Avatar Appearance in Digital Learning Environments

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ABSTRACT
In a pilot user study young people were to choose an avatar for an educational application. The avatars came in two visual styles – more naturalistic versus more stylized or sketchy. We explored to what extent similarity in appearance to oneself would be a motive for choices and whether this would differ between users who chose more visually naturalistic versus more stylized avatars. A preliminary analysis suggests that the concept of personal resonance may be useful to describe the role of avatar appearance for pedagogical use.

Categories and Subject Descriptors
J.4 [Computer Applications]: Social and Behavioral Sciences – Psychology

General Terms
Documentation, Design, Theory.

Keywords
Avatars, virtual characters, self representation, pedagogical context, visual design.

1. INTRODUCTION
Virtual characters – computer-generated, more or less humanlike characters – are increasingly being employed in educational settings, where they appear as virtual instructors, coaches, characters in educational role plays, etc. A particular kind of virtual characters are avatars: characters used to represent oneself. This article explores young peoples’ choices of an avatar in an educational context and their motives for their choices. Focus issues are the following: Is similarity in appearance to oneself a motive for choice? Do motives for choice differ between learners who choose avatars that are more visually naturalistic versus learners who choose avatars that are more stylized or sketchy?

Similarity in appearance is of course a complex notion, involving both specific attributes such as shape of face, skin color, haircut, and more holistic and inferred properties such as personality, gender, ethnicity. We will deal with all of these to various extents.

2. BACKGROUND
2.1 Avatar influences on peoples’ behavior
Which avatar a person uses to represent herself influences other peoples’ perceptions of whom it is they interact with [14,17]. Furthermore, and central for the present context, the person herself behaves differently with different avatars. In a seminal study Yee and Bailenson [19] report the following three findings, which all correspond to effects known from the real world and real people. Participants who were assigned taller avatars acted in a more confident manner and negotiated more aggressively than those who were assigned shorter avatars. Participants who were assigned more attractive avatars tended to move closer towards other avatars than did those with less attractive avatars. Finally, participants with more attractive avatars exhibited increased self-disclosure and presented more information about themselves compared to participants with less attractive avatars. The authors [19] also showed that these effects – i.e. peoples’ behavior conforming to their digital self-representations or avatars – were independent of others’ perceptions of the avatars.

2.2 Educational potentials of avatar use?
Moving to the domain of education, it is well established that a learner’s conception of herself has a considerable impact on her behavior and her accomplishments [1,11]. In view of the studies presented above, maybe there is an educational potential in avatar use. Could students’ confidence with respect to a certain knowledge domain be increased this way? Could their beliefs in their own abilities be boosted? And might the overly self-confident student be supported in taking it easier?

In sum, students could perhaps be enticed to explore potentials in themselves – abilities and behavioral patterns – that do not belong to their habitual repertoire. However, there are certain open issues that would first have to be researched. One regards the kinds of visual designs of avatars that could be useful for educational purposes. As a heuristic, and in line with Yee and Bailenson’s results presented above, visual prototypes and stereotypes [6,15] seem good candidates. But there are also pitfalls in the use of visual stereotypes, which should be taken into account [6]. Another issue regards the role of similarity in appearance between avatar and person. If the aim is pedagogical effects of the kind described above – such as learners being inspired by, and taking on characteristics from, an avatar with a certain visual design – will it matter whether there is some similarity in appearance between the avatar and the learner? Or can a self representation in a pedagogical context be completely dissimilar in appearance to oneself and yet be as pedagogically beneficial?

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2.3 The role of similarity
According to social learning theory [1] the phenomenon of role modeling – the process when a learner imitates actions, style, attitudes, etc. of a role model – is crucially related to (perceived) similarity. If there is similarity in aspects such as gender, age, and ethnicity – which all can be inferred from visual appearance – the likelihood for powerful effects of imitation and learning increases.

Less is known, in this context, about other appearance similarity aspects such as personality, look, and dressing style. But within social psychology more broadly there is rich evidence for the phenomenon of similarity attraction [3], meaning that people are more attracted to others who (seem to) match their own personal characteristics. In turn there is increased attention and receptiveness to messages from “similar others” [2,9,16].

Similarity-attraction effects of this kind have been identified in classroom contexts [4]. Furthermore, similarity-attraction as a basis for getting involved with someone’s situation and actions applies also to fictional characters [10,18]. Hall and Woods [8] present evidence for this with respect to an educational environment where virtual characters act in bullying scenarios. When children perceived that a character looked like themselves in terms of gender, age, looks, style of dressing, etc., they expressed more liking and empathy towards the character.

However, it is not clear how these processes work in the case of an avatar that represents oneself more directly than does a role model or a companion. On the one hand, one can hypothesize that perceived similarity in some aspect or other would play a role here too, at least if the person is supposed to get involved in a learning environment through the avatar, and take on characteristics from it, as described above. On the other hand, there is evidence that users sometimes deliberately chose an avatar dissimilar to themselves in appearance, for example when choosing an avatar of another gender than oneself [5].

In addition, there is an appearance dimension of interest in the context of perceived similarity, that is present in avatars but not in real people, namely the degree of visual naturalism. A humanlike or anthropomorphic character may be more or less visually naturalistic, with photorealism as an endpoint in a quite complex visual space [7]. See figure 1.

2.4 Relationship to self

Questioning the present study explored how appearance similarity seems to influence the choice of avatars in the context of a digital learning environment – in particular in relation to the parameter visual naturalism. Would learners prefer characters similar-looking to themselves? And if so, similar-looking in what sense? Would there be any differences between participants who chose more naturalistic or more stylized characters, respectively? – Note that studying what happens when students may choose between alternative avatars can provide useful knowledge also for learning environments where instructors want to assign certain characters to certain learners on a pedagogical basis.

3. STUDY
3.1 Participants and materials
Twenty 13-17-year olds, 9 females and 11 males, participated in the study. They were recruited at a youth café, a public open-air bathing pool, a public library, and a youth recreation centre.

A dummy educational portal, including an avatar feature for a chat function, had been developed for the study. As a part of signing up to the portal, the user was asked to choose an avatar to represent herself in the chat. The avatar choice function was embedded in a relatively rich and natural context involving other choices, actions and questions.

The eight alternative characters to choose from were based on four original characters – two males and two females – that had each been developed into one more naturalistic and one more stylized version. See figure 2. The more naturalistic design was inspired by the style of Sims and the more stylized design inspired by the style of Manga, which both represent established and successful graphical styles within the user group in question. (But the styles were used as inspiration only and in effect only 3 participants identified one or both sources of inspiration.) The hair color, skin color, clothing style, etc. were held relatively constant among the characters, in order to decrease the complexity of variables and to be in a better position to compare the choices of avatars of the two different visual styles.

Apart from the computer program, there were print-outs of the avatars that were used during the interview. When participants were asked to rank the avatars as to how similar to themselves they found them, these print-outs were used.

Figure 1. Visual naturalism vs. visual stylization
One may wonder how this dimension enters the scene of avatar use with respect to similarity of appearance. Do the ways of reasoning around similarity to self differ among users who prefer avatars of different degrees of visual realism? To answer this question the present study explored how appearance similarity...
3.2 Study procedure
The participants were informed that we were interested in getting points of views on an educational product under development. To enter the portal the participants were required to fill in demographic data on the screen and to answer questions about their hobbies, interest, etc. They were also asked to choose an avatar, out of the eight alternative ones. When the participants were then asked, on-screen, to choose one of some alternative subjects, such as e.g., biology, the click on any of those areas resulted in the message “this part of the program is not completed yet”. At this point we asked whether we could ask a couple of questions about what they had encountered so far and about some related subject matters.

The questioning was carried out in the form of semi-structured, conversation-like interviews. The first question was whether the participants used to read comics magazines and, if so, if they had any favorites. Upon this followed a similar question for computer games. Finally we presented questions about the avatars – that were brought forth as paper printouts. The following enquires were made: 1. Here is the avatar you chose. Why did you choose this one? 2. Here are all he eight that one can chose between? Which of them would you say looks most similar to yourself? 3. In what way? 4. Which one looks second most similar? 5. Which one looks least like you and second lest like you? 6. There are two groups of characters, four plus four, in two different visual styles. Do you recognize the styles? 7. Perhaps we (the company) will use only one style of avatars in the program release. If you think about this, do you see any advantages and disadvantages with either visual style? After the interview the participants were thanked, debriefed and received each a reward equivalent to 3 dollars.

4. RESULTS AND ANALYSIS
4.1 Choosing the avatar most similar-looking to oneself?
All participants chose an avatar “similar-looking to themselves” in at least one regard: They all chose a character of the same gender as themselves. Moreover, all participants ranked two characters with the same gender as themselves as most similar to themselves. But when comparing, for each participant, the character they ranked as most similar to themselves, and the one they chose as their avatar, only 9 out of 20 participants chose the avatar they also held to be most similar to themselves. So did seven of the 12 participants choosing a more naturalistic character (i.e., around 60%) and 2 of the 8 participants choosing a stylized character (i.e., 25%). The total number of participants is so low that not much weight can be put to the purely quantitative result. It becomes more interesting, though, when combined with the analysis of the qualitative material in terms of motives and ways of reasoning about choices, which is presented in next section.

4.2 Similarity to self as a motive for choice
The nine subjects who chose the avatar they also held most similar-looking to themselves, brought forth similarity as a reason of motive for their choice. A notable difference came forth, though, in the analysis of in what way subjects held that their chosen avatar was most similar to themselves.

Seven of the nine had chosen a naturalistic avatar. Six of them emphasized specific appearance features such as haircut, hair-style, eyes, face, etc. For instance: “Her hair is very similar, it is as curly as mine”, “He has got eyes very similar to mine”, “Because he looks like me, the hair-cut is almost the same”.

But the two participants who had chosen more stylized avatars instead spoke in terms of personality-similarity: “Because he looks like a very funny and happy kind of bloke, like me you know, I also feel like a fun guy”, “He feels like a real computer bloke, you see, like I am”.

The seventh of the participants, who chose a more naturalistic avatar, spelt out the similarity as a combination of specific appearance features and personality: “He looks much like me in his face and hair, but not just similar like that – it’s that the face mirrors the same feelings as mine”.

In sum, the indication of a quantitative difference, as presented in 4.1., aligns with a qualitative difference between participants who chose more naturalistic versus more stylized avatars. See figure 3.

![Figure 3. Distribution of motives for choices](image)

4.3 Dissimilarity as a motive for choice
Six participants – one who chose a naturalistic avatar and five who chose a stylized avatar (cf. Figure 3) – instead brought forth dissimilarity to self as motive for choice

The one subject who chose a naturalistic character argued that he did not himself look good, and that therefore he chose “this bloke who looks really good”. Note that this “dissimilarity argument” regards physical dissimilarity rather than personality dissimilarity.

In contrast, the five who chose a more stylized character referred to personality dissimilarity (see Figure 3) with motives such as the following: “She looks happy, open and extrovert, definitely not like me – but like I want to be”, “It would be nice to be more fancy like that, be a little more tough … and fancy”, “He does not care about his looks so much, I do that, I think … but would like to do it less”. It should be noticed that although these participants express that the avatar signals something that is different from themselves, it is not necessarily something “out of reach” but rather something that they have the potential to develop.

Again, the quantitative difference is not significant due to the small number of participants. However, in the light of the quantitative material just presented, together with the answer to the final question in the interview regarding the two styles, an interesting pattern emerges. Several participants commented upon the more stylized design along the following lines: “There is more left to
you own imagination with these”, “With these you can express your personality more, what you have inside”, “These, the Manga-ones, really concern personality”, “They leave things to dream about, the others are too realistic for it to feel good”. This is also in line with comics specialist McCloud’s [13] proposals about more powerful affordances in stylized characters for people to project a fantasy self and read themselves into the character.

Figure 3 summarizes how participants choosing naturalistic avatars focus on physical (dis)similarity and those choosing stylized avatars focus on personality (dis)similarity. Furthermore, of the latter 60% – compared to 8% of those choosing a naturalistic avatar – did refer to dissimilarity.

5. DISCUSSION & CONCLUSION

The results of the pilot study indicate that in the context of an educational chat, similarity in appearance – with respect to specific appearance attributes and/or a personality associated with the visual appearance of the character – is a factor that influences the choice of an avatar for some learners.

Other learners instead lift forth dissimilarity in appearance as a motive for choice. In this study, those who did so indicated that the avatar represented a desire or fantasy of “themselves”, either in terms of visual attributes or in terms of personality. Notably, the “fantasies” where within reach rather than out of reach. Returning to the role model topic, there is a parallel to be drawn. Powerful role models can have one or both of i) being similar, in important respects, to myself as I am now, ii) being not so similar to myself but being someone that I would like to and attempt to be(some) similar to.

But regardless of which of i) and ii), not just anyone can be a powerful role model for a particular individual. In analog, we hold, not just any avatar can be powerful for a particular individual from a pedagogical perspective. Pedagogical power here means: to be a support for the individual to get involved in a learning material or task rather than stay detached, to inspire so that the student explores her own capacities and ways to respond; and perhaps to be involved in processes of identity exploring and formation. However, what is required from a potentially powerful avatar is – as the presented study indicates – not perceived similarity in any simple sense but instead what we propose to call personal resonance. There must be something that resonates. Yet, for some individuals, in front of certain avatars, this something can be a certain aspect of dissimilarity in appearance, for others a certain aspect of dissimilarity. Furthermore, there is probably individual variation in what people find important: ethnicity for some, dressing style for others, gender, aspects of personality, haircut, etc.

Such a complexity rather than a simple dimension or characteristic as the base for pedagogical power would be in line with research on the use of avatars in games [12] which indicates that there is no simple relation of identification with avatars such as “this is my alter ego”. Instead avatar use is a resource for quite multifaceted activities of identity testing, exploring and formation. We think this holds for educational contexts as well.

REFERENCES