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Avatar Designs are in the Eye of the Beholder – About Identifying Preferred Avatar Designs in Digital Learning

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ABSTRACT

Gamification focuses on using game-like elements in non-entertainment-based contexts. An example for a game element is an avatar. Although lots of research has focused on analyzing avatars in gamification, little is known about which kind of avatar design users prefer. Especially avatars in gamification that are used as tutors or mentors for learning purposes do not spark the interest of users. Thus, the goal of our paper is to analyze which avatar design users of digital learning environments such as learning management systems would prefer. For that purpose, we use a best-worst scaling approach to analyze if the familiarity and shape of avatars determine user preferences in gamification. Our research will contribute to research and practice as it delivers implications about how to design avatars in gamified learning systems. We will enrich theory by getting a better understanding about the general meaning of user-centered avatar designs in gamification.

Keywords

Gamification, Avatars, User Preferences, Learning, Best-Worst Scaling

INTRODUCTION

Direct and individual feedback is one of the most critical drivers influencing learner motivation, investment, and effort (Hattie & Timperley, 2007). In a traditional classroom setting, teachers can provide such feedback to students through direct and immediate interactions (Means *et al.*, 2009). Such opportunities, however, are limited in other online self-learning settings, such as massive open online courses or learning management systems (LMS; Janson *et al.*, 2017)). In fact, there is a large number and variety of online learning platforms where the assistance of a teacher or a trainer is not immediately available (Means *et al.*, 2009). By foregoing the instructions of a teacher in online learning environments, it becomes more challenging to provide helpful feedback to learners about their learning progress that motivates and engages them to learn more regularly (Burgers *et al.*, 2015).

Gamification has been proven as an effective means of motivating individuals to use a system regularly (Simoes

et al., 2013). Gamification refers to the use and combination of game design elements in a non-entertainment-based context (Deterding *et al.*, 2011). Besides using game design elements such as points, badges, or leaderboards, avatars can be used as an effective game design element (Thiebes *et al.*, 2014).

Referring to avatars in gamification, they can be used as teachers or tutors to guide users during the system usage. Although a considerable amount of research has analyzed the role and meaning of avatars in virtual worlds, there is a limited understanding of how to design particular game design elements such as avatars (Schöbel & Janson, 2018). In particular, research is lacking on the design of avatars that truly engage users. As indicated by Seaborn and Fels (2015), most studies in gamification focus on designing game bundles instead of individual game mechanics. Especially avatars in gamification lack of design implications of how to make them more appealing to learners and motivating (Salim *et al.*, 2007). Hence, the goal of our research study is to investigate the preferences of users towards avatar designs and answer the following research question (RQ):

RQ: Which avatar design do users of LMSs prefer?

To achieve our goal, we methodologically rely on a best-worst scaling (BWS) approach that allows us to measure user preferences. To theoretically embed our research study and the design of our avatars, we draw upon self-expansion theory (Aron *et al.*, 1992), the overarching theory of the self, and ARCS theory (Keller, 1987).

When completed, this research endeavor has several important implications for theory. Overall, we will contribute to a type III theory of prediction (Gregor, 2006) because by evaluating which avatar designs users of LMSs prefer. We will contribute to theory by giving implications about specific design characteristics of an avatar that are preferred by LMS users. We can provide guidance in developing avatars for learning purposes and, thus, will be able to help practitioners who need to develop user-centered avatar designs for their LMSs. Finally, we can give implications about how user preferences can be used in a first step to develop a user-centered gamification concept.

THEORETICAL BACKGROUND AND HYPOTHESES DEVELOPMENT

To analyze avatar designs, we consider self-expansion theory (SET) and the overarching theory of the self and compare the general shape of an avatar (human, human-animal, human-fantasy) with their familiarity (familiar, not familiar). We focus on comparing human-like avatars because in learning settings it is easier for learners to cooperate with a human-like avatar that is similar to their teacher (Mull *et al.*, 2015). Finally, because our analysis focusses on avatars in learning, we refer to ARCS theory to ground our overall research idea (Keller, 1987).

Avatar Familiarity

Avatars that are designed for learning purposes in general have the function of a tutor or a teacher in an online learning environment. They do not represent a user, instead, they help them to operate in an LMS. Therefore, such an avatar gives instructions to a learner. Referring to this, Keller (1987) presents the ARCS theory that can be used to design motivating instructions. He suggests addressing learners' attention (A), outlining the relevance (R), strengthening confidence (C), and increasing their satisfaction (S). Thus, learning instructions and designed avatars should direct the attention of learners to the presented learning material, whether it is in a classroom or in an online environment (Keller, 2009). The instructions and avatar appearance should be of relevance, which learners should clearly recognize. More precisely, they should be given to a learner to instill a sense of confidence in them by helping them to believe that they can succeed (Keller, 1987). This helps them to accomplish their goals and leads to a higher motivation. Finally, by, for example, using preferred avatar designs, users can be rewarded for their learning success which can lead to a higher satisfaction (Keller, 1987). All these issues are important for designing avatar shapes that are used as teachers or tutors in an LMS.

In general, avatars are used to represent a user in an IS (Suh *et al.*, 2015). However, avatars in learning situations might have a different role because they can guide users as a kind of virtual teacher and, thus, can cause a positive feeling of familiarity (Whan *et al.*, 2010). Such emotional bonds can be explained by SET, which was developed on the key notion that individuals are fundamentally motivated towards the goals of enhancing the self through close relationships (Aron *et al.*, 2006). SET predicts that engaging in novel, exciting, and interesting self-expanding activities with a friend or a known person leads individuals to experience self-expansion (Aron *et al.*, 2006). In such a relationship, self-expansion can increase an individual's engagement in an activity or a task (Mattingly & Lewandowski, 2013).

In regard to the design of an avatar, integrating an avatar that is familiar to a learner, can lead to an emotion-laden target-specific bond between a learner and an avatar (Bowlby, 1979). The desire to develop a strong emotional bond to others serves a basic human need. Hence, learners feel accompanied, trusted, supported, and attached which makes them more emotionally involved (Mattingly & Lewandowski, 2013). The consensus is that the familiarity and similarity effect is one of the most well-established findings in the study of feeling close to something or someone (Aron *et al.*, 2006). Being involved in a positive relationship with an avatar can lead to enjoyment as well as to an attitude or behavior change (Christy & Fox, 2016). Finally, interaction between learners changes in teaching and learning situations that take place in online environments, because physical information about other persons might be unavailable (Nowak & Rauh, 2006). Therefore, individuals prefer avatars that they are familiar with, which makes it easier for them to interact with an avatar and develop a kind of relationship. Changing the behavior of learners can be observed in better learning outcomes (Bartel & Hagel, 2014). With a well-known avatar, learners will experience the feeling of presence leading to a higher degree of involvement in a task which again contributes to a better task performance (Scaife & Rogers, 2001).

Furthermore, referring to Keller's (1987) ARCS theory, we can assume that familiar avatars are more suitable to draw the attention of learners. By including a familiar avatar, learners will be better able to see the relevance of their actions in an LMS and learners might be more confident because of their familiarity; they feel closer to the integrated avatar. Finally, such a relationship feeling can increase the learning outcomes (Bartel & Hagel, 2014) and, thus, also their satisfaction. Consequently, referring to avatar designs in learning, we hypothesize:

H1: Learners can better identify themselves with well-known avatars that are familiar to them, instead of unknown avatars and, thus, prefer well-known instead of unknown avatars.

Shape Design

Overall, avatars can have different shape designs. Several options exist to adapt the design of avatars. Besides using human avatars, animal avatars, fantasy avatars or objects can be used to gamify an LMS. In our research, we analyze design decisions for an avatar that represents a teacher or tutor.

To identify the most preferred shape design, we refer to the overarching theory of the self and build up on the results presented by Mull *et al.* (2015), who analyzed different avatars in sales. It is a cognitive representation of an individual's uniqueness and of attributes and characteristics that an individual attaches to him- or

herself most firmly in relation to their identity (Berthon *et al.*, 2013). An individual's identity is the highest of the hierarchical cognitive structures comprising the self and individuals form their own identity based on roles that they have to fulfill (Kim *et al.*, 2007). Thus, in learning environments, individuals expect to interact with an avatar that is similar to their teacher in school or in a university. Therefore, the self is tantamount to the attributes of an individual (Berthon *et al.*, 2013). Jung (1969) explains that the self is a unique representation of a human in a social context. In ISs, avatars can symbolize an idealized self, which is a perfected version of an individual's self with an appearance the person wishes he or she had in the real world (Berthon *et al.*, 2013). We assume that an idealized self is someone that has the overall experience in a specific topic and a learner has to be experienced. Thus, individuals might choose an avatar with the highest credibility or likeability rating in a working or learning context (Nowak & Rauh, 2006). Therefore, Nowak and Rauh (2006) evaluated that individuals prefer to interact with avatars that were perceived to be similar to themselves. More precisely, an avatar that is used for learning purposes should have a personality because learners perceive them as their friend and they expect human avatars to have some kind of personality (Pérez-Marín & Pascual-Nieto, 2013). Regarding the overarching theory of the self, an individual's self-identity focuses on the self in respect to the roles an individual takes on, for example, as a friend, a colleague or a member of a group (Kim *et al.*, 2007).

Connecting these thoughts to Kellers (1987) ARCS theory, we can assume that including an avatar in an LMS also helps to get the learners' attention and helps to see the relevance of the presented learning material because a virtual teacher presents it to them. Finally, we can expect that learners feel more confident when they are accompanied by a human teacher when using an LMS which can influence their overall satisfaction. According to previous research, individuals prefer to select avatars that are similar to themselves (Nowak & Rauh, 2006). Thus, we can assume, that there are differences in the perception of avatar shapes. In line with this, avatars that are used as tutors, represent the learners' teachers. This indicates that learners' might be more attracted by avatars that are similar to their teachers. Furthermore, little research has analyzed gender differences in the perception of specific game mechanics. Individuals use gender stereotypes to determine which category an individual belongs to (Nowak & Rauh, 2006). Koda and Meas (1996) found out that there is a difference in the evaluation of a human face and a non-human face between females and males. Hence, since an avatar that is used as mentor for teaching and learning systems, represents a teacher, learners' might be more attracted by avatars that have a human or humanoid shape. In line with

this, Wang and Wang (2008) as well as Shen *et al.* (2016) found some evidence for gender differences in the perception and acceptance of online games. Therefore, when designing avatars and the preferences of users, it should be considered if females and males vary in their avatars shape preferences. Thus, it should be examined if there are differences between females and males regarding their avatar design preferences. In summary, we, therefore, hypothesize:

H2: Because learners can better build a relationship with avatars that are similar to their teachers and to themselves, they will prefer avatars with a human shape instead of avatars with animal or fantasy shapes.

H3: Female learners will prefer avatars with a human-female shape instead of avatars with a human-male, animal or fantasy shape.

H4: Male learners will prefer avatars with a human- male shape instead of avatars with a human-female, animal or fantasy shape

To address the overarching theory of the self and to simulate the role of a teacher in an LMS, we decided to focus on human-like avatars. We expect that a human-fantasy avatar characterizes the postmodern self, which is more fantasized as the modern self (Mull *et al.*, 2015). The human-animal avatar shape is similar to the dialogical self, which chooses whatever it wants to become (Mull *et al.*, 2015).

METHOD

To develop a user-centered avatar design and thus to measure user preferences, we use a so-called. BWS was developed by Louviere and Woodworth (2013) and it is an extension of the MaxDiff scaling that was originally developed by Thurstone (1927). BWS describes a cognitive process in which individuals repeatedly choose two objects in varying sets of three or more objects in a survey that they feel exhibit the largest perceptual difference on a described continuum of interests (Finn & Louviere, 1992). Thus, so-called choice sets are presented to participants. In total, there are three different BWS cases. In the first case, individuals choose between attributes. In the second case, they choose between different attribute levels and in the third, they choose between profiles of attributes that differ by attribute level. As indicated by the name best-worst, an individual has to choose the most and the least preferred attribute out of one choice set. A choice set is the representation of a bunch of objects where an individual has to decide which object he likes most and which one he likes least in comparison to the other attributes. By using observations obtained from all of the participants' choices, preferences for each attribute (and/or level) can be calculated by using a scoring mechanism and a conditional logistic regression

analysis. For our analysis, we decided to use case 1 of BWS. The survey results can be used to derive a preference ranking indicating the most and least preferred avatar design. With our BWS, we want to analyze the meaning of avatar familiarity and the design of the shape. With respect to current rankings, the most famous video game is Super Mario (Comic Vine, 2017). Super Mario was created by Nintendo in 1983 and has the most famous avatars to this day (Nintendo, 2017). The different avatar designs can be seen in the following figure:

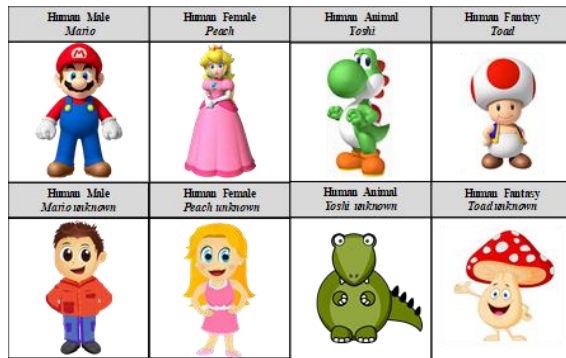


Figure 1. Avatar Designs

After we had identified our avatar designs, we were able to construct the BWS tasks. Therefore, choice sets have to be determined. We used the statistical software environment R, to calculate the sufficient amount of choice sets. Referring to this, 14 choice sets are necessary, whereby each avatar design is shown seven times over each set. As recommended by Orme (2005), we displayed four avatar designs in one choice set. In a next step, we will focus on collecting the data by using an online survey. As we use an online survey, we can ask everyone that uses LMSs for private or work purposes to participate. This survey will consist of two parts. The first one concentrated on the BWS task. In addition to our BWS, we will ask for demographics and will include questions about which LMS the participants use and which computer games they play. Furthermore, we will ask them which of the eight avatars they know from outside of the presentation in our survey.

EXPECTED CONTRIBUTIONS

After we have completed our data collection and, thus, our research study, we will be able to give several practical and theoretical implications. First, we can give theoretical implications on how to implement avatars under consideration of user preferences in the domain of LMSs. We also can give implications about how the development of user-centered designs in gamification. Based on our hypotheses, we assume that users of LMSs prefer famous avatars with a human shape. Additionally, we will be able to analyze if females and males differ in their avatar design preferences. Thus, we will be able to

give implications about how to further refine gamification concepts to make them more meaningful to users of LMSs. Second, as suggested by Seaborn and Fels (2015), after completing our research study, we can enrich gamification theory by giving implications to researchers and system designers about how to design one game mechanic and how to use a user-centered approach by considering user preferences. In line with this, we will be able to give detailed design implications. From a practical perspective, our findings will be useful to system developers as well as researchers because we can give implications about how to design avatars in LMSs to better address the interest and needs of LMS users.

REFERENCES

1. Aron, A., Aron, E. N. & Smollan, D. (1992) Inclusion of Other in the Self Scale and the structure of interpersonal closeness. *Journal of Personality and Social Psychology*, **63** (4), 596–612.
2. Aron, A., Steele, J. L., Kashdan, T. B. & Perez, M. (2006) When similars do not attract: Tests of a prediction from the self-expansion model. *Personal Relationships*, **13** (4), 387–396.
3. Bartel, A. & Hagel, G. (2014) Engaging Students With a Mobile Game-Based Learning System in University Education. *Global Engineering Education Conference*, 957–960.
4. Berthon, P., Pitt, L., Halvorson, W., Ewing, M. & Crittenden, V. L. (2013) Advocating Avatars: The Salesperson in Second Life. *Journal of Personal Selling & Sales Management*, **30** (3), 195–208. doi: 10.2753/PSS0885-3134300301.
5. Bowlby, J. (1979) *The Making and Breaking of Affectional Bonds*. Tavistock, London.
6. Burgers, C., Eden, A., van Engelenburg, M. D. & Buningh, S. (2015) How feedback boosts motivation in play in a brain-training game. *Computers in Human Behavior*, **48**, 94–103.
7. Christy, K. R. & Fox, J. (2016) Transportability and presence as predictors of avatar identification within narrative video games. *Cyberpsychology, Behavior, and Social Networking*, **19** (4), 283–287.
8. Comic Vine (2017) *Top 10 Video Game Characters* [WWW document]. URL https://comicvine.gamespot.com/profile/hirev_starna/n/lists/top-10-video-game-characters/53632/, accessed 30 April 2017.
9. Deterding, S., Dixon, D., Khaled, R. & Nacke, L. (eds.) (2011) *From game design elements to gamefulness: Defining gamification*. ACM.
10. Finn, A. & Louviere, J. J. (1992) Determining the Appropriate Response to Evidence of Public Concern: The Case of Food Safety. *Journal of Public Policy & Marketing*, **11** (1), 12–25.

11. Gregor, S. (2006) The nature of theory in information systems. *MIS Quarterly*, **30** (3), 611–642.
12. Hattie, J. & Timperley, H. (2007) The power of feedback. *Review of educational research*, **77** (1), 81–112.
13. Janson, A., Söllner, M. & Leimeister, J. M. (2017) Individual Appropriation of Learning Management Systems - Antecedents and Consequences. *AIS Transactions on Human-Computer Interaction*, **9** (3).
14. Jung, C. G. (1969) A review of the complex theory. *The structure and dynamics of the psyche*.
15. Keller, J. M. (1987) Development and use of the ARCS model of instructional design. *Journal of instructional development*, **10** (3), 2.
16. Keller, J. M. (2009) *Motivational design for learning and performance: The ARCS model approach*. Springer Science & Business Media.
17. Kim, Y., Baylor, A. L. & Shen, E. (2007) Pedagogical agents as learning companions: The impact of agent emotion and gender. *Journal of Computer Assisted Learning*, **23** (3), 220–234.
18. Koda, T. & Maes, P. (eds.) (1996) *Agents with faces: The effect of personification*. IEEE.
19. Louviere, J. J., Lings, I., Islam, T., Gudergan, S. & Flynn, T. (2013) An introduction to the application of (case 1) best-worst scaling in marketing research. *International Journal of Research in Marketing*, **30**, 292–303.
20. Mattingly, B. A. & Lewandowski, G. (2013) The power of one: Benefits of individual self-expansion. *The Journal of Positive Psychology*, **8** (1), 12–22.
21. Means, B., Toyama, Y., Murphy, R., Bakia, M. & Jones, K. (2009) Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies. *US Department of Education*.
22. Mull, I., Wyss, J., Moon, E. & Lee, S.-E. (2015) An exploratory study of using 3D avatars as online salespeople. *Journal of Fashion Marketing and Management: An International Journal*, **19** (2), 154–168. doi: 10.1108/JFMM-05-2014-0033.
23. Nintendo (2017) *Nintendo's Official Home for Mario* [WWW document]. URL <http://mario.nintendo.com/>, accessed 30 April 2017.
24. Nowak, K. L. & Rauh, C. (2006) The Influence of the Avatar on Online Perceptions of Anthropomorphism, Androgyny, Credibility, Homophily, and Attraction. *Journal of Computer-Mediated Communication*, **11**, 153–178.
25. Orme, B. (2005) Accuracy of HB Estimation in MaxDiff Experiments. *Sawtooth Research Paper Series*, 1–7.
26. Pérez-Marín, D. & Pascual-Nieto, I. (2013) An exploratory study on how children interact with pedagogic conversational agents. *Behaviour & Information Technology*, **32** (9), 955–964.
27. Salim, S. S., Marzuki, N. & Kasirun, Z. (eds.) (2007) *Modelling the requirements of an animated pedagogical agent for a web-based learning environment through input-process-output relationships*. Kassel University Press.
28. Scaife, M. & Rogers, Y. (2001) Informing the design of a virtual environment to support learning in children. *International Journal of human-computer studies*, **55** (2), 115–143.
29. Schöbel, S. & Janson, A. (2018) Is it all about Having Fun? - Developing a Taxonomy to Gamify Information Systems. *European Conference on Information Systems (ECIS)*.
30. Seaborn, K. & Fels, D. I. (2015) Gamification in theory and action: A survey. *International Journal of human-computer studies*, **74**, 14–31.
31. Shen, W.-C. M., Liu, D., Santhanam, R. & Evans, D. A. (2016) Gamified Technology-Mediated Learning: The Role of Individual Differences. *Pacific Asia Conference on Information Systems (PACIS)*.
32. Simoes, J., Díaz Redondo, R. & Fernández Vilas Ana (2013) A social gamification framework for K-6 learning platform. *Computers in Human Behavior*, **29**, 345–353.
33. Suh, A., Wagner, C. & Liu, L. (2015) The Effects of Game Dynamics on User Engagement in Gamified Systems. *Hawaii International Conference on System Sciences (HICCS)*.
34. Thiebes, S., Lins, S. & Basten, D. (2014) Gamifying Information Systems: A Synthesis of Gamification Mechanics and Dynamics. *European Conference on Information Systems (ECIS)*.
35. Thurstone, L. L. (1927) A Law of Comparative Judgement. *Psychological Review* (4), 273–286.
36. Wang, H.-Y. & Wang, Y.-S. (2008) Gender differences in the perception and acceptance of online games. *British Journal of Educational Technology*, **39** (5), 787–806.
37. Whan, P. C., MacInnis, D. J., Priester, J., Eisingerich, A. B. & Iacobucci, D. (2010) Brand attachment and brand attitude strength: Conceptual and empirical differentiation of two critical brand equity drivers. *Journal of marketing*, **74** (6), 1–17.