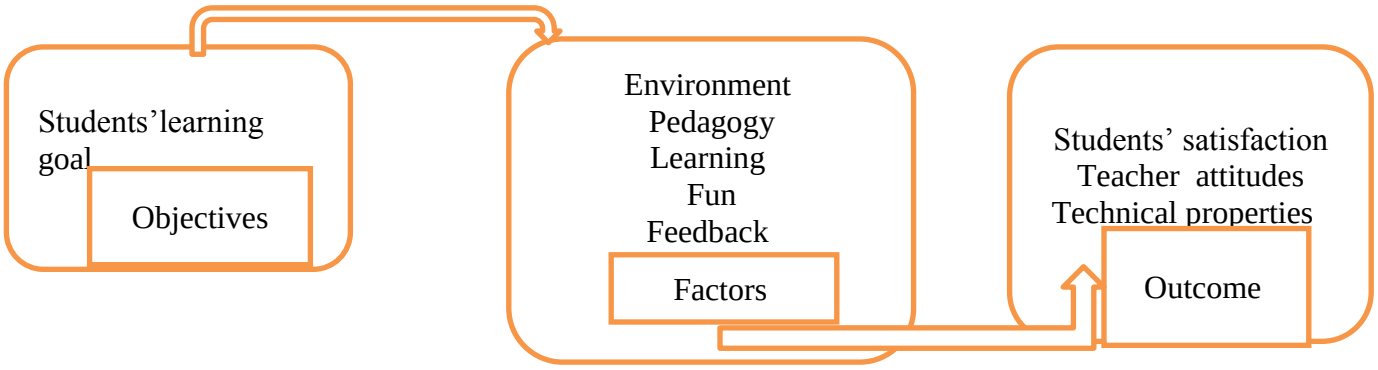


Fig. 2: Gamification approach

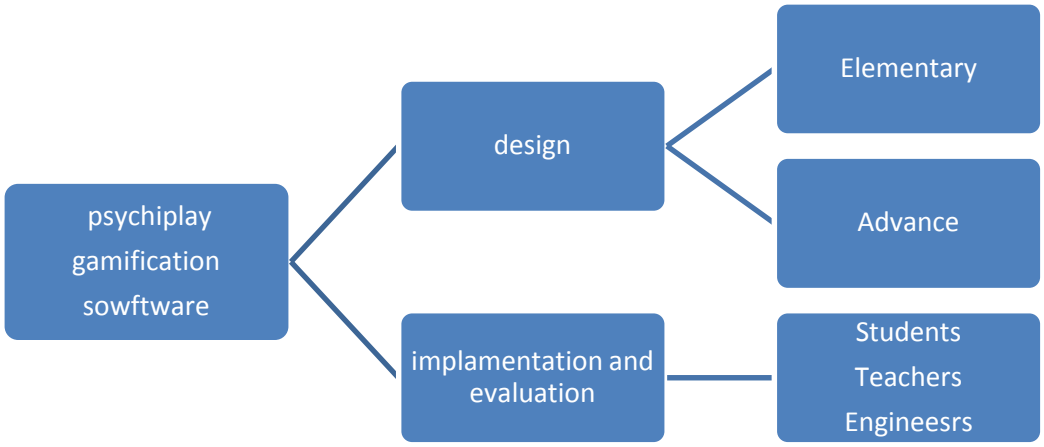


Fig 3:gamification levels

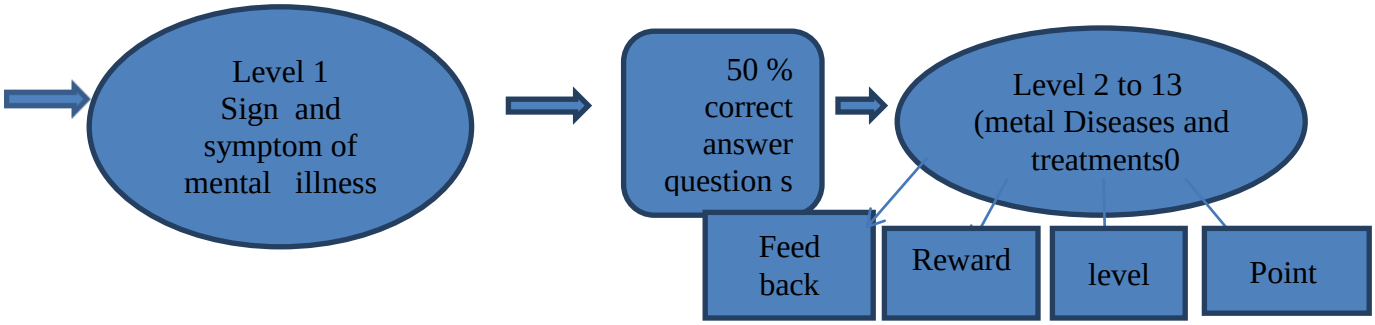
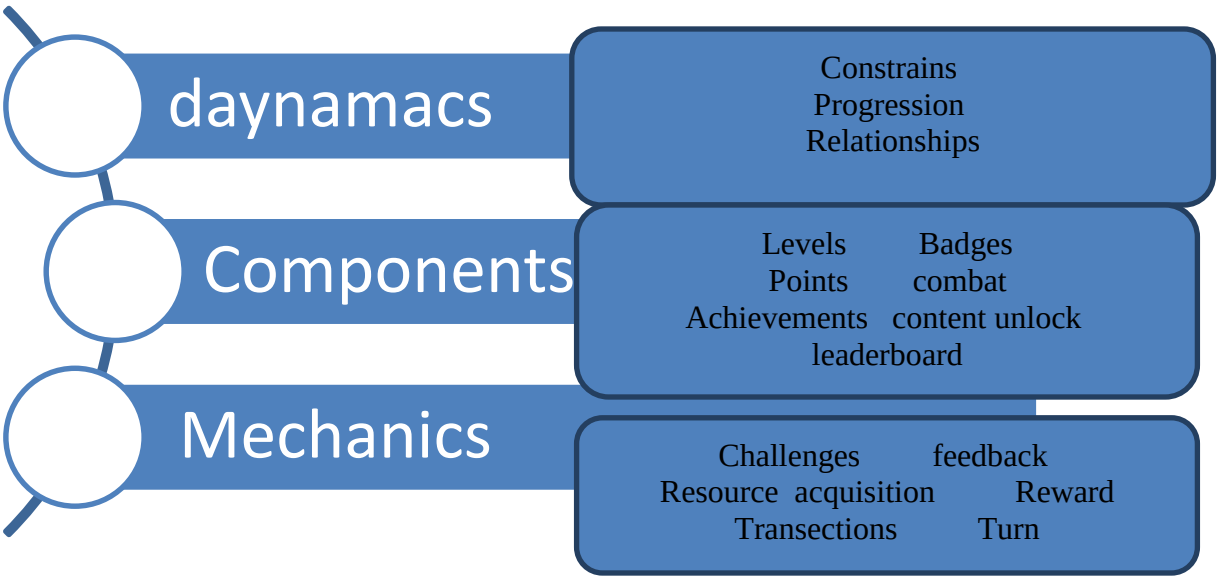


Fig. 4: Gamification elements



The gamification design document consisting of server architecture, content, its presentation and assessment as well as the preliminary blueprint of the project were prepared. For instrument design, in collaboration with two mental health specialists, the questions and scenarios were prepared and developed, to allow acquisition of deep skills for these students.

The questions comprised multiple-choice questions, fill in the blanks, matching, and design of real cases of diseases. In the composition of the scenarios, three parts including dynamics, mechanism, and elements of the gamification were considered, and the eight-dimensional framework of OCTALYSIS was used in development of the scenarios.

These scenarios were specific to gamification design and were designed in the three mentioned parts.

In the dynamics part, issues such as the skill of communication between the sections, promotion to another level, narrators of emotional situations, and game limiters were considered.

In the section of technical mechanisms, development of challenges (skill issues and the need to solve it to move towards another level), opportunities (subtracting the scores for pervasive mistakes and giving score to achieve a higher level), receiving feedback across different levels, access to resources, rewards, fragmentation (fragmenting the game into different levels), frequent rotations (not predicting the upcoming questions, the style of the questions, and the rewarding situations) were considered. Further, the main elements in the game included use of avatars, models, sets, battle for reaching higher levels, increasing degree of freedom (pervasive power of choice when entering each part of the renovation), receiving gift, leader board (the board highlighting the pervasive status), obstacles (the obstacles to pervasive achievement of higher levels without qualifying the scientific position required and virtual objects (the approval for purchasing points, medals, or saving money after achieving the required scientific level.

Each of the mentioned points can be used given the type of gamification and its usage was designed within the limits whose possibility was in line with the content of the program. The set of these three sections in the form of gamification can create an entertaining and effective environment for learning among students.

There are 5 steps involved in applying gamification in:

1. Understanding the target audience and the context.
2. Defining learning objectives**.**
3. Structuring the experience.
4. Identifying resources.
5. Applying gamification elements.

These steps will be implemented in designing the gamification system.

Implementation stages of the research: This gamification system was implemented in 2classes for psychology course (mental illness) from the period of March, 3rd 2017 to June 2nd 2017.The following steps were implemented in designing the gamification system:

Understanding the target audience : The author taught psychology course inJahrom University of Medical Sciences to two groups of students in the field of public health and laboratory sciences in IRAN. The classwas in three parts: lectures, seminar group discussion, blended learning and gamification in mental illness lectures.

Defining learning objectives: The learning objectives were divided into 2 parts as follows:

-Course objectives, which are related with the knowledgePsychology and concepts.

- Classroom objectives, which are related with how tomake students more active in the class, develop teamwork, develop information literacy in virtual environment, and make the class more fun byintroducing gamification in some parts.

3. Constructing the experience

This included the following

-Increasing the knowledge about psychology in mental illness.

- Increasing students' participation in the class and how they can be active in class.
- Developing teamwork learning.
- Developing team based learning from group seminar.

Blended learning

- Developing more knowledge about virtual learning.

The use of gamification in mental illness to create fun and motivation in class

4. Identifying resources

The following are several details of the resources:

Tracking mechanism: The teacher could track all students in leader boards. Also students could track their own level, score and points in the leader board and had better understanding of their own progress compared with their colleges.

Level: There were levels that the teacher looked out for in the gamification system, but every student had their own level.

Rules: There were several additional rules used. These rules are explained on the gamification home page.

Feedback: Upon completion or failure to answer questions, the system provided feedbacks in form of smileys and lights all over again.

Applying gamification elements:

1. Points connect the gamification system and the course scoring.
2. Badges. This is related with the students' level of achievement or the status of the students themselves.
3. Leaderboard. Students can see their position in the class or make comparisons with other colleagues

Each student has their own level. Every student will start theclass from level 1 as a conditional field to achieve the rest of the stages, and each student will try to reach the highest level that they can, in this case, level 13. Other elements are presented in figures.

Analysis: Evaluation was done from students' satisfaction, teacher attitude, and then technical appraising. Data gathering was from interview and questionnaire with 23 items in 5 continuum for the evaluation of students' satisfaction(N=33), interview with teacher evaluation(n=5), and technical evaluation from IT engineers (n=10) with 17 item in 5 continuum .

Validity and reliability of tools: Students' questionnaire validity was measured based on the content validity by fivemembers of the faculty. Furthermore, the reliability ofthe questionnaire was approved with correlation coefficient of 0.74.Also technical questionnaire validity was measured based on the content validity by four engineers And , the reliability of the test was approved with correlation coefficient of 0.68.

RESULTS

As a sampling in two class, 27 participants were females and the remainder were males. 19 students were laboratory sciences while the others were public health

sciences. The result from student prospective showed that mean score of most of items were higher than average. This implies that students attitude towards using gamification was positive. Mean score of items in positive excitement due to increased satisfaction increased the motivation for improved performance, improved learner performance, and increased the satisfaction of learning. Learning deeper and learning more about the subject and the purpose of learning in this way as clearly evident were higher than the others.

Data gathering was from interview and questionnaire with 8 items in 5 continuum for the evaluation of students' satisfaction (n=33), interview with teacher evaluation (n=5), and technical evaluation from IT engineers (n=10). Data from teacher were gathered by interview. The items are listed in the table (Table 3-5).

Table1 : students' attitudes from using gamification(N=33)

Variables	Mean	SD	SE
This training method was a motivational approach to your learning	3.87	0.81	0.13
It will increase your ability to be professional	3.78	0.81	0.14
The benefits of this training method are to improve self-management ability in learning.	3.51	0.83	0.14
Reduces the intensity of interest by repeated use	2.63	0.19	0.12
This training method is associated with positive excitement due to increased satisfaction.	4.12	0.69	0.2
This training method increases the motivation for improve performance of users	4.60	1.11	0.19
In this educational method, enjoyable activities and fun learning	3.87	0.73	0.12
This training method improves learner performance.	4.03	0.52	0.09
In the game, some rewards are irrelevant and exaggerated	2.24	1.10	0.13
This training method makes it easy to change behavior and performance.	3.72	1.28	0.22
Learning with the game increases the development of social skills.	3.81	0.68	0.11
This training method increases the satisfaction of learning Learning	4.81	1.30	0.22
this way directly depends on the capabilities and features of users	3.72	1.28	0.22
Learning deeper and learning more about the subject.	4.30	0.68	0.13
In this way learning learning has a lot of added value	3.81	1.30	0.18
Enjoy working with virtual patients	3.69	1.04	0.19
Gaming is inadequate to achieve the goals of the health team.	4.30	0.68	0.13
The purpose of learning in this way is clearly evident	4.18	1.39	0.20
The psychological joy in the learning process is achieved by this method.	3.68	0.76	0.19
Positive excitement in learning is one of the benefits of this learning style.	3.68	1.01	0.12

Table 2: Limitation of gamification from students' attitude (n=33)

Variables	Mean	SD	SE
The intensity of my interest in learning is reduced by repeated use of the game	2.57	1.39	0.20
In my opinion, gaming is inadequate to achieve the goals of the health team	2.12	1.16	0.25
Learning through this way is directly related to the individual's personality traits and capabilities	3.18	1.46	0.17
In the game, some unrelated bonuses and exaggeration have been applied	3.12	0.99	0.10
In my opinion, educational games can degrade the performance of users.	1.81	0.58	0.10
Attempts to play the game may not be sufficient to achieve a deep understanding of the subject	2.60	0.70	0.12

Table 3: Technical characteristics from it Engineers in gamification platform

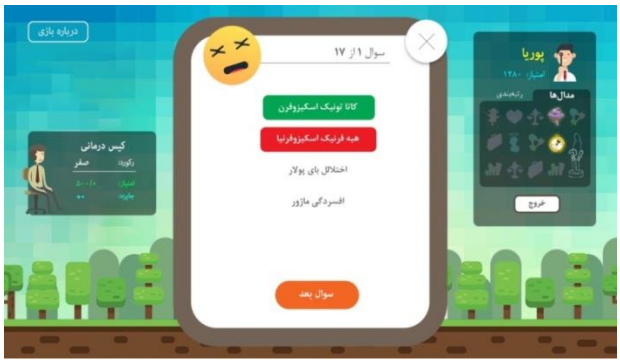
Variables	Mean	SD
Currencies	3.45	0.54
Measures	4.23	0.53
Feedback	4.64	0.77
Individual Avatar	1.11	0.23
Communication system	2.87	0.65
3D Environment	3.64	1.26
Market place	3.64	1.26
Economy	4.12	0.56
Teams	2.54	1.24
Time pressure	4.64	1.10
Competition	3.87	0.54
Difficulty adaption	3.52	1.32
Learning path	4.17	0.32
Fun failure	3.85	0.96
Social ceonnectivity	1.02	0.22
Meaning/purpose	4.96	0.32

Teacher attitude from using gamification by interview listed in table 4

Table 4: Teacher point of view about gamification (n=5)

Variables
Interesting
User friendly
Enthusiasm
Positive emotion
Effect to behavioural and performance change
Motivation to learning
High level of feasibility
Ease of access

Sample of gamification



More than 95% of students satisfied to use gamification .

DISCUSSION

In the present study, various elements were used in the design, which had an effective role in creation of an entertaining and motivational educational environment. Among these elements were leader board, feedbacks, the individuals' levels and status, medals, and challenges.

Most studies employed a combination of elements in the gamification design[27,28,29,30].

The results of this research suggested positive attitude of students and professors to this method of learning and this indicates a positive effect on learning and their performance. The research conducted in most cases suggests the positive effect of the gamification method on students.

In some cases, moderate effects have been reported without any special bias for usage of this method. Some studies have reported a mixed effect(30-32)[33,34,35].

The results of this research revealed the effective role of gamification method in the promotion of learning for students. The students considered gamification as an educational, motivational, interesting, and exciting method. They mentioned the potential of this educational method in promoting learning and performance of learning. The professors also had a positive attitude towards this method in acquisition of the educational objectives, promotion, and behavior alteration, and considered it as an entertaining and motivational environment for learning among students[33,34].

Some studies have reported effect of gamification on students' satisfaction and engaging students[34].

The results of the study by O'Leary which compared the satisfaction and learning using traditional methods and educational games for teaching ectopic pregnancy demonstrated that the students' score was higher compared to the traditional method. Also, the student interaction – memorization – and learning enjoyment were higher in this method in comparison with the traditional methods[35].

These results are in line with the results of the present study and the students' comments on this type of intervention.

Another study was conducted for training nutrition to students, and the lecturing method was compared with the role-play method. The results indicated that in the role-play method, the learning was greater[36].

Various other studies have also emphasized the superiority of gaming method over lecturing method[37,38,39].

In another study done by Selby et al through gaming method in the education of children development, the results suggested that this method had a greater effect on the knowledge of students in comparison with the reflective lecturing method. However, this method had no effect on the Ski test results[40].

The results of the present study suggested the effect of gamification on deep learning, promotion of practical skills in line with the educational objectives and promotion of self-management skills. In accordance with the present study, the mentioned investigations confirm the student's opinion about gamification.

Reviewing the role of educational games on the knowledge of students, the results of the studies indicated that this educational method has no effect on the knowledge of students. This researcher proposes further studies with valid designs to confirm the result[39]. These results do not confirm the students' opinion about the effect on learning and performance in the present study.

In the study by Bhoopathi performed with the aim of reviewing the effect of educational game on the mental health course, the results of the comparisons on analysis indicated a 10% increase in the students' scores through employing game strategy. This level showed six scores higher compared to the control group[41].

Begg believes that decision-making on substitution of game method in medical sciences education should be done, given the potentials and utility of the method against costs-time and attempts for its development and application[42].

Other researchers believe that the use of gamification in education requires mental adaptation to its utility in the education. Among these points are caring for active learning as an educational experience, which is manifested in the form of higher-level thoughts such as analysis, synthesis, and evaluation[43]. Some researchers consider this method as being helpful in reducing the stress and anxiety of students and enhancing their excitement and motivation in education.

The results also suggest that this method will have a considerable effect on achieving educational objectives, enhancing the performance of students, and acquiring the necessary skills, and altering their behavior. It can also fulfill their satisfaction.

The students in the present study also cited deeper learning based on educational objectives in this research. The professors also emphasized that this method has a positive effect of alteration of learning and performance of students[29,31,39,44,45].

In the present study, the students and professors mentioned the entertaining value of gamification and its motivational role, which is in accordance with the above research.

CONCLUSION

given the positive effect of this educational method on students' satisfaction and its impact on learning among students, along with the favorable comments of professors about this method and its application in education, as well as the positive comments of the technical team about the technical design mechanisms, the use of this method as a new technology-based method in education of medical sciences is recommended. Furthermore, the type of utilized design as a native model can be of interest to amateur researchers worldwide, especially Iran. It is hoped that through effective use of this technology, effective steps will be taken for promoting and deepening the learning of students as providers of healthcare services.

Limitation: Due to the native design of gamification, this method needs to be conducted in more groups. Also there is the need to develop some part of gamification from students and teachers, qualitatively. There is the need to develop a software for gamification by group collaboration .

Ethics approval and consent to participate: Permission to conduct this study has been received from the Jahrom University of Medical Sciences Ethics Committee.

Competing interests: The authors declare that they have no competing interests.

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