

Learning Incentives and Educational Games

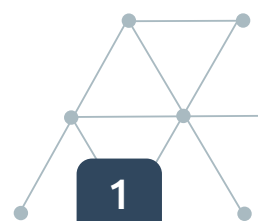
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Gamification can be defined as the “use of game design elements in non-game contexts to motivate and increase user activity and retention” (Deterding et al., 2011, p.9), and has been seen as supporting user engagement by increasing user activity, social interaction, and productivity (Hamari, 2013). Gamification also acknowledges the role of game mechanics, aesthetics, and game-thinking as a way of aiding in problem-solving and fostering learning (Kapp, 2012). Due to its nature of affecting various motivational and learning aspects, gamification has seen a rise in implementation in various domains ranging from finance to health, and education is no different (Deterding et al., 2011). Among the many benefits, gamification affects learning by increasing engagement (Dicheva et al., 2015; Anderson et al., 2014; Denny, 2013), motivation (de Freitas & Freitas, 2013) and achievement (Turan et al., 2016) amongst users.

Incentives and motivation have long been studied in the fields of psychology and organizational behaviour. Their role in a gamified environment opens the floor for various theories to see their relevance in a modern scenario. Games affect motivation which is shown by the playing individual’s decision to engage with the game and the intensity with which they engage with it (Garris et al., 2002). Motivation in games exist of two major kinds: intrinsic and extrinsic, and are combined in games to increase engagement amongst users. Extrinsic motivation is that which is driven by external rewards such as points, levels, and challenges. On the other hand, intrinsic motivation is when an action in itself provides a personal reward and usually takes the form of a sense of belonging, autonomy, and achieving mastery (Muntean, n.d.). The differences in extrinsic and intrinsic motivation with regards to their application in a gamified learning environment will be discussed over the course of this paper. Incentives play a great role in increasing learning outcomes by affecting various factors, including motivation, retention, and creating a sense of ownership. Juxtaposing learning incentives and motivations with gamified learning, the aim of this paper is thus to identify intrinsic and extrinsic motivations and their role in the gamified application for English learning, ‘Dawn of Civilization’. However, before discussing the role of Dawn of Civilization and incentives within, it is important to discuss intrinsic and extrinsic incentives, their theories, and types of incentives across gamification.

How intrinsic incentives work

Intrinsic motivation is something founded in people’s inherent interest in activities that provide them with fascination and appeal. Intrinsic motivation does not demand external factors, rewards, or recognitions, but are instead the expression of a person’s self-evaluation based on what they relate to, what draws them in, and their sense of who they are (de Charms, 1968).

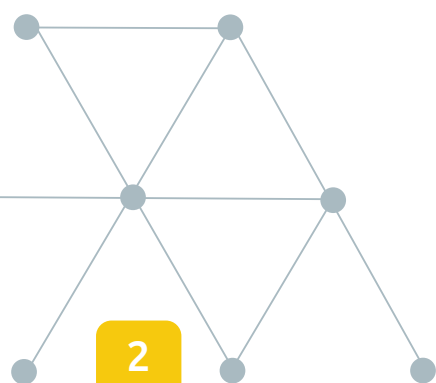




Intrinsic motivation theories insinuate that people seek an ideal level of stimulation, consequently entailing a sequence of finding challenges and undertakings that provide stimulation, and then working on mastering them before repeating the cycle with another challenge (Weiner & Craighead, 2010). In a nutshell, intrinsically motivated individuals seek out and attempt to successfully overcome challenges. These are most commonly shown in activities such as reading books, solving puzzles and exploring new areas. However it must be noted that no particular activity can be intrinsically motivating, since it is not a rule but rather a relationship between the person and activity, and thus for someone to be intrinsically motivated, they must do the activity because they find it interesting.

The social aspect of games is an important factor in enhancing intrinsic motivation. Inter-player competitions, social interactions, and cooperation influences player behaviour (Yee, 2006; (Malone, 1981). To study intrinsic incentives in games, we must take a look at need-based theories, starting with Maslow's hierarchy of needs, which is one of the most widely known theories of motivation. According to Maslow (1943), the desire to satisfy physical and psychological needs is what drives human behaviour, with five levels of needs steering human activities (Maslow, 1943). The pyramid of needs as proposed by Maslow indicates that we must satisfy our more pressing physiological needs before attempting to tackle more complex needs at the top of the pyramid. Thus, as we advance upwards, we move towards needs produced by positive goals and incentives (Lillienfeld et al., 2009). According to Siang & Rao (2003), Maslow's hierarchy of needs can be adapted to suit the context of gamification and help game designers direct their users' motivation to learn, by ensuring the needs at the bottom level such as knowing information about the game are fulfilled, before moving on to higher levels that cover the belongingness of a player within their game of choice (Siang & Rao, 2003)

Another need-based theory carrying relevance in intrinsic incentives for learning in games is the goal-setting theory, which claims that "difficult, specific, context-appropriate, and immediate goals, rather than long-term goals, motivate to achieve more" (Ling et al., 2005). Goals impact user performance by diverting attention and allocating effort towards a particular task while also increasing perseverance and self-belief in the ability to complete a task; thereby improving performance when tasks are specific and challenging, and when the goals are actually accepted by the user (Locke et al., 1981).



How Extrinsic incentives work

Extrinsic incentives are reward-driven behaviour and are presented in the form of external factors like rewards or punishments to affect the probability of specific behaviours. Extrinsic motivation, unlike intrinsic motivation, implies the existence of an external factor that pushes this form of motivation. The external factor could be tangible or intangible, as praise and fame are also extrinsic incentives that drive motivation.

Games across the world use achievement-based extrinsic incentives to motivate participants, as commonly seen in TV game shows such as 'Jeopardy' and 'Who Wants to be a Millionaire', wherein money, praise, and promotion motivate the participants. In school too, achievement-based rewards form the crux of our education system, where students must work towards achieving a certain number of points in order to get through the class. A point to note here is that extrinsic motivation here doesn't always refer to something external from the game which is given to the participants, but can be an inherent part of the game, which can be availed after participants demonstrate success within the game, and are thus considered achievement-based rewards.

There are multiple studies conducted on the efficacy of extrinsic motivation, with one highlighting an effect known as the overjustification effect (Carlson & Heth, 2007). According to the overjustification effect, providing external factors and incentives can decrease an individual's already existing intrinsic motivation to perform a task. The fact that an extrinsic reward is offered for a previously unrewarded activity that was already driven by an intrinsic motivation shifts the pre-existing intrinsic motivation within an individual to extrinsic motivation. Therefore, once rewards are stopped for the activity, the interest will then be reduced too. The intrinsic motivation that had previously already existed does not return, and external rewards must be offered continuously as motivation in order to keep the activity from failing. A theory related to this is Skinner's principle of partial reinforcement, wherein Skinner (1957) observed that while continuous reinforcement creates desired behaviours at a faster rate than partial reinforcement, once the continuous reinforcement is stopped, the desired behaviours die down (Skinner, 1957). According to the principle of partial reinforcement, occasional reinforcement of behaviours leads to a greater determination towards doing the particular activity.

Intrinsic incentives within Dawn of Civilization

The gamified learning application developed by Solve Education! – Dawn of Civilization – utilizes the concepts of intrinsic and extrinsic motivation in order to motivate its users and increase engagement thereby also increasing educational attainment of its users. Several features of Dawn of Civilization encourage intrinsic motivation amongst users, the first among which is the social features of the app. Chat forums allow users to converse with other players of the game, thus promoting socialization. While currently most games are focused on “achievement-oriented mentalities” (Koivisto & Hamari, 2014, p.204), research on the motivating influences of games notes that the social aspect of playing with others and the ability to immerse oneself in the plotline and roleplay of a game is important. Dawn of Civilization capitalizes on this by also introducing features that allow users to ‘follow’ their friends, as well as ‘visit’ each other’s cities within the app, thus comparing each other’s progress and aesthetic set-up. Further, users can also challenge their friends and create alliances, advancing the social set up and creating intrinsic motivation within the hearts of users. As a comedic relief for its users, the application also allows them to ‘prank’ their in-game friends, thus creating a thriving social and collaborative environment.

Real incentives within DOC

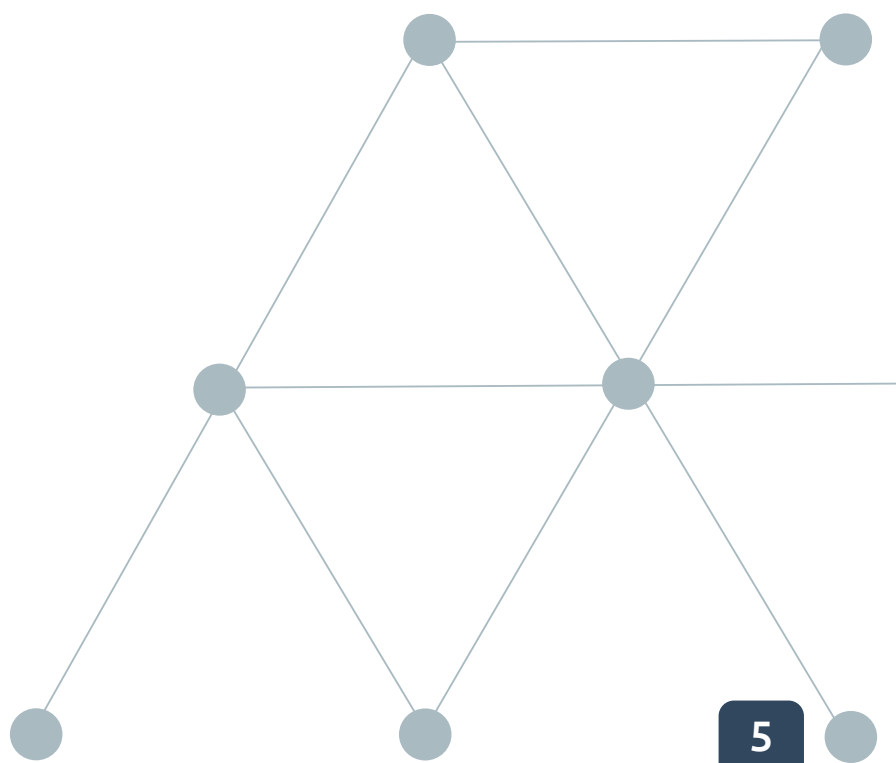
While Dawn of Civilization does take advantage of intrinsic motivation to increase engagement, it also uses concepts local to extrinsic motivation to increase user participation as well.

The Weekly Learning Challenge within the app allows participants to win up to Rp 50,000 worth of mobile data each week if they find themselves ranking first in the leaderboard. The number of minigames played, friends in-game, and learning tickets earned affect the journey to the top of the leaderboard, and thus motivates users by creating a sense of eagerness to advance their names. In order to reduce chances of demotivation amongst lower ranked players, only the top 10 names are displayed, and the leaderboard is reset every week. Furthermore, the winners of each week are temporarily prevented from joining the following 2 challenges, thus giving other players the opportunity to try again and improve their standings.

Another extrinsically motivating feature of Dawn of Civilization is the availability of points to learners in the form of XP points, stars, build points, and in-game dollars. These different forms of points and currencies help progress in the game by allowing players to build their city, afford new developments, and speed up building time. These points serve as a measure of in-game success.

The COVID-19 pandemic that hit in 2019 also allowed experimentation of a new type of reward for Dawn of Civilization learners. The 'Game for Charity' programme within Dawn of Civilization not only enabled users to educate themselves about COVID-19 but also to help those in need while doing so. For every 500 stars accumulated by users, Solve Education! would donate one food package to a family in need or one PPE kit to a medical worker through the help of their sponsors. This particular reward is unique in the sense that it could be both an extrinsic and intrinsic motivation at the same time. It is extrinsic in that users could play with the aim to get as many stars as possible and get to the top of the donor leaderboard, but it can also be intrinsic in that some players may play in order to gain a good feeling from doing good for someone in need simply by playing the game.

To summarize, the use of extrinsic and intrinsic incentives indeed has the potential to bring great benefit to the use of gamification in an educational context. Rewards can help boost motivation and engagement in learning, leading to a potential increase in learning outcomes. One does need to note, however, that the use of incentives is not a one-size-fits-all solution to increase engagement and retention of users. A good understanding of the target users is necessary in order to provide incentives that are suitable and attractive to the audience.



Bibliography

- Anderson, A., Huttenlocher, D., Kleinberg, J., & Leskovec, J. (2014). Engaging with massive online courses. Proceedings Of The 23Rd International Conference On World Wide Web - WWW '14, 687-698. 10.1145/2566486.2568042
- Carlson, N. R., & Heth, D. C. (2007). Psychology the Science of Behaviour. Pearson Education
- de Charms, R. (1968). Personal Causation. Academic Press.
- de Freitas, A., & de Freitas, M. (2013). Classroom Live: a software-assisted gamification tool. Computer Science Education, 23(2), 186-206. 10.1080/08993408.2013.780449
- de Freitas, A., & de Freitas, M. (2013). Classroom Live: a software-assisted gamification tool. Computer Science Education, 23(2), 186-206. 10.1080/08993408.2013.780449
- Denny, P. (2013). The effect of virtual achievements on student engagement. Proceedings of SIGCHI Conference on Human Factors in Computing Systems, 763-772.
- Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011, September). From Game Design Elements to Gamefulness: Defining Gamification. Proceedings of the 15th International Academic MindTrek Conference on Envisioning Future Media Environments, 9-15. 10.1145/2181037.2181040
- Dicheva, D., Dichev, C., Agre, G., & Angelova, G. (2015). Gamification in Education: A Systematic Mapping Study. Journal of Educational Technology & Society, 18(3), 75-88. <https://www.jstor.org/stable/jeductechsoci.18.3.75>
- Garris, R., Ahlers, R., & Driskell, J. E. (2002). Games, motivation, and learning: A research and practice model. Simulation and Gaming, 33(4), 441-472.
- Hamari, J. (2013). Transforming Homo Economicus into Homo Ludens: A Field Experiment on Gamification in a Utilitarian Peer-To-Peer Trading Service. Electronic Commerce Research and Applications, 12(4), 236-245. <https://doi.org/10.1016/j.elerap.2013.01.004>
- Kapp, K. M. (2012). The gamification of learning and instruction: game-based methods and strategies for training and education. John Wiley & Sons.

- Koivisto, J., & Hamari, J. (2014). Demographic differences in perceived benefits from gamification. *Computers in Human Behavior*, 35, 179-188. <https://doi.org/10.1016/j.chb.2014.03.007>
- Lillienfeld, S. O., Lynn, S. J., Namy, L. L., & Woolf, N. J. (2009). *Psychology: From inquiry to understanding*. Pearson/Allyn and Bacon.
- Ling, K., Beenen, G., Ludford, P., Wang, X., Chang, K., & Li, X. (2005). Using social psychology to motivate contributions to online communities. *Proceedings of the 2004 ACM conference on Computer supported cooperative work*, 212-221.
- Locke, E. A., Shaw, K. N., Saari, L. M., & Latham, G. P. (1981). Goal setting and task performance. *Psychological Bulletin*, 90(1), 125-152.
- Malone, T. W. (1981). Toward a theory of intrinsically motivating instruction. *Cognitive Science*, 5(4), 333-369.
- Maslow, A. H. (1943). A theory of human motivation. *Psychological Review*, 50(4), 370-396.
- Muntean, C. I. (n.d.). Raising engagement in e-learning through gamification. *Proceedings 6th International Conference on Virtual Learning ICVL*, 323-329.
- Siang, A., & Rao, R. (2003). Theories of Learning: A Computer Game Perspective. *Proceedings of Multimedia Software Engineering, International Symposium*, 239. [10.1109/MMSE.2003.1254447](https://doi.org/10.1109/MMSE.2003.1254447)
- Skinner, B. F. (1957). The experimental analysis of behavior. *American Scientist*, 45(4), 343-371.
- Turan, Z., Avinc, Z., Kara, K., & Goktas, Y. (2016). Gamification and Education: Achievements, Cognitive Loads, and Views of Students. *International Journal Of Emerging Technologies In Learning (Ijet)*, 11(07), 64. [10.3991/ijet.v11i07.5455](https://doi.org/10.3991/ijet.v11i07.5455)
- Weiner, I. B., & Craighead, W. E. (2010). *The Corsini Encyclopedia of Psychology (Vol. 4)*. John Wiley & Sons.
- Yee, N. (2006). Motivations for play in online games. *CyberPsychology & Behavior*, 9(6), 772-775.