

# Avatars in Education: Age Differences in Avatar Customization

Monika Paleczna<sup>1\*</sup> and Barbara Szmigielska<sup>2</sup>

<sup>1</sup>MSc, PhD candidate, Jagiellonian University in Cracow, Institute of Psychology, Ingardena 6, 33-332 Cracow, Poland

<sup>2</sup>Professor, Jagiellonian University in Cracow, Institute of Psychology, Ingardena 6, 33-332 Cracow, Poland

\*Correspondence to: Monika Paleczna, MSc, PhD candidate, Jagiellonian University in Cracow, Institute of Psychology, Ingardena 6, 33-332 Cracow, Poland.

E-mail: monika.paleczna@doctoral.uj.edu.pl

## Abstract

The use of new technologies in education has become increasingly popular in recent years. One element that increases engagement in activity undertaken on electronic devices is the avatar – a virtual representation of the player. For online education to bring the expected results, it is important for users to choose the right avatar. The purpose of the article is to present existing data on the creation of avatars by people of different ages. Additionally, issues which deserve future consideration are suggested.

**Keywords:** avatar, customization, online education, age differences.

## Introduction

Due to the availability and attractiveness of electronic devices, they are used more and more frequently in educational practice (Virvou, Katsionis and Manos, 2005; Moore, Dickson-Deane and Galyen, 2011; Durkin, Boyle, Hunter and Conti-Ramsden, 2015). Many device-based activities require the creation of a virtual user representation – an avatar (Meadows, 2007). Klevjer (2007) defines it as a substitute body that allows the player to be present in the fictional world. However, a player's representation does not have to be just a human image. It can be an animal, machine, or anything else (Waggoner, 2009). The use of avatars in education has the advantage that they are fun and are always available, therefore engagement is increased (Oestreicher, Kuzma and Yen, 2010). Furthermore, avatars' characteristics can affect learning outcomes. For example, Chen et al., (2012) show that empathic avatars increase learners' willingness to continue reading and complete exercises.

The use of avatars in education is gaining more and more attention. Tongpeth and Clark (2018) plan to evaluate the effectiveness of the SAVE app – an avatar-based application that aims to increase knowledge of and responses to heart attack symptoms. The preliminary study showed that the application works. In another study (Andrade, Bagri, Zaw et al., 2010), ten medical trainees were tasked to inform a female avatar that she had been diagnosed with breast cancer. Participants rated this task as valuable training in terms of contact and conversation with the patient. The broad spectrum of avatars' use in education is demonstrated by other research undertaken in areas such as sign language (Lima et al., 2013), lectures on ethnography (Foster, 2008), history (Wakefield, Warren, Rankin, Mills and Gratch, 2012) and in the fields of dietary (Cho et al., 2013) and interview skills (Sweigart and Hodson-Carlton, 2013).

However, when people learn to use electronic devices, the results vary in terms of learning outcomes or involvement (Kirkup, 2002). Therefore, avatar-based materials should be personalized for each learner. Rice, Koh, He et al. (2013) compared avatar preferences across three groups: teenagers, adults and older adults. They observed the largest differences in the perceived attractiveness, homophily, engagement and expressiveness of the avatar representations. Given the growing popularity of avatars in the field of education, the goal of

the paper is to review the research on avatar customization in people of all ages, from childhood to old age.

## Childhood and adolescence

So far, little research has been devoted to the creation of virtual representations of children and teenagers. Inal, Sancar and Cagiltay (2006) compared the personality traits of children aged 7–13 with the characteristics of their avatars. Boys with low and high levels of openness created avatars similar to powerful warriors, while boys with high openness used fantastical elements. Avatars of girls with a low level of openness were very conventional, while in those with a high level of openness it was difficult to find common elements. High conscientiousness in boys was associated with two types of avatars: some created strong characters such as a soldier, warrior or a monster, while others looked like gentlemen. A common element of both these types was helpfulness and clothing related to the performed activity. Girls with a high level of conscientiousness created normal people or music/film stars. Boys with a low level of conscientiousness created avatars similar to movie stars. The avatars of girls with a low level of conscientiousness were extravagant. They wore costumes that did not fit the situation; they had colored hair, hats and glasses. Boys with high extraversion were inspired by their favorite characters and created unusual avatars. In contrast to girls with a low level of extraversion, those with a high level used accessories such as bags, necklaces or bracelets. The avatars of boys with a low level of extraversion had dark skin, unusual hairstyles, and wore sunglasses. High agreeableness in boys was associated with the creation of non-human beings. The avatars of girls high in agreeableness were sweet and charming; they wore purses, necklaces and earrings. The avatars of boys of low agreeableness looked naughty and strict. No tendencies were found in girls with low agreeableness. Only two boys were characterized by a high level of neuroticism, and their avatars were very different. Girls with a high level of neuroticism (also only two) created characters with suitably chosen outfits and accessories. Boys with a low level of neuroticism created unusual avatars, while girls chose skirts and used various accessories. The vast majority of the children (20 out of 23 boys and 35 out of 36 girls) created avatars compatible with their gender. The significance of gender was also noticed by Villani et al. (2016). Kafai, Fields and Cook (2007) conducted interviews with 35 children

aged 9–12, the vast majority of whom declared that their avatars were not a reflection of them. The motives for their avatars were different: aesthetic appearance, similarity to someone (e.g. a hero) or something else (e.g. hobby), possessing certain things or features that they cannot have in real life (e.g. hair style which parents do not agree with), or functionality in the game.

## Adulthood

More research was conducted to determine adults' motivation for the creation of their avatars. According to Ducheneaut, Wen, Yee and Wadley (2009), the factors that are important for players when creating an avatar depend on the type of game they will play. If the main goal of the game is to follow the story and progress through the levels, players pay attention to such features as hair style, facial features and hair color. However, if the main goal of the game is socialization in the virtual world, then the avatar's body becomes the most important element. If the game combines elements of following the plot and socialization, players pay attention to hairstyle, hair color and weapons. In addition, the researchers wanted to determine the relationship between avatars' and players' features. Based on the answers given by the players, they distinguished three factors: 'idealized self', 'distinguishing factor' and 'trend factor'. The 'idealized self' contains statements about creating an avatar that is an idealized version of the player and has features that the player would like to have in real life. The 'distinguishing factor' applies to statements about the creation of an avatar that is very distinctive, has an unconventional appearance, and is not very similar to the player. The 'trend factor' is based on statements about creating an avatar based on the appearance of celebrities or another liked person. Researchers have observed that women are generally characterized by the 'idealized self' and men by the 'distinguishing factor'. In addition, overweight users tend to create idealized avatars more than other users. Mancini and Sibilla (2017) showed that players identify more strongly with an avatar if it is similar to them. In contrast, studies by Bessière, Seay and Kiesler (2007) support the hypothesis that players create an avatar that is their "ideal self". Another study (Messinger et al., 2008) shows that respondents say that they create avatars that are similar to them but more attractive. In studies by Dunn and Guadagno (2012), both men and women created avatars in line with their ideal image of the masculine and feminine body. Players try to create a character that will help them master the game, but they strive to create an avatar with whom they can identify, thus they prefer their own gender (Trepte, Reinecke and Behr, 2009). The preference for one's own gender is also confirmed by the research of Nowak and Rauh (2005). The mere fact of creating one's own representation affects identification with the character (Turkay and Kinzer, 2014). Kim (2014) revealed that participants who create personalized avatars experience less stress and aggressive thoughts, more enjoyment, and stronger presence in the game, and at the same time show less aggressive and more pro-social behavior than participants who cannot customize their representation.

Trepte, Reinecke and Behr (2009) observed that men with a high level of openness to experience more often choose a darker skin color than their own. Introverts chose more attractive avatars than extroverts, and the most attractive ones were chosen by women with high neuroticism. In studies by Dunn and Guadagno (2012), more attractive avatars were chosen by introverted men and women and neurotic women. Lin and Wang (2014) did not find a relationship between an avatar and a player's personality. Sometimes players adapt to the roles expected of their avatars, regardless of who they are in the social world (Yee, Ducheneaut, Yao and Nelson, 2011).

## Old age

Few studies concern avatar customization by older people. Ducheneaut, Wen, Yee and Wadley (2009) observed that seniors tend to idealize their own avatars. They look for attractive features and prefer younger and visually pleasing avatars (Rice et al., 2013). They reduce the age of their characters more often than younger players, sometimes even by several decades (Ducheneaut, Wen, Yee and Wadley, 2009). Older people who use old-looking avatars reveal more information about themselves when interacting with people who also use old-looking avatars (Lee, Xiao and Wells, 2018). If seniors are represented by young-looking avatars, they reveal more information to people who also use young-looking avatars. Puri, Baker, Hoang and Zuffi (2017) examined six older adults aged 70 to 80 years and found that they were able to identify with photorealistic avatars created by the author of the study. Most of the participants indicated that facial features were most important. In another study (Cheong, Jung, and Theng, 2011), 24 seniors aged 55 and above evaluated 20 avatars. The participants revealed a strong trust in avatars depicting children, and an attraction towards animal and object avatars; however, they were not able to identify with any of the avatars.

## Conclusions

The paper presents existing data on the creation of avatars for three age groups: children and teenagers, adults and old people. The amount of data is still too small to draw detailed conclusions, but it can be a source of hypotheses. For education to be effective, avatars should be conducive to learning and teaching. There are many factors to consider when determining how people create their avatars, one of which is the user's age.

The use of mobile devices is already a form of children's activity (Bağ, 2015). Vandewater et al. (2007) talk about digital childhood, and Buckingham (2006) discusses the digital generation. Six-month-old children have contact with technology (Anand and Krosninch, 2005) and two-year-olds can use touch screens effectively (Ahearne, Dilworth, Rollings, Livingstone and Murray, 2016). Therefore, it seems reasonable to include pre-school children in research that relates to the use of electronic devices.

Similarly, there is still not enough research into the senior group. More and more seniors remain active and want to learn new things, but still little attention is given to them as virtual users. Computer use by older adults leads to better self-efficacy; it reduces computer anxiety and thus increases life satisfaction (Karavidas, Lim and Katsikas, 2005). Ortiz, del Puy Carretero, Oyarzun et al. (2007) indicate that virtual characters could improve interaction between older people and machines. Siriaraya and Siang Ang (2012) showed that avatars are a way to strengthen relationships between older people and other types of users.

The presented research results largely refer to avatars created by users; therefore, these avatars are representations of their users. The next step would be further research into teachers' avatars. Mkrttchian, and Stephanova (2013) emphasize that it is necessary to make avatars capable of relaying knowledge and skills in various subject areas.

## Limitations

Many of the studies cited above that involve customization of avatars are not related directly to learning and teaching processes. Therefore, the age group preferences for specific types of avatars do not have to apply only in education. These results can be a source of hypotheses regarding avatar preferences in the context of education.

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