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The Implementation of Gamification for Behavior Change towards Sustainability of Emerging Adults: a Case Study of the SDA-NOW

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Introduction

The Sustainable Development Goals (SDGs) are categorized in 17 goals and associated 169 targets developed by the United Nations that put challenges such as poverty, the environment and education (*THE 17 GOALS | Sustainable Development*, n.d.). They can be considered to be a compass for people who are aware of the need for change and want to contribute for a sustainable future. Many organizations are operationalizing sustainability, but implementing the SDGs in their own organizations and engaging with their employees seems to be challenging for many companies.

"The current format of the proposed SDGs and their targets has laid a policy framework; however, without thorough expert and scientific follow up on their operationalisation the indicators may be ambiguous" (Hák et al., 2016, p. 565) This shows that there are no concrete actions and change is rarely realized based on the SDGs. Therefore, 'Overstekend Wild' is a tribe in which more than 50 specialists and companies from the strategic, creative and digital domains collaborate with other organizations by educating people and businesses through missions, teaching habits and by engaging with their environment, the SDGs become operationalized. Furthermore, 'Overstekend Wild' has developed an innovative activation program around the SDGs; SDA-NOW (SDA NOW, 2022). Through a gamified platform with strategic, creative and contemporary content, they offer solutions that raise awareness and spur people into action based on the SDGs.

The SDA-NOW uses the technology, experience and proven applied game mechanics of the Hero Center (Powered by Hero Centered Design) and the online activation program Hackshield, a platform that makes children aware of cyber security (HackShield, 2022). It is the Winner of Best Applied Game Award during The Dutch Game Awards 2022. HackShield has been adopted by multiple municipalities such as Amsterdam, Rotterdam, national police, public ministry and others. It has now been played by 120,000 young participants and they are aspiring to introduce the Hackshield to an international audience. Therefore, the SDA-NOW also desires to prototype a new platform: 'The Hero's Journey'. The '30 day's quest' that participants can play contains challenging assignments. In addition, the participants receive the information and assignments of the quests via digital cards. The teams and employees collaborate in the familiar design of the specific organization. The SDA-NOW converts all communication, media and resources custom-made into your corporate identity and maintains the data.

The desired effect of the prototype is to improve the SDA-NOW and the deployment of the Applied Game (Hero's Journey) of the platform, reach the right target groups and activate them to make a valuable contribution to the implementation of the SDGs. In this stage, the prototype is catered for a Dutch audience.

Image 1: The home-page of the prototype that displays quests and the registration form that is presented in the first page.

This prototype attempts to implement gamification for this platform. Deterding et al. (2020) state that: "'Gamification' is the use of game design elements in non-game contexts" (p. 10). This is reaffirmed, since the organization is attempting to motivate their target audience to alter their behavior by using the knowledge they gain on the SDGs. Currently it is able to play the 'Food' deck and to sign up with the 'aanmeldformulier.'
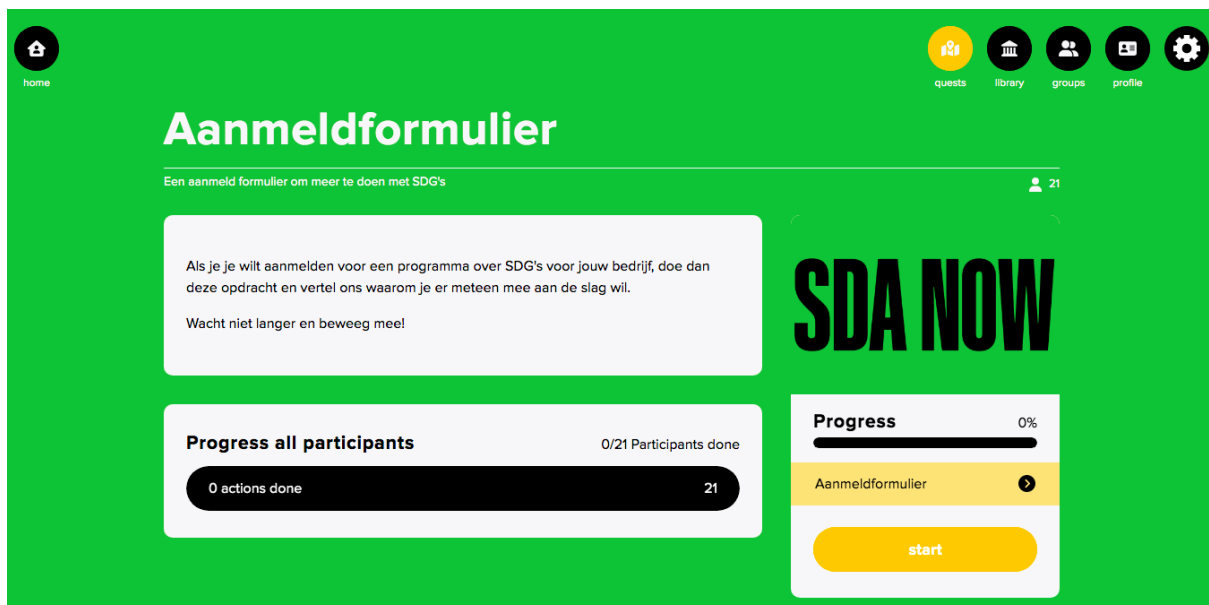

Image 2: The registration form of the 'Hero's Journey'

Furthermore, the goal of the SDA-NOW and their media product can be described as a structural change in behavior and mentality for sustainable and impactful change in the immediate living, working and residential environment and improving processes that contribute to sustainability. In this case, the organization emphasizes that the desired effect of the prototype is one that correlates

to a 'serious game', since it focuses on awareness and education of SDGs. Deterding et al. (2020) describes 'serious games' as: "the design of full-fledged games for non-entertainment purposes, 'gamified' applications merely incorporate elements of games" (p. 11).

Image 3: An example task presented in the 'Food' quest deck

In the time that this desk research is written, the SDA-NOW have not stated a specific target audience for their media product. Based on the 'Food' deck, which focuses on agriculture and food industry. Additionally, academic literature has been examined in order to define the target audience of the Hero's Journey. Emerging adults seemed to be particularly suitable for the prototype. As stated by Coyne et al. (2013:) "Emerging adulthood has been defined as the period between the age of 18 and the late 20s" (p. 1). 'Emerging adulthood,' according to Jeffrey Arnett (2014), is a life cycle phase that is between adolescence of the age of 18 and the beginning of adulthood, which is between the age of 25 and 30. Therefore, the majority of academic literature regards college students as emerging adults.

Additionally, the demography can be characterized when the individual is experiencing an identity exploration, a focus on oneself, instability and optimism towards future opportunities (Coyne et al., 2013). The arrival of adulthood is reflected through the acceptance of one's responsibility of their own life and the ability to make autonomous decisions (Arnett, 2014). Therefore, emerging adults seem to be in a process where their behavior is subject to different factors in comparison to an older adult, who has explored their identity and has established their role in society. Based on these characteristics, this target audience appears to hold potential to conjure awareness of sustainability and align oneself with progressive goals and to consider themselves as sustainable, whether they possess knowledge of the SDGs or not. Besides, this target group can also set a new standard for conducting sustainable practice of work in the future.

Moreover, media plays an integral role in this process of emerging adulthood, since it enables them to socialize and allows them to express autonomy in order to explore their identity and build new relationships (Coyne et al., 2013). "Emerging adults spend more time each day using the media than in engaging in any other activity, including time spent in school, at work, with friends, and sleeping" (Coyne et al., 2013, p. 1). Due to the implementation of media in order to express the

desired effects by the SDA-NOW, emerging adults appeared to be the most effective use of this product concept.

Thus, the present desk research aims to review literature in the attempt of developing knowledge on the use of gamification of serious games for SDA-NOW and on how to effectively produce educational content on the SDGs for an audience that emerges into adulthood to alter their behavior to a sustainable one. Therefore, this examination identifies gamification as a potential quality that appeals to the target audience.

Additionally, the literature on the empirical studies shall be examined based on the theory presented by Marcucci et al.: *Gamification design to foster stakeholder engagement and behavior change: An application to urban freight transport* (2018) as a means to explain the implementation of gamification in order to alter behavior. Since the SDA-NOW emphasizes the change of behavior of employees through the Hero's Journey, the article proposes a user-centered approach for differing players' preferences. The procedure allows to arrange game characteristics with preferences and expectations and enhance stakeholders' engagement while stimulating change in the behavior through stated choice experiments (SCEs) (Marcucci et al., 2018).

Furthermore, the literature presented in this desk research shall address each qualitative attribute of gamification theory presented by Marcucci et al. (2018). Consequently, this theory shall provide an explanation to why this media product is expected to reach the desired effect among the target audience. Henceforth, this research shall examine the following question: To what extent can gamification be implemented in order to alter the behavior and mentality for sustainable and impactful change by emerging adults.

Desk Research

Marcucci et al. (2018) addressed strategic issues through their case study: CITYLAB, a project that aims to increase city sustainability by emphasizing the effect of transport. Therefore, the goals of this research seem to be similar to those of the SDA-NOW. However, it emphasizes on gamification in transport, with a focus on plastic cap recycling, as an instrument to change behavior and avoid undesired effects. Based on literature of Bartle (1996), the theory of Marcucci et al. (2018) suggests three qualitative attributes to be incorporated in a game: point assignment mechanism, rewarding system and type of participation. As stated in image 4, it provides 4 player types: 'achiever' (emphasizes the need for acting on the world by gaining reward), 'explorer' (breaking rules and understanding real game mechanics), 'socializer' (interacting with others) and 'killer' (defeat others)
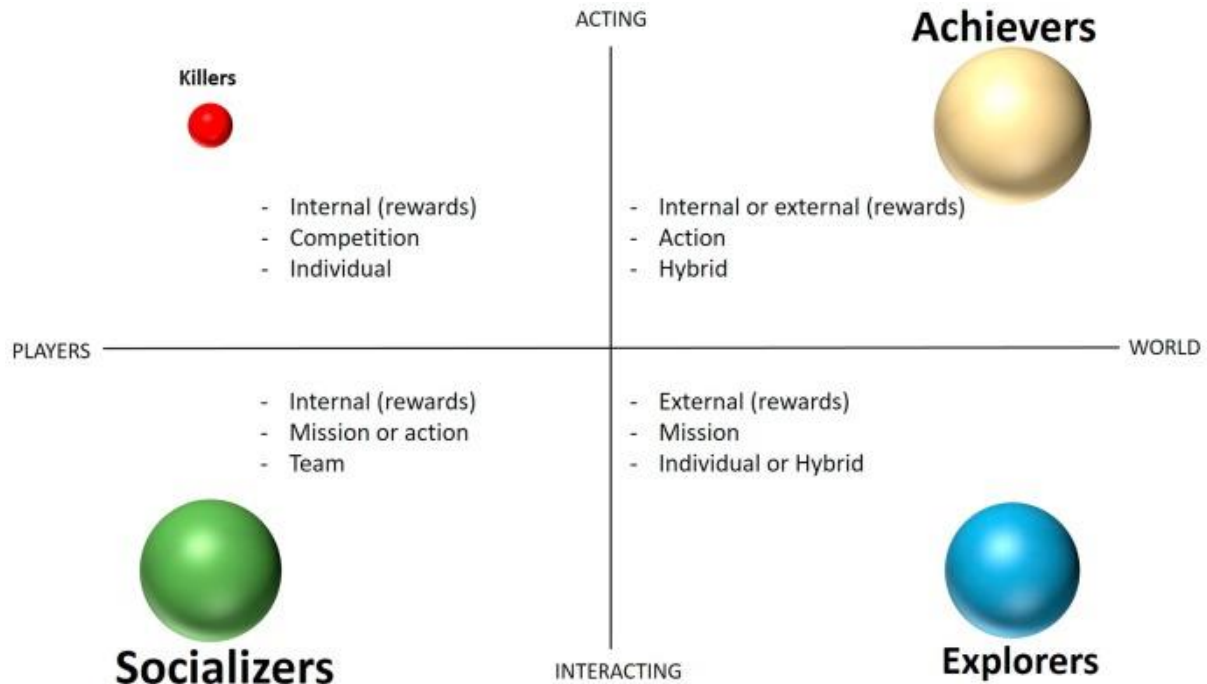
(Bartle, 1996).

Image 4: Modified Bartle's gamer interest graph (Marcucci et al., 2018, p. 128)

Moreover, the findings of this research are based on multiple studies consisting of different sections that contained samples of: 157, 223, 532 respondents around the median age of 23 (Marcucci et al., 2018). "It explores the issue of gamification design, leaving the implementation phase to a second step of the research" (Marcucci et al., 2018, p. 130). Identifying player-types and a qualitative approach for game mechanics results in success of gamification on behavior. Therefore, this theory has potential to realize the goal of the SDA-NOW to educate emerging adults on SDGs and bring these into practice through gamification.

Mulcahy et al. (2020) tested the effectiveness of a field study on sustainable consumption organized by energy companies. The research implemented a gamified app in order to spur users to form sustainable households. The app contained a game for each behavior: 'Cool' (using a fan rather than an AC), 'Wash' (running full laundry rather than partial) and 'Switch' (turning off lights and devices) (Mulcahy et al., 2020). They analyzed app usage, surveys and energy bills data to reveal the effect particular game design factors have on the participants' knowledge, enjoyment and behavioral intentions regarding sustainability.

"A sample of 1000 participants was recruited via Facebook and a third party, and screened to qualify–they had to be 18-35 years old, earning less than $AUD50,700" (annual household income), and who rented" (Mulcahy et al., 2020, p. 381). The participants interacted with the app for around 10 minutes in September. Based on the duration and enthusiasm for the game, the company selected a few that continued a follow-up study in June.

The research explores the implementation of gamified applications for sustainable consumption, such as saving money on energy bills of consumers, word-of-mouth behavior of businesses and reduced energy consumption. The variables of game design elements and perceived value were moderated by the duration of the different users: hardcore and casual users. The mediator of the perceived value was then split into 2 different mediators: word-of-mouth behaviors and behavioral intentions, which was followed up with energy saving behaviors and eventually it would lead to energy bill savings.

Furthermore, the results of this study suggests that a gamified app encourages sustainable consumption of household energy and that it can alter behavioral intentions and habits (Mulcahy et al., 2020). A fundamental finding is that across user segments the factors 'challenge' and 'points' were integral for generating knowledge. This also significantly affected game design elements and was integral for long-term users and the emergence of enjoyment.

Moreover, in a second study, Mulcahy et al. (2021) have explored the potential of gamification for influencing the behavior to be increasingly sustainable by incorporating game design within multiple marketing services in a follow up study. In order to research this phenomenon, they tested gamification principles on consumers through pre-post surveys, application analytics and energy levels of households (Mulcahy et al., 2021).

The research required 601 participants that were "18-35 years old, low-income (earning less than $41,000) and renters" (Mulcahy et al., 2021, p. 2601). The participants were split in two groups: a control group that applied a gamified design to generate sustainable behavior and a group that does not partake in the gamification. The findings indicated that gamification significantly improved the consumers' behavior and attitude towards sustainability through a reward-based game design that consists of badges, points and trophies (Mulcahy et al., 2021).

Additionally, this can be understood as point assignment, that relates to succeeding in a challenge, generating a 'virtuous' action and competing with others for a sustainable household and a reduced energy bill (Marcucci et al., 2018). The mechanisms that Mulcahy et al. (2021) attempts to explain is the behavioral effect of the reward-based game design and the energy bill savings. These variables are mediated by sustainable behavioral intentions and habits through reward-based game design elements such as points, trophies and badges.

Whittaker et al. (2021) researched digital gaming for sustainability purposes. According to Whittaker et al. (2021), gaming can increase sustainability marketing results, such as value in behavior, knowledge and long behavioral intentions. The research attempts to comprehend the effect that games with reward-based mechanics have.

For this research, 387 participants between the age of 21 and 29 were recruited for a week-long field study that encouraged them to interact with content that motivated household energy preservation (Whittaker et al., 2021). The game that the participants interacted with was the application 'Reduce Your Juice.' As Whittaker et al. (2021) states: "Reduce Your Juice contains serious mini-games that target a specific household energy-saving behavior" (p. 989). However, the only game that the participants engaged with was 'Power Raid.' A game that focussed on turning off light switches in a household.

The variables that are portrayed by Whittaker et al. (2021) are sustainability knowledge and sustainable behavioral intention, where value-in-behavior is the mediator. In addition, the sustainability knowledge is moderated by meaningful game mechanics such as educational messages and the reward based game mechanics: points, badges and trophies.

The findings prove that the serious game of 'Reduce Your Juice' significantly contributed to a sustainable behavioral intention of the participants. Therefore, this research advocates that reward-based game mechanics indirectly influence value-in-behavior through sustainable knowledge, such as badges and trophies. However, rewards systems differ from player type preferences. 'Killers' are motivated in competition and prefer rewards that are internal to the game, whereas 'achievers' gain a reward by acting on the world through rising levels as their main objective (Marcucci et al., 2018).

In contrast, points and educational messages seemed to have left an inconspicuous impression on the participants. Consequently, the study suggests that higher-tier rewards are beneficial compared to lower-tiered rewards in order to motivate participants to alter their behavior. Additionally, for this target group, reward-based game mechanics exceed meaningful game mechanics.

Where the previous literature emphasizes 'serious games', Kapp et al. (2020) focussed on the implementation of casual games in order to motivate employees to engage in an online learning platform 'Axonify'. The platform is a gamified learning management system (LMS), that contains mechanisms such as points, badges, a leaderboard and an exchange feature for tangible rewards. It provides individual learning material, for example videos, images, slideshows and text. In addition, the platform contained casual games: "games with a low barrier to entry that can be enjoyed in short increments" (Kapp et al., 2020, p. 2265).

Furthermore, two groups were analyzed: one group consisted of learners that used the game (with a duration of five minutes with each session) and the other that did not play the game (Kapp et al., 2020). A limitation of this convenience sample that was granted by the company, was that the age of the participants differed. The research took place over a 12 month timespan and a sample of 6301, where 1908 played the game and 4393 that did not. During this period, the two groups were compared in the level of engagement that was measured by the number of times learners went on the platform and the time spent on it. The platform measured knowledge, behavior and performance and individualized tests for the user.

The findings provide evidence that by playing a casual game engagement with the learning platform significantly increased (Kapp et al., 2020). Additionally, it supports the fact that adult learners are motivated to engage with the learning platform when a casual game is played first. With regard to learning, the game condition answered most of the questions that were presented in the content of the platform correctly. The research states the use of 'casual games' allow the user to be receptive to learning experiences in contrast to 'serious games.'

Based on this research, the type of participation can be classified as a mix between 'achiever' and 'socializer' (Marcucci et al., 2018). The casual game leaves room for socializers to interact with external factors, such as platforms and other players, and achievers that are spurred into action. Consequently, a 'serious game' can have undesired effects on the motivation of the user to learn for a long period. This finding is also supported by Cohen (2016), who states that games that are considered difficult, may have a negative effect on the experience of the media product. Therefore, it is integral to realize that Bartle's player classification has its limits, since 'real' players consist of a mixture of multiple categories, which implies that their preferences are mixed. In this case, Marcucci et al. (2018) suggest external rewards, such as points assigned to challenges completed and collaborative participation to achieve gamification structure, rather than competition.

Conclusion

In conclusion, this research has examined the following question: To what extent can gamification be implemented in order to alter the behavior and mentality for sustainable and impactful change by emerging adults. To answer this question, the research resorted to a literature review to address the case study presented by the SDA-NOW. Based on the literature review, the implementation of gamification has a positive response towards the alteration of the behavior and mentality for sustainability by emerging adults. This is evident, since the literature addressed in this desk research consisted mainly of participants that were considered emerging adults.

Furthermore, gamification enhanced the motivation and dedication of work mentality in several studies. This was reinforced by the theory of Marcucci et al (2018), that presented improvements in user-centered design techniques to structure gamification processes in order to alter behavior. With regard to Bartle's classification, a mixture of categories should be considered to define the player type. By considering the type of participant of the prototype, different preferences can be catered. This avoids that undesired effects emerge through the experience of the media product (Cohen, 2016)

Moreover, future research should focus on novel attributes and levels for behavioral change through gamification. The effectiveness of the media product, such as a serious game that may alter the behavior of emerging adults to become significantly sustainable, is evident. This is supported by Marcucci et al. (2018) that concludes that user-centered designs based on SCEs are effective in designing gamification to maximize the engagement and behavior change. The current operationalization of the SDGs is considered to be ambiguous (Hák et al., 2016), this desk research advocates that SCEs and user design hold the potential to operationalize the SDGs through gamification. Based on the findings in the literature and the case study, this desk research supports the exploration of gamification and the influence it has on altering behavior.

As an extension of this desk research, it is integral to examine the specific prototype of the SDA-NOW (Hero Center). This desk research provides a theoretical framework of the effect gamification may have on the behavior of emerging adults. At the moment of writing, the prototype is still being developed. Consequently, testing of the prototype on a considerate number of participants will be necessary in order to confirm whether the specific case study of the SDA-NOW is significant for emerging adults and incorporates the classification of Bartles (1996). While the prototype shows promise with its educational aims, these factors may pose challenges in the development of the prototype.

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Bibliography

Arnett, J. J. (2014). Emerging Adulthood: The Winding Road from the Late Teens Through the Twenties. Oxford University Press.

Bartle, R. A. (1996). Hearts, Clubs, Diamonds Spades: Players Who Suit MUDs. MUSE Ltd, Colchester, Essex. United Kingdom. https://mud.co.uk/richard/hcds.htm

Cohen, E. L. (2016). Social Context of Media Use. In The International Encyclopedia of Media Effects (pp. 1–12). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118783764.wbieme0203

Coyne, S. M., Padilla-Walker, L. M., & Howard, E. (2013). Emerging in a Digital World: A Decade Review of Media Use, Effects, and Gratifications in Emerging Adulthood. Emerging Adulthood, 1(2), 125–137. https://doi.org/10.1177/2167696813479782

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: Defining "gamification." 7.

HackShield. 2022. Retrieved November 9, 2022, from https://hackshield.herocenter.com/

Hák, T., Janoušková, S., & Moldan, B. (2016). Sustainable Development Goals: A need for relevant indicators. Ecological Indicators, 60, 565–573. https://doi.org/10.1016/j.ecolind.2015.08.003

Kapp, K. M., Valtchanov, D., & Pastore, R. (2020). Enhancing motivation in workplace training with casual games: A twelve month field study of retail employees. Educational Technology Research and Development, 68(5), 2263–2284. https://doi.org/10.1007/s11423-020-09769-2

Marcucci, E., Gatta, V., & Le Pira, M. (2018). Gamification design to foster stakeholder engagement and behavior change: An application to urban freight transport. *Transportation Research Part A: Policy and Practice*, *118*, 119–132. https://doi.org/10.1016/j.tra.2018.08.028

Mulcahy, R., Russell-Bennett, R., & Iacobucci, D. (2020). Designing gamified apps for sustainable consumption: A field study. Journal of Business Research, 106, 377–387. https://doi.org/10.1016/j.jbusres.2018.10.026

Mulcahy, R. F., McAndrew, R., Russell-Bennett, R., & Iacobucci, D. (2021). "Game on!" Pushing consumer buttons to change sustainable behavior: A gamification field study. European Journal of Marketing, 55(10), 2593–2619. https://doi.org/10.1108/EJM-05-2020-0341

SDA NOW. 2022. Retrieved November 9, 2022, from https://overstekend-wild.nl/sda-now/

THE 17 GOALS | Sustainable Development. (n.d.). Retrieved October 25, 2022, from https://sdgs.un.org/goals

Whittaker, L., Russell-Bennett, R., & Mulcahy, R. (2021). Reward-based or meaningful gaming? A field study on game mechanics and serious games for sustainability. Psychology & Marketing, 38(6), 981–1000. https://doi.org/10.1002/mar.21476