

The virtual world is the of our society. From fake Facebook accounts to artificially intelligent web browsers and machines, the globe is moving more and more towards a society that cherishes and values our online persona just as much as our real life one. In fact, in the coming years, “real” life will be a misnomer. The separation between reality and fiction will only become more strained as the walls between the virtual and real worlds blend. It is within that society that the children of the future will have to learn and grow. Avatars and embodied agents will continue to play an ever-increasing role within the lives of school children and families. As such, games and their design will begin to be seen as a means of education and information to a large portion of society. It is up to the designers to create safe and intelligent learning environments that inform children on the big issues while maintaining the delicate balance of reality and fantasy. As mentioned earlier, the inclusion of avatars and embodied agents will only grow and as such, the need for skillfully designed and thoughtfully executed creations cannot be stressed enough. The best part about these tools is that they can be created, manipulated, and iterated upon. On top of that, they can be used to teach children important lessons about the environment, energy use, and other topics within the realm planetary conservation.

There are a few key factors that go into creating a game or virtual environment that children can benefit from. Those factors are player agency, environmental reality, and enjoyment. Player agency will be defined as the player’s capabilities within the virtual world. Environmental reality will be the child’s ability to get lost in and learn from the world. Ideally, those two factors will then feed directly into a high level of enjoyment or, in other words, the child’s ability to synthesize information from and find amusement within the game world. As stated, the child’s agency plays a big role within their perception of the quality of a game. One of

the ways to improve the players level of engagement within a game is from the inclusion of avatars and embodied agents.

### **Avatars**

“Within the context of human-computer interaction, an avatar is a perceptible digital representation whose behaviors reflect those executed, typically in real time, by a specific human being” (Bailenson & Blascovich, 2004, p. 65). This means a created character of the child’s design. By creating this character, the child already becomes more invested because the person or entity that they see within the game more closely aligns with what they themselves believe and feel, as opposed to being forced to play as a seemingly random character.

“Thus, if a user is given a choice of avatar, his or her idea of self is altered by adopting characteristics of the avatar, and if the user is given the option of building an avatar to represent himself or herself, the experience may be made more real and have an effect on the user’s own mental representation of self” (Bailey, Wise, & Bolls, 2009, p. 278).

In short, by creating an avatar that is similar to them, the user (in this case, player) will begin to create a sense of real and imagined self that more closely aligns with the assumed thoughts, feelings, and ideals of the created virtual character. This can be used to create a stronger bond between the real player and the artificial world. At the same time, the designers should also be careful of the implications that come about from this design choice. For example, if the real player begins to do bad things in the real world because they are rewarded for bad behavior in the virtual, then that disconnect, and failure falls squarely on the designer. This is, of course, a gross oversimplification of the interplay between the virtual and real-world experience but the message of caution still stands. Although avatars can be used to great effect in creating ownership of action within the game world, those actions and lessons learned can have an effect on reality.

### **Embodied Agents**

Following the creation of an avatar is the embodied agent. Embodied agents are extremely similar to avatars and they can easily be confused with each other. “Both agents and avatars exhibit behavior in real time in accordance with the controlling algorithm or human actions” (Bailenson et al., 2004, p. 65). However, “An embodied agent, by contrast, is a perceptible digital representation whose behaviors reflect a computational algorithm designed to accomplish a specific goal or set of goals” (Bailenson et al., 2004, p. 65). This means that the embodied agent is actually under the control of the game designer, as opposed to the game player. Although the actions of the agent can be influenced by the decisions of the player, the underlying algorithm within the game is created by the designer. The embodied agent gives the game designer a direct means of interacting with the player without breaking the illusion of the game world. An embodied agent can act as a guide or friend on the journey that the player must go on to learn and grow within the virtual environment.

### **Parasocial Relationships**

This interaction between the real child through their virtual avatar with the fake embodied agent gives way to a unique relationship. That relationship is called a parasocial relationship. “Parasocial relationships refer to one-sided, emotionally tinged relationships that people (in this discussion, children) develop with media characters” (Brunick, Putnam, McGarry, Richards, & Calvert, 2016, p. 182). A good example of this type of relationship can be seen in children’s television shows. In a show like *Blue’s Clues* a child feels more involved with the main characters because the main characters (although fictional and inside of an inanimate object) constantly interact with, and ask for the input of, the child. This leads the child to develop a pseudo bond between themselves and the fictional characters. These relationships can be used to greatly improve the experience of the game player. By giving the player a companion that they

can relate to and learn from, the child will be more likely to retain the information that the designer is attempting to give. “Intelligent characters [and the relationships that occur with them] are an ideal link between home and school environments since children already perceive media characters as enjoyable companions during their free time” (Brunick et al., 2016, p. 187).

Even though parasocial relationships can be seen as a very useful tool in a designer’s arsenal, there are still issues that arise. “In classrooms, an overly personalized intelligent character could weaken a child’s ability to learn from less individualized forms of instruction in a typical classroom” (Brunick et al., 2016, p. 188). When creating the embodied agent and attempting to foster a parasocial relationship, a designer needs to be careful and consider the context that the media they create will be used in. While at home use of a game with a relatable agent may foster learning, that same agent can disrupt a classroom educational effort. This means that the creation of the avatar, the embodied agent, and the game itself need to be extremely well thought out.

### **Uncanny Valley**

Another aspect that lends itself to the creation of an embodied agent and a healthy parasocial relationship is the uncanny valley and its implications. “The uncanny valley hypothesis, proposed already in the 1970s, suggests that almost but not fully human like artificial characters will trigger a profound sense of unease” (Kätsyri, Förger, Mäkäräinen, & Takala, 2015, p. 1). The uncanny valley can completely ruin any well-designed game or environment simply because of how off putting that feeling is. “The uncanny valley is an important consideration when designing an intelligent agent, as character attachment is predicated on feelings of comfort and safety. Fearful reactions to uncanny valley characters likely mean that children will feel uncomfortable or unsafe with those characters, thereby disrupting parasocial

relationship development” (Brunick et al., 2016, p. 183). The key to a good experience within a virtual environment depends on the acrobat-like balance of parasocial relationships, uncanny valleys, avatars, and embodied agents. Once these elements are understood and managed, a fantastic learning experience can be had.

### **Game Design**

With all the terms and concepts defined above, below is an example of a game designed with those philosophies and ideas placed front and center. *Clean Earth* is a game that tasks children with saving the Earth, one turned off light bulb at a time. The child, aged six to nine, has been asked by a peace-loving alien to help them bring Earth up to “galactic code”. The planet is currently wasting too much energy and it is the child’s job, with help from their alien friend, to save the planet. The game begins with child creating their own avatar. The creation of this avatar allows for self-expression and gives the player more agency within the game world. The player is tasked with practicing energy efficient uses of their own home electricity. Over time, the child will branch out of their house and begin to change the poor energy and power usage of their city. Gradually, the child will increase the scale of their energy project until they’ve changed the entire planet’s energy usage and brought life back to the planet as a whole.

As mentioned above, the child will create their own avatar using the in-game avatar creation engine. The student begins the game in their room where they decide what they look like (from altering clothing, to adjusting their skin color and hair type). The creation of the avatar is pivotal for the overall function of the game because it gets the child invested in the actions that they take within the game world since, to a certain extent, they live in the world too. The child will not be by their self and forced to figure all the rules and issues of the game out on their own. An embodied agent in the shape of a humanoid alien will help guide them through the levels and

issues of the game. This alien will look similar to a human in terms of it being a bipedal creature with two arms and two legs. On top of that it will have two, regular sized eyes, a nose, and a mouth with fairly human like facial features. The main difference between the alien and a regular human will be the alien's purple skin and high-pitched voice.

Within the game, the child will have complete control over their own character and can interact with the alien embodied agent to receive guidance and information on energy usage. The bond between the alien and the child depends on the child's level of play within the game world. The better the child plays, the happier the alien becomes. In turn, the alien will continue to reassure the player and guide them towards good behavior and proper play. The human qualities of the alien will increase the chance of the child creating a parasocial relationship with the embodied agent. Again, that relationship heavily depends on the child attempting to interact with the embodied agent and the game world in a positive manner. However, the human-likeness of the alien would be kept to a minimum in order to avoid falling into the uncanny valley. If the alien were to look too real and move too stiff, then the child (and most adults) would more than likely feel unease and begin to fall out of the parasocial bond attempting to be made by the designers.

Although the purpose of the game is to teach children proper energy use, that experience cannot be fostered without the help of a good avatar creation system, a helpful and relatable embodied agent, and the bond that is created between those two entities. On top of that, the need to avoid the uncanny valley will keep the creation of the game moving swiftly toward an immersive experience that the child can get lost in. By continuing to study the relation between avatars and agents, designers can better create experiences that educate and entertain children of all ages.

## References

- Bailenson, J.N. & Blascovich, J. (2004). *Avatars. Encyclopedia of Human-Computer Interaction*. Berkshire Publishing Group, 64-68.
- Bailey, R., Wise, K., Bolls, P. (2009). *How Avatar Customizability Affects Children's Arousal and Subjective Presence During Junk Food-Sponsored Online Video Games*. *CyberPsychology and Behavior*, 12 (3), 227-283.
- Brunick, K.L., Putnam, M.M., McGarry, L.E., Richards, M.N., & Calvert, S.L. (2016). *Children's Future Parasocial Relationships with Media Characters: The Age of Intelligent Characters*. *Journal of Children and Media*, 10 (2), 181-190.
- Kätsyri, J., Förger, K., Mäkräinen, & Takala, T. (2015). *A review on different uncanny valley hypotheses: Support for perceptual mismatch as one road to the valley of eeriness*. *Frontiers in Psychology*, 6 (390) Retrieved from <https://www.frontiersin.org/articles/10.3389/fpsyg.2015.00390/full>
- Richert, R., Shawber, A. Hoffman, R., Taylor, M. (2009) *Learning from Fantasy and Real Characters in Preschool and Kindergarten*. *Journal of Cognition and Development*, 10 (1-2), 41-66.