TRIANGULATION OF SUCCESSFUL SOURCES IN TEACHING: LEARNING STYLES, GAMIFICATION AND SELF-REGULATED LEARNING

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Abstract:

The following work contains a reflection, based on a wide bibliographical study, which attempts to shed light on the importance of using Learning Styles, Gamification and self-regulation in educational contexts. All students have the power and ability to become *smart learners* if they learn and use self-regulation and gamification techniques in the classroom along with a methodology that considers learning styles. The motivation of the student during the learning process has always been a fundamental objective to be achieved by the teaching body. Games can teach us many aspects, techniques and ways of improving the teaching methodologies applicable in the classroom on a daily basis. These techniques may be used as primary student service at the primary and secondary

education level in both university and informal teaching contexts.

Keywords: Gamification, self-regulation, construct, learning style and potential.

LA TRIANGULACIÓN DE LAS FUENTES DE ÉXITO EN LA ENSEÑANZA: LOS ESTILOS DE APRENDIZAJE, EL JUEGO DE LA GAMIFICACIÓN Y EL APRENDIZAJE AUTORREGULADO

Resumen:

En el siguiente trabajo, se encuentra una reflexión basada en un amplio estudio bibliográfico que trata de arrojar luz sobre la importancia del uso de los Estilos de Aprendizaje, la Gamificación y el aprendizaje autorregulado en los contextos educativos. Todos los estudiantes tienen el poder y la habilidad de llegar a ser *smart learners* si aprenden y emplean técnicas de autorregulación y de gamificación en el aula junto con una metodología que se tenga en cuenta los estilos de aprendizaje. La motivación del alumno durante el proceso de aprendizaje siempre ha sido un objetivo fundamental a conseguir por parte de los docentes. Los juegos pueden enseñarnos muchos aspectos, técnicas y formas para mejorar las metodologías docentes que a diario aplicamos en el aula. Estas técnicas se pueden usar como atención temprana tanto en primaria, instituto como en contextos universitarios o no formales de la enseñanza.

Palabras clave: Gamificación, autorregulación, constructo, estilo de aprendizaje y potencial.

Introduction

Education is undergoing major changes. With the onset of new technologies in the classrooms, an infinite number of options are now available to teachers

Changes in knowledge have led to innumerable research on how to make learning more efficient. Gamification provides students with the instrument required for achieving their goals by playing using self-regulation techniques. Each student must develop the role of Mario Brothers (one of the world´s most famous video games) by accomplishing goals and obtaining rewards throughout the span of the game and upon exceeding the education levels in the most efficient manner possible by optimising time and fulfilling all the operational competences. Changes triggered by new preferences and societal movements: the current business world requires professionals with capabilities that differ from those needed in the industrial revolution society. At present, companies require people capable of working in groups, with exceptional creativity abilities, etc.

In the same way, it is possible to reference Vázquez Rodríguez who sees today's society as: "The XXI century is changing largely on account of early adopters and to the amazing advances in technology. On the basis of modern research, we must learn how the process occurs, who it needs to be provided to and how to improve it. It is the education that prepares us for life in general. In this sense, studies on learning styles and the use of ICT as mediators in the learning process are a sustainable platform for renovated tasks that must be assumed by the teaching community.

The learning profile identifies personal preferences in terms of organizing an activity, planning strategies to resolve everyday problems and transferring knowledge to other similar situations. Digital environments, particularly those that capture the motivation of new generations, are promising as teaching aids because of their ability to concentrate on and combine the strengths and advantages of various means and then explore the options available by these resources, adapted

to various alternatives, rhythms and demands of the students that are convinced that is the way to overcome learning problems by providing timely teaching aid. "

As Matamoros (2013) says, Social Sciences have defined the process of learning as the systematic transformations with a scientific and dynamic type that lead to gradual changes "… all processes can understand this improvement, transformation and shift" (Colectivo de autores, 1994). The teaching process passes in a dialectical relation and awareness between the teacher and the student aimed at stimulating and controlling learning and to making the learner an active player and conscious of the process. In other words, this process is like the systematic mode to scholar and social education where the student instructors, qualifies and learns. Learning styles help develop the full potential of students through quality education. This combined with gamification techniques and self-regulated learning strategies create a perfect formula for education.

The concept of style in pedagogical language is generally used to indicate a series of distinct behaviours that fall under a single label.

Styles can be seen as conclusions that we reach regarding how individuals act. This is particularly useful for classifying and analyzing behaviours. Nonetheless, the danger arises in that they are used as simple labels.

In the 1960s, Gregorc (1979) and other authors studied the characteristic behaviours of brilliant students, in and outside of the classroom environment, and detected very contradictory aspects. Some took a lot of notes, while others did not jot down a single line. Some studied every night and others studied only before exams. This was repeated in other areas and activities.

Hunt (1979) describes learning styles as:

> "...those educational conditions under which he is most likely to learn. Learning style describes how a student learns, not what he has learned"

Educators have always attempted to define education as a response to the needs

of the individual.

This recognition of the differentiating, individual characteristics of students clashes with the unidirectional focus of certain books and courses on studying techniques, which merely propose single way of studying which is applicable to all students. A reflexive adaptation of theories on Learning Styles forces many of the focuses on studying techniques to be readapted and diversified (Alonso and Gallego (2000)). In line with this same viewpoint, one recalls García, Tamez and Lozano, who, in relation to Learning Styles, state: "learning styles are linked to the attitudes of human beings, to their gifts, talents, resources, personal tools that are there for interacting with reality effectively on their own merits. In the field of education, the term advocated was styles learning, since it was considered sufficiently broad and its confines sufficiently flexible to encompass cognitive styles. This debate was ended and, since the definition chosen by Alonso, Gallego and Honey (2006) has deep cognitive roots, both expressions are treated as equivalent terms. Clearly, you cannot talk about good learning styles or those that are bad, rigid or unique to an individual. This will depend on the purpose and depth required by the task performed during cognitive activity developed."

Students have to develop the learn-to-learn competence. Next, there is a simple list of aspects that explain what it means to learn to learn in practical terms. We can state that a person has learned to learn if he/she knows:

- How to control his/her own learning
- How to develop a personal learning plan
- How to detect his/her strong and weak points as a learner.
- How to describe his/her Learning Style.
- Under which conditions he/she learn better
- How to learn from experience on a daily basis.
- How to learn from the radio, TV, news, computers.
- How to participate in discussion and problem resolution groups

- How to take full advantage of a conference or course.
- How to learn from a tutor.
- How to use intuition in learning.

All students have the power and capability of becoming *smart learners* if they learn and use self-regulation and gamification techniques in the classroom (Garcia, 2014).

Self-regulated learning is non-stop inquisitiveness, that power and motivation that needs to be instilled in students so that they always search for the best possible strategy in relation to studying in order to achieve the greatest efficacy in their studies and be effective and efficient student (Roces and González, 1998).

As we all know, nature is full of examples where it is easily observable how a game is a fundamental way of learning for the rearing of all higher-order mammals. As such, in the natural habitat, there are no formal learning processes, but, mammals are not born with all their abilities fully developed. The offspring play they are fighting, play they are hunting, play how to mark their territory and how to establish their social position.

This game activity, which emulates a real action, is used as a training ground, somewhat of a practice session so that in sometime in the future, it will become a set of physical and social abilities. Furthermore, this is an activity that they perform in a secure manner, in a protected environment, oftentimes under the surveillance of adult specimens. If this is the natural, learning mechanism validated by the evolution, couldn't we argue that a game is the natural way of learning and that structuring learning is a distortion?

In contrast, Santaolalla, Gallego and Urosa (2015) say: “nevertheless, in literature regarding teacher’s feeling and family’s perception, the concept of limiting curricular material almost exclusively to text book is overly abused. So much so, that in Spain, according to the evaluation indicators of the state system (Instituto de

Evaluación del Ministerio de Educación, 2009), 99.1% students from Primary Education use text books, more than 85% of study time is dedicated using them and they are used such resource planner by teachers (Picón, 2008)". In contrast, students currently spend their leisure time playing video games, accessing social networks and various forms of ICT. Accordingly, an ever-increasing technological gap has widened in relation to the communication between teacher and students, and learners are not being motivated by any methodology. Once again, it is evident that nowadays, there are XX-century teacher using XIX-century methodology to teach XXI-century learners, which poses one of our current society's most important challenges. Furthermore, it is important to remember that textbook do not generally increase significantly the process in students in terms of self-regulation or creativity.

1. Development

For Zimmerman (1986, 1989; Schunk y Zimmerman, 1994), the self-regulated construct can be defined as the process in which the students activate and maintain cognitions, behaviours and affections, all of which are oriented towards the achievement of their goals, or as the process through which goal-driven activities are instigated and maintained, all of which are produced cyclically (Zimmerman, 2000).

Accordingly, to develop the maximum potential of students, it is very important that they use self-regulation techniques along with gamification activities, all in perfect harmony and duly organized.

Gamification is using game-based mechanics, aesthetics, and game thinking to engage people, motivate action, promote learning, and resolve problems, Karl. M. Kapp (2012).

Gamification is the concept of applying game mechanics and game design techniques to engage and motivate people to achieve their goals. This term was

coined by Nick Pelling in 2002 (Marczewski, 2013), as the application of game metaphors for real-life tasks that influence in behaviour and improve motivation and the engagement of those involved within the same.

Gabe Zichermann and Christopher Cunningham (2011) in their work *Gamification by Design*, define gamification as "the process of game-thinking and game mechanics to engage users and solve problems".

Hamari and Koivisto published the study *Social Motivations to Use Gamification: An Empirical Study of Gamifying Exercise* in which they established the differences between gamification and games/video games.

1. The main objective of gamification is to influence the engagement of people, regardless of other secondary objectives such as the enjoyment on part of these people during the execution of game activity.

2. Gamification produces and creates experiences; it creates senses of dominance and self-sufficiency in people, thus leading to a considerable change in their behaviour. Video games only create hedonistic experiences in the form of audiovisual media.

The difference between gamification and the use of educational games in the classrooms is that the former provides a more attractive game setting that motivates the players while the latter does not (Kapp, 2012)

It is important to remember that, according to the Spanish Videogames Association, 62% of today's youth are regular videogame users. As such, it has been demonstrated that videogames is the language of more than the half of the youth in Spain. As a result, education needs to employ this tool as an ally in the teaching-learning process: young students are predisposed to playing videogames vs. reading a traditional text book. As is the case with other ICT tools, the new generations are more attracted to interactive tools. Today's teachers cannot disregard this aspect and according to Morrison (2003) regarding the Prensky

approach: "Marc Prensky (2002) coined the phrase “Digital Natives” to describe the current breed of young students, who are accustomed to hypertext, phones in their pockets, a library on their laptops, and instant messaging. They have little patience for in-class lectures or modes of instruction that require them to regurgitate information through pencil-and-paper tests. Their cultural background is also reflected in their speech: For example, one kindergartener expressed his feelings at lunchtime by saying “www.hungry.com,” while a high school student reportedly said, “Every time I go to school I have to power down.”"

The game setting mentioned by Kapp is based on two key, fundamental concepts in gamification, which are the mechanics and dynamics of games.

The first ones are the rules and rewards that make the games challenging, fun, and satisfactory or that provoke any emotion the gamification system seeks to generate in the participants. These emotions are the result of satisfying desires and motivations (game dynamics). The game mechanics from the practical viewpoint are the missions or goals, challenges, prizes and points. When applied in the classroom, all these mechanics help to modify the behaviour of the students in the classroom, depending on the various intended situations.

Game dynamics are the global aspects to which the gamification system must be oriented. It is related with the effects, motivations and desires that are intended to be generated in the participants. To carry them out, they are performed, selected and various game mechanics are used. In the educational environment, it is fundamental to design various educational dynamics duly adapted to the educational centre and, in particular, customized to the student. There are many curricular materials that do not meet the needs of the student and do not consider their next development zone.

We already know that the game motivates and truly functions, but what is truly new is the creation of a working methodology with the students that procedurally and structurally use the tools provided by gamification and the self-regulatory strategies

to enrich and improve the learning process. Furthermore, this major leap would occur when this system is retrofitted into the specific courses and curriculum in place in the Spanish educational framework.

Teachers and institutions alike have a long and rough road ahead of them in this sense. Nonetheless, the road is full of challenges, objectives and satisfactions, which for many, is so uphill, that they choose not to proceed and discover what is in store for them at the end of that unknown road.

Lee, Ceyhan, Jordan-Cooley and Sung (2013) state that gamification when used properly along with self-regulation techniques is a most powerful tool to actively grasp the interest of students in the learning process, not only as mere recipients of knowledge because via game mechanics and dynamics, the traditional learning-teaching activities can take on a new dimension, which is the product of new experiences and habits.

Some students have considerable limitations when it comes to resolving certain tasks or exercises. In general, those limitations are not related to cognitive deficiencies but rather to deficiencies related to planning, revising the task or not selecting the appropriate strategy to be used. As such, despite possessing adequate cognitive resources, student learning is sometimes not developed in the optimum and significant manner.

It is important to remember that videogames require problem solving of various sorts. This activity produces a major increase in the creativity capability in individuals. This activity has a positive influence on students and not merely in terms of videogames: the mental process improves in any activity performed by the person. As has already been mentioned, videogames coach the brain for new challenges and creativity is but one of the developed process.

For Derry and Murphy (1986), learning strategies are a set of procedures or mental processes used by an individual in a particular learning situation in order to

improve knowledge acquisition. For Weinstein and Mayer (1986), learning strategies are any activity used by the student during his/her learning process with the aim of optimizing it.

There are a series of essential connotations of the learning strategy concept that are cited hierarchically (Garner, 1988): determination of a goal, control over the cognitive activity on the part of the student and coordination of the various phases.

There are various types of learning strategies, depending on the concept and definition of the various authors. For Jones (1986), for example, there are three types of strategies: Coding strategies (naming, repeating, creating, key ideas of a paragraph), generative (paraphrasing and creating material in the form of metaphors and interferences) and constructive (reasoning, transformation and synthesis).

One of the most complete classifications is the one proposed by Beltrán (1995). This author differentiates, on the one hand, cognitive strategies and, on the other hand, metacognitive strategies. Within cognitive strategies, the ones corresponding to the following processes are included:

1. Awareness (emotional control, training, search for success, etc.)
2. Attention (global, selective and sustained)
3. Acquisition (selection, repetition, organization and creation)
4. Customization (self-regulation, critical thinking and creativity)
5. Retrieval (guided search, random search)
6. Transfer (high level, low level);
7. Evaluation (initial, final, guideline, etc.).

Cognitive strategies are those used by students in order to remember and to gain access to information in order to improve their learning capabilities (McCombs, 1988; Pintrich et al., 1991). According to Pintrich and DeGroot (1990), cognitive strategies constitute one of the self-regulated learning components.

The strategies utilized by the student have an influence over how the information is processed and the kind of learning that takes place. Different types of cognitive strategies have been highlighted in literature. According to Weinstein y Mayer (1986), there are four cognitive strategies: repetition strategy, selection strategy, organization strategy and creation strategy.

“Time management, study environment or assistance from professors and colleagues are self-regulation strategies used by students to improve adaptation to the context and allow them to be modified in order to adapt it to their particular objectives and needs” (Rodríguez et al., 2002, p.117).

a. Regarding time management:

   “In time management, three essential processes must be considered: goal setting, activity scheduling and programming” (p.147).

   Accordingly, proper time management is closely linked to realistic setting of the goals associated with the process. One of the first obstacles encountered by a student is a lack of awareness regarding how to use and distribute academic work time. For efficient time management, students must set specific, realistic study goals, attribute the results to the use of strategies and feel efficient in order to carry out a task in the allocated timeframe. One possible action plan is creating a daily activity log to improve subsequent analysis of the same since this will improve the reflection on how time is used and on what it is invested in. A second obstacle is lack of knowledge the students demonstrate to have with regards to the time required for completing the designated activities. As such, they suggest the students be provided with the amount of time it may take to reach the goals and the milestones they should encounter with the development of the activity or that the students themselves analyze through forms or annotations when they begin and when they finish the task.

b. In relation to seeking assistance

Requesting help is a strategy that is understood as required in the learning process of the student, since it is virtually impossible to not stumble across obstacles in the course of the academic track. Nonetheless, the search for help may have negative connotations, such as the lack of competence to perform a certain task. This may explain why so many students opt to refrain from seeking out help in order to avoid being tagged as being incapable or dependent. For that reason, some students, regardless of being aware that they need help, do not request it. It is erroneous to consider that the self-regulated student is one who is the most self-sufficient and require no help from anyone. In fact, students that reach success constantly request help from their colleagues and professors. The primary reason is that these students ensure their self-sufficiency in the future because the main reason they request help is not in order to get things done immediately, but rather in order to overcome obstacles and thus gain access to learning and command of the same, which, in turn, will allow them to perform the tasks alone and efficiently in the long term. Successful students deem it more effective to request help from those that are truly competent in that area and this can help them advance in reaching full command of the task to be carried out rather than desisting from requesting help and working persistently, but dysfunctinally and inefficiently.

Requesting help can be considered an actual strategy of willingness that helps the subjects to protect the intention of learning when they confront alternatives such as distraction or abandonment and in certain respects, their being aware that they need help requires being able to reflect on the actual comprehension and on who can provide them with that help, and as such, this is also a social strategy. As such, “the decision to request help is strongly influenced by social and motivational factors, and it is interesting to note that students who do not request help when they need it are in a clear disadvantage in terms of learning and performing”

(Rodríguez et al., 2002, p.150). Self-regulated learning is not always conscious, complex or metacognitive. Furthermore, it is also developed as other abilities and it can eventually be performed automatically to the point of making it look easy and natural. The origins of automatic behaviour may, nonetheless, be embedded deeply in the subject, from unconscious self-regulation of the knowledge, abilities and beliefs that have been integrated through learning experiences during a long period of time.

From the socio-cognitive viewpoint, Zimmerman (2000) identified four levels in the development of self-regulation abilities:

- **Observation Level**. This level occurs when the student can capture the primary characteristics of the ability or strategy while observing a model that learns or is performed.

- **Imitation Level**. In this level, the student imitates a style or general pattern of a model with social support. The model can encourage the student to achieve approximations to the desired performance by providing the subject with guides, feedback and social reinforcement during the practice session.

- **Self-control Level**. This occurs when the students performs an ability with full mastery in a structured environment, even without any model whatsoever. The use of the ability now depends on an internalized model, which are the performance standards of the model, for example, mental or verbal reminders.

- **Self-regulation Level of Abilities**. This level is reached when students can systematically adapt their performance to conform to their personal and changing personal conditions. Students are capable of changing the use of strategic tasks and make the necessary adjustments based on various conditions. They no longer depend on the model. Students possess self-efficacy beliefs that determine the motivation required for sustaining this

self-regulation level of the abilities. The refinement of the self-regulation abilities means the student does not need to pay attention to the learning process and instead to the actual outcomes.

It is important to develop the self-regulation of students and their abilities in order to strengthen them and so that they become effective learners throughout their life (Paris y Newman, 1990; Pintrich and De Groot, 1990; Schunk and Zimmerman,1994). On incrementing personal control perception of the students, positive outcomes occur. This also increases the probability of adopting strategies and abilities to be used in new scenarios (Ruohotie, 2000).

This is how the learning of a self-regulation strategy begins with an ample social guide that is systematically reduced as the subjects acquire the self-regulation ability (Puustinen and Pulkkinen, 2001). It is not necessary to advance through the four levels of refinement of a self-regulation competence, because there is evidence that the speed and quality of self-regulated development of students may be fortified significantly if the students proceed in accordance with the multi-level development order.

Nonetheless, this desired, evolutive process does not always occur, but rather that many students fail directly in the implementation of the self-regulation strategies.

It is fundamental to study closely the attitudes to be modified in students and the type of student players we are targeting with the gamification strategy, because the mechanics and dynamics to be used will depend directly on these factors.

According to Spanish Videogame Association, in reference to data from the National Cyber Security Institute, "54% of Spanish parents play videogames with their children and believe it is a good activity to share with their children on their leisure time (Inteco)". Thus, it has been demonstrated that while in the past, parents played with their children in more traditional activities, they still continue to do so but in the field of ICT. As such, the whole concept that videogames lead to a

low level of socialization and involvement in family life has been demystified. Furthermore, most of the current video games encourage interaction with other players from around the world, thus generating new interconnections in today's global society based on cyber connection and the world of the "World Wide Web ".

2. Conclusion

When gamification and self-regulated learning are used properly, they are very powerful tools for the students that are involved in the learning process, not only as a recipients of knowledge, since through the game mechanics and dynamics, the traditional teaching-learning activities can take on a very attractive nuance as a result of new experiences and habits.

As such, it is fundamental to study closely the attitudes to be modified in students and the type of student players we are targeting with the gamification strategy, because the mechanics and dynamics to be used will depend directly on these factors.

The basic algorithm for the teaching quality is a sum of the game variable, gamification variable and self-regulated learning variable and the outcome of the sum is learning quality.

The interjection between self-regulated learning and gamification produce an important improvement in the creativity capability, faced with the traditional methodologies and in a world where this ability is increasingly more important, we can state that it is an important combination that contributes to a significant improvement not only in the aspect of the educational curriculum area, but also in cognitive processes of students in general.

References

Alonso, C.; Gallego, D. (2000). Aprendizaje y Ordenador. Madrid: Dykinson.

Colectivo de Autores. (1994). Problemas Sociales de la Ciencia. Cuba. Editorial: Félix Varela. 1994

Crawford, C. (1984). The Art of Computer Game Design. United States: McGraw-Hill/Osborne Media.

Freud, S. (1908). Creative Writers and Daydreaming.

García Luna, A. J.; Tamez Herrera, C.; Lozano Rodríguez, A. (2015). Estilos de Aprendizaje y Rendimiento Académico en Alumnos de Segundo Grado de Secundaria. Journal of Learning Styles, Vol, 8. Nº 15. http://learningstyles.uvu.edu/index.php/jls/article/view/230/188

Garcia, O. (2014). La autorregulación en primaria. Rastros Rostros.115-118. Printed. doi: http://dx.doi.org/10.16925/ ra.v16i30.826

Gregorc, A. F. (1979). Learning/Teaching Styles: Potent Forces Behind them. Educational Leadership, January, 234-236

Hamari, J. and Koivisto, J. (2013). Social motivations to use gamification: an empirical study of gamifying exercise. In Proceedings of the 21st European Conference on Information Systems. Utrecht, Netherlands, June 5-8.

Hunt, D. E. (1979). Learning Styles and student needs: An introduction to conceptual level. In Students Learning Styles: Diagnosing and Prescribing Programs. Reston, Virginia: NASSP. 27-38.

Kapp, K. (2012). The Gamification of Learning and Instruction: Game-Based Methods and Strategies for Training and Education. San Francisco: John Wiley & Sons.

Lee, J.; Ceyhan, P.; Jordan-Cooley, W. y Sung, W. (2013) GREENIFY: A Real-World Action Game for Climate Change Education. Simulation & Gaming, Paper. http://tcgameslab.org/wp-content/uploads/2013/02/Lee-et-al.-Greenify-Simulation-and-Gaming-2013.pdf

Marczewski, A. (2013). Gamification: a simple introduction.

Matamoros Suárez, M. (2013). Educación en y para la diversidad y estilos de aprendizaje. At Review of Learning Styles, nº 12, Vol. 11, 2013 October. Available in http://learningstyles.uvu.edu/index.php/jls/article/view/8/4

Morrison, J. (2003) U.S. Higher Education in Transition. On the Horizon (2003), 11(1), pp. 6-10. Available in http://horizon.unc.edu/courses/papers/InTransition.html

Picón, E. (Coord.) (2008). El libro de texto ante la incorporación de las TIC a la enseñanza. Unidad de investigación en psicología del consumidor y usuario (USC-PSICOM). Santiago de Compostela: Universidad de Santiago de Compostela.

Prensky, M. (2002), "Digital Natives, Digital Immigrants Part I", On the Horizon, Vol. 9 No. 5 pp 1, 3-6.

Roces, C. & González, M.C. (1998). Capacidad de autorregulación de aprendizaje. In J.A. González-Pienda & J.C. Núñez (Coords.), Dificultades de Aprendizaje. Madrid: Pirámide.

Rodríguez Carracedo, M. C.; Vázquez Carro, E. (2013). Fortalecer estilos de aprendizaje para aprender a aprender. Review of Learning Styles, nº11, Vol 6, April of 2013

Santaolalla, E. Gallego, D. and Urosa, B. (2015) Los libros de texto de matemáticas y su capacidad para desarrollar los distintos estilos de aprendizaje: estudio piloto. Journal of Learning Styles, Vol. 8 No. 16 Available in http://learningstyles.uvu.edu/index.php/jls/article/view/274/200

Zichermann, G. y Cunningham, C. (2011). Gamification by Design: Implementing Game Mechanics in Web and Mobile Apps. Cambridge, MA: O'Reilly Media.

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