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The use of Gamification in Medical Educations

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ABSTRACT

The game has become an important part of daily lives of all people. The main objective of gamification phenomenon is to stimulate and direct individuals through playing game for training and educational purposes in financial, educational, and entertainment fields. The present study is a critical review of the available literatures on the position and future perspective of gamification in medical education. The available resources were searched and collected using the keywords Gamification, Medical Education, Academic Gaming, and Digital Gaming. the databases of Google Scholar, Pubmed, Eric, Sinhal, and Medline were used. The current evidence showed the effectiveness of gamification in stimulating people to play games in the. Various researches have been conducted regarding the behavioral effects of gamification in different health parts including rehabilitation, physical activities, and educational scenarios in public health promotion. Organizations try more and more focusing on the objectives and standards to achieve competitive advantage while in the meantime, gamification has become an innovative solution for the development of organizations by creating links between employee and organizational goals in an collaborative environment.

Keywords: Gamification, Game, Medical Education, Academic Gaming, and Digital Gaming

INTRODUCTION

The game has become an important part of daily lives of all people (1). The main objective of gamification phenomenon is to incite people to play using people passion for playing the game and also using he common elements in the different environments (2). Evidences have been provided suggesting the effectiveness of gamification in stimulating people to play games in the financial, educational, and entertainment fields (3). Various researches have been conducted regarding the behavioral effects of gamification in different health parts including rehabilitation, physical activities, and educational scenarios in public health promotion (4). The term of gamification is lately becoming common and apparently is not considered in any way a child's game. Organizations try more and more focusing on the objectives and standards in order to achieve competitive advantage while in the meantime, gamification has become an innovative solution for the development of organizations by creating links between

employee and organizational goals in an collaborative environment. As Burke (2012) has estimated, until 2015, 40% of the organizations will use the gamification as the main mechanism for changing their business operations (5, 6). On the other hand, Gartner (2012) has also anticipated that until 2016, gamification will become an essential factor in attracting and developing loyalty of customers to the brand or to specific products (7). According to the aforementioned study, the researcher has tried to introduce this organizational annovation model in medical education, make more enlightenment in this regard.

MATERIALS AND METHODS

The present study is a critical review of the available literatures on gamification after the reviewing, classification, and prioritization of search resources), will be used. In the critical review, the literatures are widely and the extensively identified and then the general and case issues were analyzed and synthesized using one of the leading sources. In this review, an extensice search was carried out using specific key words (such as: Gamification, Medical Education, Academic Gaming, Digital Gaming), in the related literatures, categories and their quality was discussed. Search engines included Google Scholar, Pubmed, Eric, Sinhal and Medline.

In the critical review there are two general approaches. Conceptual and chronological. The time approach can be explained considering that every science has been an idea at first and it has been formed over time. Reviewing the Studying the articles of available resources widely revealed that a number of articles are highlighted on a particular topic. This means that many individuals have referred on it. Then they are sorted according to the time and the formation proceed of this concept during the time is also obtained. The author of any article adds anything new to it. What has filled the blanks? How concept has been driven one step forward. However in the conceptual approach the time has not been organized. It is suggested that formation and evolution of the concept over time has not been regular, and it is often in the form of reciprocating. For example, we can observe that a more developed idea has been existed before our considered article. Therefore this concept is not linear or continuous. Here the time is not considered but also the earlier, current, and future developments of the concept have been studied. It should be mentioned that in this research the time approach is used and the contents of selected articles have been analyzed using qualitative analysis in order to clarify the definition, dimensions, and attributes of the concept as well as the place, requirements, and applications in the medical education of other countries.

What is Gamification?

Gamification is a novel concept with the origin of the digital media (2). Nick Pauling introduced this term in 2003 for the first time. But it was not considered at that time until in the second half of 2010, the gamification attracted a lot of attention with the arrival of the debate to various conferences. Of course, the idea of using the games in the daily life is not entirely new, because several examples of games can be noted that have been used without mentioning the gamification for serious work purposes. For example, a big organization like America's Army was leading in the use of video games (8).

Since the introduction of this term has not been passed much time, but it is clear that numerous definitions have not been presented about it yet. However the point which is obtained from these definitions is that gamification is considered much more varied than a simple definition. Deterding et al. (2011) has defined the gamification as "using the elements and techniques of the game in the real world and a platform not the game" and Huotari and Hamari (2012) defined it as "The process of service upgrade using rich entertainment experiences to support the members of created values" (9). While others introduce it as creating a virtual three-dimensional space that has led to changes in user behaviors or a method of training users in the complex systems (8). Others also define gamification as adding fun and happiness seasoning through helping playful structures in the daily lives (10).

According to the generality and more usage of the first definition in the literature, this paper considers the definition presented by Deterding et al. (2011).

In the deliberate gamification, it is attempted to introduce the goods and services using the governing thinking and psychology principles of games to customers. Accordingly, it can be said that gamification primarily involves the targeted population for a relatively long time with a product or a service, using mechanisms of the games, and secondly, encourages the players that optimize their behaviors due to the strategies of the game. In other words, gamification force people to perform their behaviors repeatedly and every time do better than last time in order to finally be familiar with the optimized behaviors of the game designers. In order to encourage players for optimization of their behaviors the points, prizes, scores, ranks, cash bonuses, etc. are used. Therefore, positive behavior provides the interests of both the player and the organization. Thus, unlike promotional tools such as sweepstakes and prizes that have been focused only on the sale of goods and short-term effects, gamification targets development process of

education, behavior change, full introduction, engaging with the product or service and loyalty of customers to the target. So far, many organizations have planned using the gamification with different objectives. Among the most important goals is considered in this regard is recruiting, selection and training of staff. Companies such as Google, Domino, a Marriott hotels, Siemens, etc have used gamification in this regard.

A simple and common model of gamification is that it has determined goals in the real world and non-gaming platform and also consideration of points and prizes for achieving the aim. For example, it is assumed that the game elements are implemented in the real organizational life. When you participate in a tender and win, a few points are given to you. When you successfully finish a production of a good or service an organization correctly, you get some points. When you get timely present at work, you get points and accordingly you get incentive points for all useful works. It may seem very exciting. In fact, you're trying to get higher points and rank, do more useful things and even forced labor and exhausting works become attractive for you, because you get rewarded for doing them.

Gamification Structure

Werbach and Hunter (2012) have divided the refined system structure into three levels: upper, middle and lower. As it can be seen in Figure 1 the dynamics places in the upper layer, mechanic gets place in the middle layer, and the components of the game is in the lower layers (11).

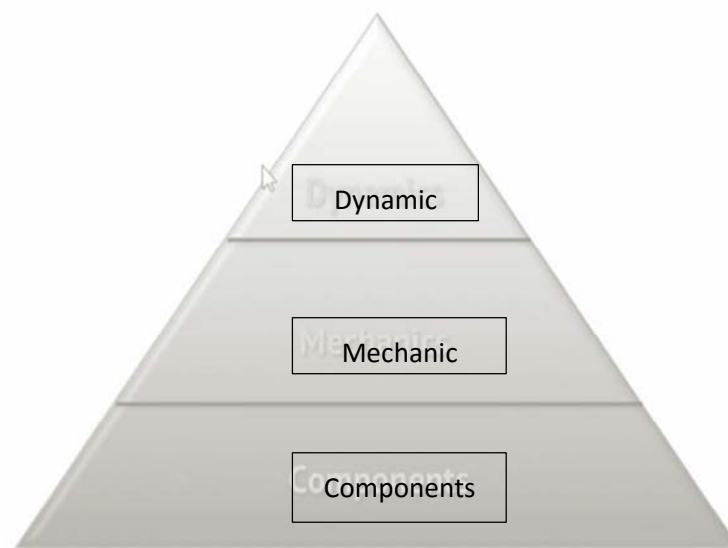


Figure 1. Pyramid of gamification structure

Dynamic Game

At the top of the pyramid, there is the dynamic element that is consisted of the considered general and conceptual aspects in the game that have been likened to the language or hidden rules. This hidden structure causes the game follow a certain and coherent pattern. Dynamics is the implied structure of that the game is reflected in the form of rules, but at the same time it includes a kind of conceptual elements that make up the game frame. The dynamics of gamification has three major components, namely: a) restrictions, b) emotions, and c) version of the game. In fact, these three elements form the part hidden.

Restrictions: In each game some restrictions are intended for players. In terms of the reconstructed conditions, rules and regulations are taken into account for organizational games which are implemented in design the game. Players will encounter a variety of meaningful choices that ultimately manner specified by selecting any one of them will change the course of the game.

Emotions: people experience different emotions in the daily life (from pleasure to pain) that can be used in gamification. Victory, joy, and failure, are along with discomfort. However the emotions considered for organizational gamifications are much narrower than the typical game, because we do not want people to get upset or angry in the workplace. Because this kind of excitement is considered as an anti- value in the media. Rather, the goal is to use positive emotions, such as a sense of accomplishment, high motivation, and reinforcement this emotional leverage can be used and encourage people for playing more.

The game's Narrative: The narrative interwoven the fabric of the original game and forms them. In fact, the game without narrative has no concept and becomes a collection of the abstract and detached activities. According to narrative of game, graphical images can be created for it in which the player can act effectively. In addition to the mentioned three components, relationships is created between players in the game and with others outside of that environment and the development of players during games is also an important component of the dynamics of the game (8).

Game Mechanics

As noted earlier, the game dynamic has been resembled to the game language, but the game mechanics are similar to the games verbs; that are practical and achievable part of the game. Principally, this level includes the elements that are pursuing the game and have been defined as the main activities, processes and control mechanisms. Activities that players do in the game and the limiting rules that are applied form the mechanical of the game. In fact, anything that can be linked to the approach of playing can be said the game mechanics. Typically 24 types of mechanics have been presented for the games in three groups: a) the type of game mechanics, b) the advantages and iii) fit the personality type.

Components of the Game

The components of the game aren't the forming parts of the game, but are the tangible elements in the games or reconstructed games such as the points, classification, badges, table ratings, feedback, missions, etc. Of course, sometimes some of researchers categorize this definition often as the game mechanic. However Verbakh and Hauntr classify this concept separately and introduce it as Toolkit games. They believe that the three components of the game that have high importance and more inclusive in the game environments including points, badges, and leaderboards (standings). They have stated that the use of these elements is not always effective and purposeful and meaningful choices should be taken for their implementation.

The Benefits of Gamifications in the Organizations

Gamification has a positive impact on people's motivation for participation in the duties and related issues, and the results of some researches have suggested that engaging the game elements in repetitive and monotonous tasks, in addition to making these tasks fun, causes people to be more involved in these issues (12). Therefore observing that business and product designers have embraced this concept, is not surprising. Gamification had the ability to work in any process, including sales, marketing, human resources and is also used in every industry, including health, education, information technology and like them. This is because gamification has a key advantage that is creation of interest in learning and performing an iterative process by providing content that has considered the aspects of animal behavior and psychology's contacts. In addition to the aforementioned advantages, other benefits have also been raised in this regard, which a few of them have been mentioned in the following.

Retaining the Top Talents

With this organizational innovation and using the game elements like creation of individual reward systems in the workplace by an effective manner, the top talents can be kept and protected. For example, in the the staffs who achieve the organizational goals receive medals and logos in order to staffs be able to have appropriate awards (13, 14).

Increasing Efficiency

Using this model, only if employees receive rewards and prizes, they perform their duties through a specific manner and finish works within the stipulated time. This will result in a significant increase in efficiency and productivity (13, 14).

Quick Feedback

Using the most common elements that simulate the game environment and place all staff in an environment that they can observe all others playings, then administrator can easily inform the activities of their employees, while employees can also compare their current status with other colleagues. For example, by designing the score tables in the game environment, the presented people can inform the status of other colleagues and obtain feedbacks from their performances (15, 16).

Creating Positive Behaviors

Organizations help modelling the favorable attitudes in their own organizations and also influence the behaviors of the staff by creating a special model of the game and reward system specific to their top performers. Therefore, employees observing behaviors that have good rewards, try to mimic the considered behaviors. Some inappropriate behaviors are presented in the following that can be changed through the midfield and properly managed:

- The behavior in which the goals are considered unrealistic and below the people capabilities.
- Behaviors through which each individual mentality achieves his/her individual goals without considering its effects on the other areas of the organization.
- The method of achieving the aims that security and environmental impact are ignored.
- Unethical behaviors and unverified that individuals consider to achieve the desired targets (17, 18). In another classification (19), the benefits are divided in four categories (Figure 2):



Figure 2. The four main categories of (Source: Mann 2013)

Increase of Employee Participation

Many large organizations are trying to use the gamification as a lever to encourage employees for incorporating the effective use of the common issues in the organization. Using an operating system of behaviors in constructing the game mechanics and designing the achievements and motivations for users, the main contributors across the organization are identified and receive bonus for their behaviors.

Increase of Productivity

In most manufacturing organizations, gamification is considered as the core strategy of production. In today's competitive environment, organizations are trying to enter the key performance indicators by reconstructing measures of business assessments in order to monitor the performances of their employees and in order to increase overall efficiency and productivity for making decisions.

Increase of Efficiency

Staff through game mechanics can assess how much time passed for performing the considered activities successfully and how much progress they have been charged. This will cause the employees be encouraged to do their activities in less time and with more efficiency.

Increase of Innovation

For organizations that are active in the global, innovation is crucial and should constantly encourage employees to present new ideas in order to raise the organization to take their advantages and to achieve their targets. In this process, organizations have implemented their utmost efforts to gain market share for the effective use of new technologies, such as game development.

The Relationship Between the Midfield and Organizational Performance

Gamification should improve with the support of organizational achievements by strengthening the organizational culture and organizational strategy. Of course, if we want to strengthen our organizational performance through this model, we should note the following points in designing the gamification of organizations (13, 14):

Conformity

Each organization is unique, then the organizational games should be consistent with the needs, objectives and organizational culture. Gamification should be based on the organizational culture in order to motivate employees to participate and co-created. Therefore for designing organizational games in the human resources and board fields, enough data should be collected.

Prizes and Awards

If staff have high performance, then prizes or rewards should be considered to encourage them. This process should be quite clear to other employees understand that if they have such behavior, they will be rewarded. This will further motivate staff and lead the organization to achieve the desired objectives.

Employee Participation

For achieving the aim of staffs make their best efforts in the human resources in the organizations, the system should encourage them to further cooperation in the organization and help to solve organizational issues. Encouraging the employees for teamwork cause to have more organizational communication, increase the employee involvement, and then increase high efficiency.

Criticisms Against Gamification

Despite the positive aspects of this phenomenon, many concerns have been raised about the games. Some critics believe that this term has recently become fashionable among organizations and is only applied as a marketing tool. Some also believe that gamification beriefes important motivational factors play only in a few but ineffective approaches that is not enough to motivate people. Additionally, Gartner (2012) had predicted that by 2014, 80% of applications that take advantages of the games will fail due to poor design (20).

Another criticism that the researchers entered in the field of the gamification is related to the name of these term. These people believe that since the word of "game" has been used at the beginning of the term, then it implies this concept that overall of this activity will be a very interesting experience, while actually the scoring system is used in gaming phenomenon, which has lowest excitement in the game. These critics believe that it will be better to use "pointification" instead of it, that in fact it nothing more than adding scoring in the real system and platform rather than the game (21). Ian Bugust (2011) suggests "Exploitation ware" instead of it. The theme of the criticism is that other effective methods should be used to attract users rather than reward system (22).

Another important concern in this area is related to the motivation subject. Organizations that utilize this strategy, actually convert the intrinsic motivation of performing this activity to extrinsic motivation like getting a bonus (22). Of course, Zicherman and Cunningham (2011) have claimed that organizations using creative strategies can replace intrinsic motivation with extrinsic motivation and change the behavior their staff. Of course they confirmed that if rewarding was started in an organization, then it should always be continued. This can have positive impacts through the correct application of game designing elements with increased information on their users and ultimately focusing on the convert of internal motivation to extrinsic motivation (8).

The challenges of using gamification in the organizations

- Organizations face with following obstacles and challenges using the game strategies:
- cultural void- since organizational culture is considered as the biggest obstacle to success of gamification in organizations and is one of the main challenges of cultural change in organizations.
- Lack of success criteria- organizations do not know properly define what behavioral objectives and criteria should have to determine the success or failure of played gaes in the system.
- lack of motivation- since converting the boring activities to interesting activities is difficult, staff usually has not enough motivation.
- Lack of understanding the requirements of players- because of the differents of employees in terms of demographic characteristics (age, gender, etc.) and psychological (personality type, values, etc.) understanding the need for all of them is difficult.
- Lack of staff dealing with significant choices- interesting and motivating activities, and behavioral intentions are not enough.
- Lack of structure for modeling behavioral objectives

Lack of good tools for gamification and multi-channel support system (19).

Future of Gamification

Today, global and international organizations are trying to create a powerful social fields through the combination of different technologies, and steal lead generation from each other. By using gamification more and more by organizations, the expectations of customers will also be changed over time. Therefore development of strong gamification societies for organizations to have superiority from each other, in the areas of internal collaboration and innovation was also essential. It seems that frameworks and patterns of gamification for presenting and designing models to deliver innovative of gamification in touch with employees and customers play also important roles. Due to this, gamification has announced it self rapidly in the new technologies and soon they will be placed at the head of the most influential. As Gartner (2012) has estimated, gamification will have important impacts along with other emerging technologies and trends in the following areas (20):

- Innovation
- Designed to employee performance
- Globalization of Higher Education
- The emergence of collaborative systems customers
- Gamification of growth and personal development

DISCUSSION

Gamification has a positive impact on people's motivation in order to participate in relevant tasks and activities and the results of the studies have shown that deployment of elements of the game in repetitive and monotonous tasks leads to people be more involved in these matters addition to these fun tasks (12). Therefore observation that business and education planners have embraced this concept, it is not surprising. Gamification has the ability to work in any process, including sales, marketing, and human resources and in every industry including health, education, information technology and the like. This is because gamification is a key advantage and creates interests in learning and performing an iterative process by providing content that involves all aspects of animal behavior and psychology's contacts (8). In addition to the aforementioned advantages, other benefits have been proposed in this regard which will be discussed in the article.

CONCLUSION

Gamification is a relatively new strategy that organizations with educational innovation will have maximum benefit. Of course, if providing that the correct pattern designing is appropriate for the needs of the organization, then the new strategy will increase productivity and employee motivation and goals of the organization and will support earning the targets more. Accordingly when the organizational gamification is implemented well, so that the organization will be to more attractive and fun activities by transforming agent of the subject to the player. In this way, the interests of the organization are aligned with the incentives inherent in the players, the staff, both sides enjoy the benefits of it.

REFERENCES

- [1] McGonigal J. Be a gamer, save the world. *Wall Street Journal*. **2011**;22:01-11.
- [2] Deterding S. Gamification by Design: Response to Zichermann **2011**. Available from: <http://gamificationresearch.org/2011/09/gamification-by-design-response-to-zichermann/>.
- [3] Hamari J. Transforming homo economicus into homo ludens: A field experiment on gamification in a utilitarian peer-to-peer trading service. *Electronic Commerce Research and Applications*. **2013**;12(4):236-45.
- [4] Thiebes S, Lins S, Basten D. Gamifying Information Systems - A Synthesis of Gamification Mechanics and Dynamics. Twenty Second European Conference on Information Systems; Tel Aviv **2014**.
- [5] Burke B. Gamification 2020: What Is the Future of Gamification? Gartner Symposium/ITxpo November 5-8, 2012 Centre Convencions Internacional Barcelona, Barcelona, Spain **2012**.
- [6] Burke B. Gartner Says by 2014, 80 Percent of Current Gamified Applications Will Fail to Meet Business Objectives Primarily Due to Poor Design, Gartner. com (November 27, **2012**).
- [7] Gartner I. Gartner Says By 2015, More Than 50 Percent of Organizations That Manage Innovation Processes Will Gamify Those Processes Egham, UK: Gartner, Inc.; April 12, 2011 [cited 2015 **2015** July 05]. Available from: <http://www.gartner.com/newsroom/id/1629214>.
- [8] Zichermann G, Cunningham C. Gamification by design: Implementing game mechanics in web and mobile apps: " O'Reilly Media, Inc."; **2011**.

- [9] Huotari K, Hamari J, editors. Defining gamification: a service marketing perspective. Proceeding of the 16th International Academic MindTrek Conference; **2012**: ACM.
- [10] Mollick ER, Rothbard N. Mandatory fun: consent, gamification and the impact of games at work. The Wharton School research paper series. **2014**.
- [11] Werbach K, Hunter D. For the win: How game thinking can revolutionize your business: Wharton Digital Press; **2012**.
- [12] Flatla DR, Gutwin C, Nacke LE, Bateman S, Mandryk RL, editors. Calibration games: making calibration tasks enjoyable by adding motivating game elements. Proceedings of the 24th annual ACM symposium on User interface software and technology; **2011**: ACM.
- [13] Callan RC, Bauer KN, Landers RN. How to avoid the dark side of gamification: Ten business scenarios and their unintended consequences. Gamification in education and business: Springer; **2015**. p. 553-68.
- [14] Singh S. Gamification: A strategic tool for organizational effectiveness. *International Journal of Management*. **2012**;1(1):108-13.
- [15] Hamari J, Koivisto J. Why do people use gamification services? *International Journal of Information Management*. **2015**;35(4):419-31.
- [16] Marczewski A. Gamification: a simple introduction: Andrzej Marczewski; **2013**.
- [17] Shahin A, Mahbod MA. Prioritization of key performance indicators: An integration of analytical hierarchy process and goal setting. *International Journal of Productivity and Performance Management*. **2007**;56(3):226-40. [18] Parmenter D. Key performance indicators: developing, implementing, and using winning KPIs: John Wiley & Sons; **2015**.
- [19] Maan J. Social business transformation through gamification. arXiv preprint arXiv:13097063. **2013**.
- [20] Gartner I. Gartner says by 2014, 80 percent of current gamified applications will fail to meet business objectives primarily due to poor design (Press Release). **2012**.
- [21] Robertson M. Can't play, won't play. Hide & Seek: Inventing New Kinds of Play. Online verfügbar unter <http://hideandseek.net/2010/10/06/cant-play-wont-play/>, zuletzt aktualisiert am. **2010**;6:2010.
- [22] Nicholson S. Two paths to motivation through game design elements: reward-based gamification and meaningful gamification. **2013**.