Aliaa S. Z. Ali   Prof. Ismail M. Aldardery   Dr. Eman Z. M. Elshrief

Standards for Producing Learning Environment Based Gamification according to Goal Setting Theory.

Aliaa Sameh Zohny Ali[1]

Prof. Dr. Ismail M. Aldardery[2]   **Prof.Dr Eman Z. M. Elshrief**[3]

Abstract:

The new challenge in the educational process is that it is not a process of providing information to learners and measuring the extent to which learners retain this information. Rather, this challenge involves tasks to involve learners in the educational process, simulates their interests, stimulates their attention and maintains a positive direction towards the educational environment. Gamification is a new term inspired by games, especially the elements that are based on them, and is used for purposes other than entertainment without there being a game. Using gamification a system makes it look like a game but not a game and achieves a specific goal. This term can be distinguished from play, as it is a concept that has its own criteria and characteristics that offer a type of play that includes structure, goals, educational content and targeted play.

The aim of the present research is to identify the criteria for producing a learning environment based on gamification in light of the goal setting theory. The research used the descriptive approach to answer the research question "What are the criteria necessary to produce a learning environment based on gamification?", And the results of the research reached a set of educational and technological standards after their control by specialists, was monitored in a list of (9) standards, which included (51) Indicator, and accordingly the study recommends the use of these criteria when designing and producing learning environments based on numerical stimuli.

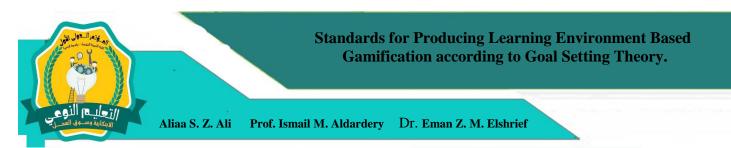**Keywords:** production standards - gamification - goal setting theory.

Introduction:

The term gamification has spread significantly in recent years, and this term has been employed in the education sector in various

---

[1] - PhD Researcher, Department of Curricula and Teaching Methods of Specific Specializations (Educational Technology), Faculty of Specific Education, Minia University.

[2] - Professor of Curricula &Instruction Faculty of Education Minia University

[3] - Assistant Professor of Educational Technology. Faculty of Specific Education Minia University

Aliaa S. Z. Ali   **Prof. Ismail M. Aldardery**   Dr. Eman Z. M. Elshrief
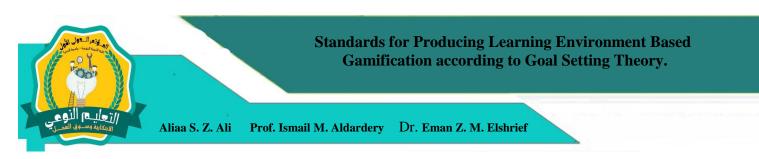
educational decisions and stages where the effective application of the elements of games in the educational context in order to enhance the educational content and increase the learner's motivation, and to achieve the desired educational goals, and achieving the goals is closely related to how to employ elements Game mechanics and dynamics.

Digital incentives are increasingly accepted in education as they aim to encourage learning, participation, development and the enjoyment of learning by attracting the attention of learners and motivating them to continue learning (Dayal et el, 2018), by interacting with the learning environment based on gamification and the available features and benefits that help To achieve the desired educational goals, and thus lead to improved learning processes and outputs (Kapp, 2012a).

The concept of gamification:

Gamification it all educational are based on incorporating the elements of games in education and not integrating games in education, the term Gamification is derived from the word game, which is the game, and the word Purification in the meaning of the game, it appeared first in the field of commercial marketing to promote brands, then moved to other fields including education, training and media And Health (Al-Qayed, 2015).The term digital catalysts refers to the application of game elements and their characteristics outside of the context of games to enhance engagement and problem solving and increase participation and motivation among learners in the classroom (Watson-Huggins, 2018, 21).Also known as the process of using a digital platform to integrate game-like elements in non-gaming contexts with the aim of positively impacting user motivation and improving user interaction in desired behaviors (Ruhi, 2015,5).It is also known as the process of identifying the elements that make up the games that make these games enjoyable while motivating the players to continue playing, and using those same elements in a context other than the game to influence the learner's behavior (Deterding et al, 2011, 12).From the above it is clear that the various definitions of gamification are unanimous as the use, employment and application of the elements of games in a context away from games, and thus achieve fun and excitement in education such as games, and are used in the educational context in order to motivate learners to interact, increase the integration of learners and increase participation and interaction and motivation and improve Behavior of learners.

المؤتمر الدولي الأول ـ التعليم النوعي .. الابتكارية وسوق العمل، كلية التربية النوعية. جامعة المنيا
مجلة البحوث في مجالات التربية النوعية، ع١٧، ج ١ يوليو ٢٠١٨
(عدد خاص: العلوم النفسية والتربوية) ISSN-1687-3424/2001

196

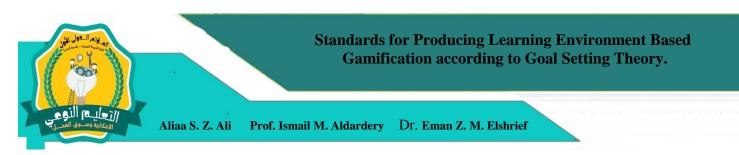Aliaa S. Z. Ali   Prof. Ismail M. Aldardery   Dr. Eman Z. M. Elshrief

The Basic principles of Gamification

Digital catalysts focus on extracting the fundamental principles of games while restructuring educational experiences (World Government Summit, Oxford Analytical, 2016, 4). Based on these principles, the process of using digital incentives in education is organized through six basic principles (Marache-Francisco, 2013, 127):

- **Freedom of choice:** Giving the user the freedom to exercise according to his will, for example allowing him to disable some jobs, or exit the system based on digital incentives.
- **Benefits and significance:** The effect of digital catalysts must be relevant to both founders of the catalyst-based system who expect positive results, and to the users themselves, otherwise unimportant elements will have a negative impact on users, or will be ignored by them.
- **Diagnosing experience:** through user files and analysis leads to the design of defining multiple designs according to the characteristics of users, and through this, they add valuable digital incentives to experiences.
- **Long-term interaction:** The design is to take into account the evolution of the level of the reaction, especially with regard to the catalytic elements.
- **Anticipating unwanted secondary effects:** These unwanted effects may include pressure from efficiency requirements, a loss of a sense of privacy and credibility, exercise system rules, or focus on quantity on quality to obtain some rewards.
- **Legal and ethical issues:** They take into account the legal context, for example data and privacy.

Gamification Elements:

Elements of Gamification can be divided into categories, each of which has its advantages and disadvantages in the educational process. These categories illustrate how the elements of the game can lead to greater interaction through its internal design and how it enhances student engagement, thus creating an environment of intense focus that stimulates learning and retention of information (World Government Summit, Oxford Analytica, 2016, 4) According to the World Government Summit report in cooperation with the Oxford Data Analysis Foundation, these elements are grouped into three categories: mechanisms, emotion, and

Aliaa S. Z. Ali   Prof. Ismail M. Aldardery   Dr. Eman Z. M. Elshrief

personal elements. While design elements of Gamification are generally divided into three categories: mechanical, dynamic, components, and every mechanic that includes one or more dynamics, and each component involves under one or more higher-level elements, and the different literature has combined that there are basic elements that represent the most important elements of common games Which is effectively employed in the application of Gamification in education are explained in the following points:

Points:

The points are one of the elements of the game mechanics that give an indication of progress and represent an immediate reward that the player gets as a result of performing a specific task (Kapp, 2012 b, 54), and the learner may lose some points for not succeeding in it as a specific task, and give a quantitative indication of the learner's performance (Iosup, A., & Epema, 2014, 29), a tool that advertisers use to estimate student grades and is a key component of the gaming reward system, and can be used as a reward to foster a behavior that is traditionally difficult to foster (Campbell, 2016, 67).

Badges:

Learners are awarded honors upon completion of a number of activities or to achieve a certain level of knowledge and competence, and are used to display learners' achievements, and learners can share their medals on the social learning platform (Kiryakova et el, 2014,4), and provides a visual presentation of the reward better than the points, and appear In the learner profile (Kapp, 2012 b, 52).
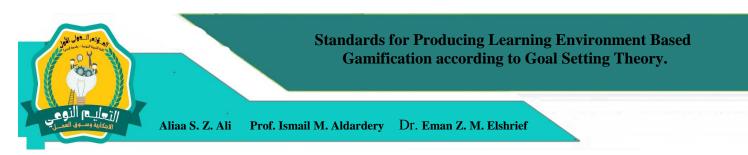
Leaderboard:

A list that is used routinely to compare learners 'achievements. It is a mechanism for recording and displaying high learners' rankings. It can be used in the classroom to indicate the best performance and encourage students to excel. Leaderboards can be assigned to specific users to allow them to assess the achievement of specific goals in the game, as there are specific goals that motivate users to stay focused and involved (Nah, 2013,103).

Levels:

The levels represent boundary points for the beginning or end of a

Aliaa S. Z. Ali   Prof. Ismail M. Aldardery   Dr. Eman Z. M. Elshrief

part of the game so that the user can climb between them automatically based on his participation and use (Bunchball, 2010,6), where the levels are linked to the time management system and the basic plan of the decision and it must be logical in design, so that it is easy for learners to understand (Strmečki, 2015,1115).

Challenges:

The level of performance and progress of the players towards the set goals (Kiryakova & Others, 2014, 1), and the challenge is a strong incentive in learning and is to invite participants to engage in a difficult but verifiable task, and the challenge is associated with both self-motivation and motivation related to enhancing student competence and effectiveness, The challenge must be used to start learning a task to support the involvement, participation and encouragement of learners who want to start learning the content, and is sometimes used to persuade hesitant learners to start learning the content and this requires careful balance if the learner feels the difficulty of learning the content, other methods can be used to engage the learner Such as story or employing other practices (Kapp, 2014).

Rewarded Awards:

A means to stimulate participation in activities or learn skills (Nicholson, 2013, 671), which are rewards that the learner gets as a result of performing a task, activity or challenge which increases his motivation to accomplish and enhance his learning.
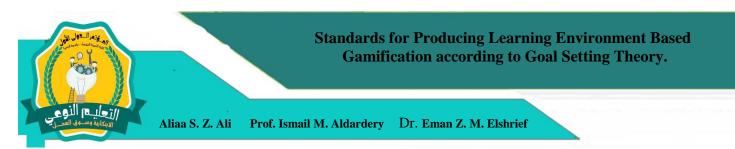
Feed Back:

The process of providing immediate feedback or a late picture is one of the most important elements of the games as a therapeutic measure and support for the user and is essentially part of the experience provided, and an indication to the user about his performance at the previous level and the support and information he needs and what he must return to complete the learning (Jackson, 2017, 6)

Goal setting theory:

Goal setting theory refers to purposefully directed work and is concerned with motivation, as it focuses on people performing better work tasks, so if people are equal in ability and knowledge, direct motivation is required to achieve better performance (Locke & Latham,

الموتمر الدولي الأول ـ التعليم النوعي .. الابتكارية وسوق العمل، كلية التربية النوعية. جامعة المنيا
مجلة البحوث في مجالات التربية النوعية، ع۱۷، ج ۱ يوليو ۲۰۱۸
(عدد خاص: العلوم النفسية والتربوية) ISSN-1687-3424/2001

199

Aliaa S. Z. Ali   Prof. Ismail M. Aldardery   Dr. Eman Z. M. Elshrief

1990, 213). The goal setting theory has been used for more than two decades to explain how to motivate individuals to better perform task-related tasks by setting goals and pursuing their achievement, and more recently it has received digital incentives as a promising input to enhance and motivate participation in activities and performance in contexts. Goal setting theory indicates that difficult goals lead to higher performance compared to no simple goals or targets, so the theory assumes that optimal performance is achieved when the achievement goals are clear and require an effort to achieve them (Tondello et el, 2018, 1).

Goal setting is one of the elements of digital incentives, as many studies dealt with the use of goal setting to explain one of the elements of digital incentives instead of the principles of digital incentives, so the elements of decorations and leaderboards were more used, then the rules, objectives and progress bars (Tondello et el, 2018, 3), including a study (Landers, 2017), (Grund, 2015), (Karimi & Nickpayam, 2017).

The principles of goal setting theory are related to the principles of designing gamification, where clear, specific goals lead to focusing the learner's attention towards achieving them, and in difficult goals, challenges are adapted according to the level of the learner's skills, which results in a better performance, provided that the degree of difficulty does not exceed the learner's capabilities, while balancing the challenges (Tondello et el, 2018,).
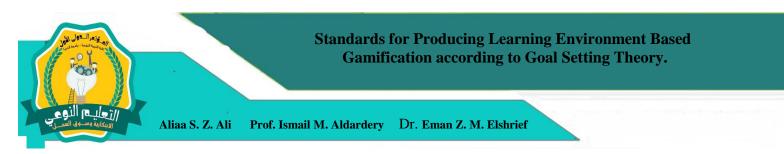
Defining the problem:

With the increasing interest in using gamification strategy in the different educational stages and the association of this strategy with many learning theories, and with the proliferation of foreign learning environments based on gamification, it was necessary to adopt criteria for designing learning environments based on numerical stimuli in Arab environments, hence the problem of research appeared in The absence of a list of criteria that can be adopted in design in digital stimulus-based learning environments, and the research raises the following question: "What are the criteria for producing a learning environment based on gamification " as an attempt to solve the problem?

Research Aims:

The aim of the current research is to prepare a list of criteria for producing a learning environment based on digital incentives in light of the goal setting theory

Aliaa S. Z. Ali   **Prof. Ismail M. Aldardery**   Dr. Eman Z. M. Elshrief

Research importance:

The current research deals with a new teaching strategy in the field of education that enjoys great interest in the field of educational technology, and the research derives its importance through arriving at a list of criteria to produce a learning environment based on digital incentives in the light of the theory of goal setting.
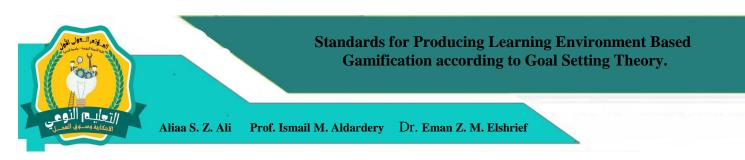
Research Methodology:

The current research relied on the descriptive approach, which in turn provides a description and interpretation of what is in place to identify the reality of gamification and come up with a list of criteria for producing a learning environment based on gamification in light of the theory of goal setting through a survey of the literature and research associated with gamification.

Research procedures

1. Identify the reality of the use of gamification in learning environments by looking at studies and literature related to learning environments based on gamification

2. Preparing a list of criteria for producing learning environments based on digital incentives by following these steps:
   - Determine the general goal of building a list of criteria; The overall goal is to reach a list of a set of educational and technological standards for the production of learning environments based on gamification, for use in building learning environments for different educational stages.
   - Define the sources for deriving the list of criteria: Several sources were referred to as a basis for preparing a list of criteria for learning environments based on gamification, including studies and literature related to numerical stimuli and their principles, and studies related to the goal-setting theory and principles.

3. Review the educational sites that dealt with the principles of digital incentives.

4. Analysis of some foreign digital learning platforms and applications based on gamification such as (Class Dojo- Class Craft- Khan Academy- coursera).

5. Refer to the criteria for designing e-learning environments due to

المؤتمر الدولي الأول ـ التعليم النوعي .. الابتكارية وسوق العمل، كلية التربية النوعية، جامعة المنيا
مجلة البحوث في مجالات التربية النوعية، ع١٧، ج ١ يوليو ٢٠١٨
(عدد خاص: العلوم النفسية والتربوية) ISSN-1687-3424/2001

201

Aliaa S. Z. Ali   **Prof. Ismail M. Aldardery**   Dr. Eman Z. M. Elshrief

the fact that digital incentives are one of the e-learning strategies and are used in e-learning environments (Desouky et al., 2012), (Hassan et al., 2011), (Aqel, 2014).

6. Recommendations of previous studies on the importance of using gamification in education and developing programs based on them, including (Al-Hafnawi, 2017), (Abu Seif, 2017).

7. Prepare the initial image for the list of criteria: The list of criteria for producing learning environments based on digital incentives was derived as axes and indicators that represent the elements that must be available in the learning environment based on digital incentives, and through which the validity of the learning environment is used.

8. Present the list of criteria to experts and specialists: The list was presented to experts and specialists to judge it in addition to, deleting and amending to reach the list in its final form.

Search results:

The research finds the following results: The list of production of learning environments based on digital catalysts has been reached as follows:

The first Standard	Define educational goals for learning environment based on gamification
Rubrics	1. Define overall goals accurately
	2. Determine the procedural goals at the beginning of each level
	3. Diversity of target areas
	4. Goal sequencing logically
	5. Clarity of objectives
	6. Goals relate to learning outcomes
The second Standard	**Learning content and presentation within the learning environment**
Rubrics	7. Scientific accuracy of scientific content
	8. Formulate content according to objectives
	9. Clarity of the content
	10. The sequence of content levels is logical
	11. Flexibility to modify and update content by the teacher
The third Standard	**Educational activities in a learning environment based on gamification**
Rubrics	12. Activities relate to content goals
	13. Simplicity of design activities
	14. Design activities that develop learning engagement skills
	15. Provide a map of available and unavailable tasks and

Aliaa S. Z. Ali   **Prof. Ismail M. Aldardery**   Dr. Eman Z. M. Elshrief

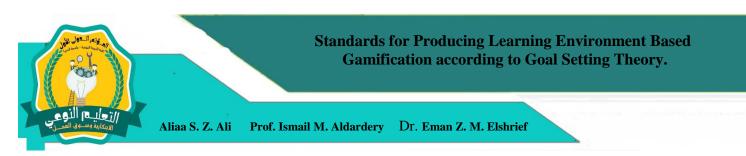| The first Standard	Define educational goals for learning environment based on gamification
	challenges
The fourth	**Assessment properties a learning environment based on**
Rubrics	16. Comprehensiveness of the assessment for the content of learning levels
	17. Variety of assessment methods
	18. assessment linking to learning goals
	19. Each question measures one goal
	20. Applicability of the assessment
Fifth Standard	**Feed Back in a learning environment based on gamification**
Rubrics	21. Provide appropriate feedback.
	22. Provide feedback upon successful completion of tasks and levels.
	23. Diversity of feedback forms (promotion - points - badges - communication).
	24. Ease of communication between the teacher and the learner
	25. Provide feedback on learning outcomes.
Sixth Standard	**Game design elements in a learning environment based on gamification**
Rubrics	26. The presence of a progress bar in each level of the learning content in a clear and stable place.
	27. The ability of the learner to see the level of progress of his peers (if privacy permits).
	28. The learner gets to know the points he needs to move to the next level.
	29. Clarity of achievements and decorations for learners.
	30. Learner arrival notices of celebration of achievement.
	31. Certificates of achievement are visually appealing.
	32. The learner's ability to spread achievement outside the game.
	33. The clarity of the leaderboards for learners in a fixed place at all levels of learning.
	34. Clarity of the learners in the leaderboards.
The seventh Standard	**Multimedia with a learning environment based on gamification**
Rubrics	35. Multimedia diversity with a digital stimulus-based learning environment.
	36. Multimedia correlation with learning objectives.
	37. The simplicity of photos and drawings.
	38. Suitable time for video clips.
	39. Clarity of texts and free of language errors.
Eighth Standard	**learning environment based on gamification working system**

Aliaa S. Z. Ali   Prof. Ismail M. Aldardery   Dr. Eman Z. M. Elshrief

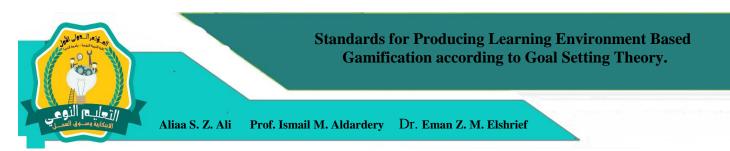| The first Standard	Define educational goals for learning environment based on gamification
Rubrics	40. Clarity of the rules and working system within the learning environment.
	41. Clarity of learning strategy based on gamification.
	42. Consider privacy of learner failure records.
	43. The possibility of repeating activities and tasks.
	44. Provide additional time for the learner to perform the tasks.
The Ninth Standard	**Interface in a learning environment based on gamification**
Rubrics	45. The simplicity of the interface interface.
	46. Balance between interface elements.
	47. Provide tools for interaction between the teacher and the learner.
	48. Allow learners to edit their personal profile.
	49. The links are working properly.
	50. Easily access any part of the learning environment.
	51. The links appear with clear text when standing on them.

References:

Bunchball, I. (2010). Gamification 101: An introduction to the use of game dynamics to influence behavior. *White paper*, 9

Campbell, A. A. (2016). *Gamification in higher education: Not a trivial pursuit* (Doctoral dissertation, St. Thomas University).

Dayal, Deen & Kaushal, Upadhyay & Ddukk, Kendra & Joy, Manu. (2018). Gamification: Impact on learning and development with special reference to Deloitte Leadership Academy.

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011, September). From game design elements to gamefulness: defining gamification. In *Proceedings of the 15th international academic MindTrek conference: Envisioning future media environments* (. 9-15). ACM. Retrieved 1 December 2017.

Grund, *C. K. (2015). How games and game elements facilitate learning and motivation: A literature review. INFORMATIK 2015.*

Jackson, M., Gamification Elements to Use for Learning. (2017).Retrevied from:
https://trainingindustry.com

Kapp, K. M. (2012 a). The gamification of learning and instruction: game-based methods and strategies for training and education. John Wiley & Sons

Standards for Producing Learning Environment Based Gamification according to Goal Setting Theory.

Aliaa S. Z. Ali   Prof. Ismail M. Aldardery   Dr. Eman Z. M. Elshrief

Kapp, K. M. (2012 b). The Gamification of Learning and Instruction. San Francisco, CA: Pfeiffer.

Kapp, K. (2014). *Use of Challenge in Gamification and Learning Design « Karl Kapp*. *Karlkapp.com*. Retrieved 23 December 2017, from http://karlkapp.com/use-of-challenge-in-gamification-and-learning-design/

Karimi, *K., & Nickpayam, J. (2017). Gamification from the viewpoint of motivational theory. Emerging Science Journal, 1(1), 34-42.*

Kiryakova, G., Angelova, N., & Yordanova, L. (2014). Gamification in education. Proceedings of 9th International Balkan Education and Science Conference.

Landers, R. N., Bauer, K. N., & Callan, R. C. (2017). Gamification of task performance with leaderboards: A goal setting experiment. Computers in Human Behavior, 71, 508-515.

Locke, E. A., & Latham, G. P. (1990). *A theory of goal setting & task performance*. Prentice-Hall, Inc.

Iosup, A., & Epema, D. (2014, March). An experience report on using gamification in technical higher education. In Proceedings of the 45th ACM technical symposium on Computer science education (pp. 27-32). ACM.

Aqel, M.S. (2014). Design criteria for learning elements in e-learning repositories. Palestine University Journal for Research and Studies - No. (6).

Abu Seif, M.S. (2017). A suggested model for the use of gamification marketing the services of Egyptian universities. Journal of Educational Sciences - Cairo University. Available at: https://doi.org/http://fgse.cu.edu.eg/Default.aspx

El-Hefnawy, M.M. (2017). The effect of using electronic activities based on the principle of gamification in light of the criteria for developing mathematical concepts for students with learning difficulties. Journal of Educational Sciences. G (4). C (3), pp. 29-73.

Marache-Francisco, C., & Brangier, E. (2013). Process of gamification. *Proceedings of the 6th Centric*, 126-131.

Hassan, M.H. (2011). Design and construction standards for a three-dimensional virtual learning environment within the current virtual worlds. Journal of Education Technology - Studies and Research.

El-Desouky, M.I., Mahmoud, M.E., Kassem, A.H. (2012). Quality standards for participatory e-learning environments. Arab Association for Education Technology, pp. 255-269.

Al-Qayed, M. (2015). What is gamification? What do we mean by

المؤتمر الدولي الأول ـ التعليم النوعي .. الابتكارية وسوق العمل، كلية التربية النوعية ـ جامعة المنيا
مجلة البحوث في مجالات التربية النوعية، ع١٧، ج ١ يوليو ٢٠١٨
(عدد خاص: العلوم النفسية والتربوية) ISSN-1687-3424/2001

205

Standards for Producing Learning Environment Based Gamification according to Goal Setting Theory.

Aliaa S. Z. Ali   Prof. Ismail M. Aldardery   Dr. Eman Z. M. Elshrief

gamification in education? New Education Blog. Available at: http://www.new-educ.com/gamification-education

Nah, F. F. H., Telaprolu, V. R., Rallapalli, S., & Venkata, P. R. (2013, July). Gamification of education using computer games. In *International Conference on Human Interface and the Management of Information* (pp. 99-107). Springer, Berlin, Heidelberg.

Nicholson, S. (2013). Two paths to motivation through game design elements: Reward-based gamification and meaningful gamification. IConference 2013 Proceedings (pp. 671-672). *Doi*, *10*, 13313.

Ruhi, U. (2015). Level up your strategy: Towards a descriptive framework for meaningful enterprise gamification.

Strmečki, D., Bernik, A., & Radošević, D. (2015). Gamification in e-learning: introducing gamified design elements into e-learning systems. *Journal of Computer Science*, *11*(12), 1108-1117.

Tondello, F, G., Premsukh, H., & Nacke, L. (2018, January). A theory of gamification principles through goal-setting theory. Hawaii International Conference on System Sciences.

Watson-Huggins, J. (2018). An Experimental Study on the Effects of a Gamified Software Intervention inMathematics Achievement among Sixth Grade Students (Doctoral dissertation, Nova Southeastern University).

World *Government Summit, Oxford Analytica. (2016). gamification and the future of education*. www.oxan.com