V-learning: how gaming and avatars are engaging online students

Len Annetta, *North Carolina State University, Raleigh, NC, USA*
Marta Klesath, *North Carolina State University, Raleigh, NC, USA*
Shawn Holmes, *North Carolina State University, Raleigh, NC, USA*

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ABSTRACT. Len Annetta, Marta Klesath, and Shawn Holmes describe how avatars in Virtual Learning Environments (VLEs) can contribute to the learning experience by giving students a sense of social presence, and investment in the learning community, that may otherwise be difficult to access. VLEs have the potential to become the next generation of instructional tools for online learning. By allowing students to simulate the campus experience online, VLEs offer rich, flexible class environments, without compromising their reach to diverse students desiring online courses. Describing studies carried out in the *WolfDen* VLE, Annetta, Klesath, and Holmes examine how gaming and avatars are engaging online students, and the role personality may play in a student's selection of an avatar.

KEYWORDS: *Avatars, Flexible Class, Games, Learning community, V-learning environment*

Introduction

As I watched my 12-year-old nephew play *Halo 2* online while strategizing with his friends over his microphone-enabled headset, I realized that his play environment might well be the next distance learning platform (Halo 2, 2008). In cooperative online video games like *Halo 2*, players win by working together to understand and overcome the obstacles set forth in the storyline. Essentially, cooperative learning is occurring in these games. The virtual worlds in which today's video games take place can be reshaped as real-time synchronous virtual classrooms; the advance of technology and increasing accessibility of that technology mean that virtual reality is a viable distance education option.

As net generation students[1], already the leading population in online gaming, bring their well-documented learning styles, and demands for flexibility and adaptability into higher education venues, the three-dimensional gaming environment remade as a virtual classroom could become the natural next step in online learning (Oblinger, 2006).

1. http://innovateonline.info:80/extra.php?id=1955

The educational analogue to the three-dimensional gaming world is the Virtual Learning Environment (VLE). The VLE is an online space where learners represent themselves through images called avatars, graphical personifications that represent the learner's identity, presence, location, and interaction within the VLE. Within this environment, students, represented by their individual avatars, can interact, in real time, with each other, and with computer-based agents, digital artifacts, and virtual contexts. These three-dimensional worlds promise to extend the classroom, and offer an engaging medium for distance education (Dickey, 2000). However, if avatars serve a vital role in supporting interactions among learners in a VLE, the typical relationship between an avatar and a given learner's sense of identity remains an open question for researchers. To what extent does a learner's selection of an avatar correspond to his or her self-perception, personality traits, or overall character outside the virtual environment? Is such a correspondence based upon a relatively consistent, coherent personality type, or does it invoke a more fluid sense of identity, that depends on the learner's state of mind, from one day to the next? How flexible should a VLE platform be in allowing users to modify their avatars? As designers continue to explore new ways of creating VLEs for instructors and students, further research into these questions can provide a helpful foundation for such innovations. This article offers a preliminary exploration of such issues, based on a study of avatar selection among students at North Carolina State University (NCSU).

WolfDen

Created with the support of an internally funded NCSU grant, *WolfDen*, the first three-dimensional VLE used for distance education on the NCSU campus, is designed to investigate how synchronous interaction could be facilitated online. The inaugural course (http://courses.ncsu.edu:80/ems594/common/ignite/index.html) offered via *WolfDen* was a graduate-level course on game design for education students; that course and subsequent offerings have served as a test bed for research on the connections between avatar choice, personality, and social presence in a VLE. *WolfDen* virtually simulates parts of the NCSU campus, giving students a sense of being on campus, and engaged in the student community even as they work from home.

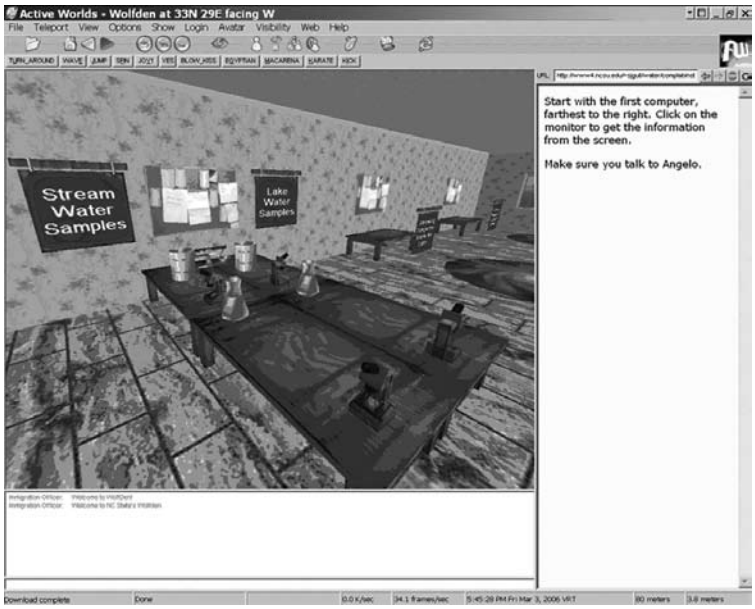

Figure 1. WolfDen's virtual environment emulates NCSU's physical campus. For instance, when students first enter WolfDen, they are situated in the brickyard area outside D. H. Hall Library and the University Center on North Campus http://innovateonline.info/extra.php?id=1957

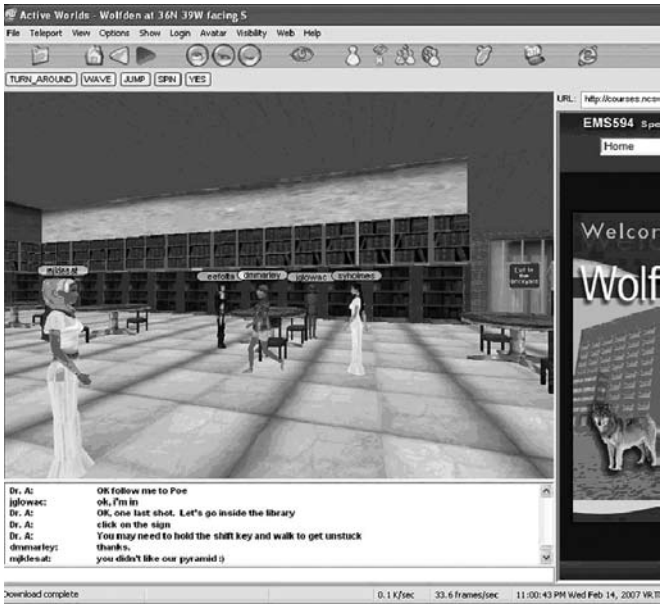

Figure 2. Students can take a virtual walk through the library itself http://innovateonline.info/extra.php?id=1957

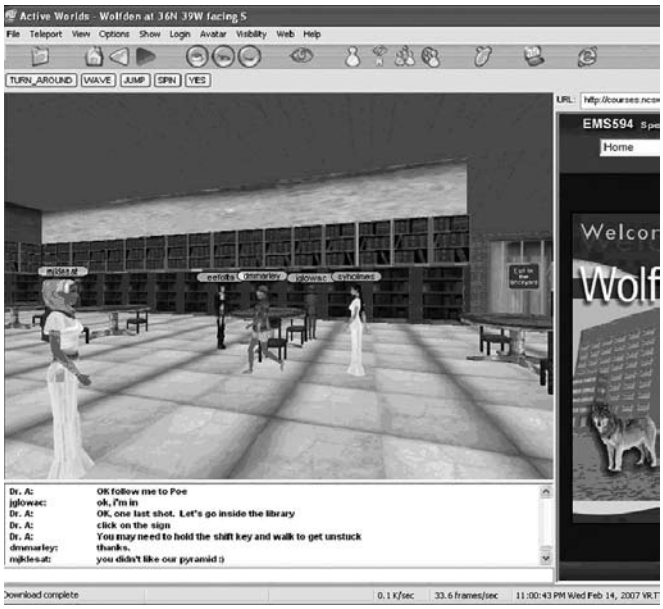

Figure 3. Students can visit online versions of other campus locations, such as Poe Hall, the education building http://innovateonline.info/extra.php?id=1957

Within the virtual campus, students can access teacher-designed objects to complete class activities and facilitate learning. The online environment was created using tools provided by Activeworlds (Activeworlds, 2008), a 3-D chat room and virtual reality platform. The same Voice over Internet Protocol (VoIP) technology typically used to connect players in online games supports real-time verbal communication among students in the VLE.

The *WolfDen* format reflects that of multiplayer video games: up to 50 people can interact in the environment in real time. This format creates an engaging and interactive virtual environment that students find appealing. The three-dimensional virtual environment also addresses some customary problems in online learning, in terms of teamwork, labs (Figure 3), and discrepant events.

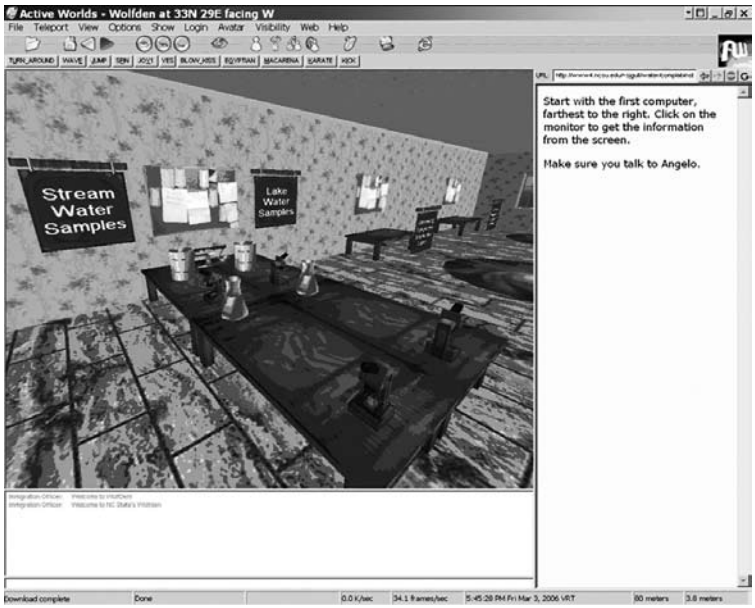

Figure 4. A virtual water testing lab in WolfDen http://www.innovateonline.info/extra.php?id=2212

The Activeworlds interface offers students a choice of 100 avatar designs of different genders and various ethnicities and species (http://innovateonline.info:80/extra.php?id=2215).

Avatars and social presence in the VLE

Gamers have long been aware, at least intuitively, of the importance of avatars; the gaming world thrives on software that gives participants the ability to express their personalities through avatars (Kushner, 2004). The choice of avatar can reflect a player's gender, ethnicity, and personality - or allow a student to assume a completely different identity, in itself a learning experience (Lee, Hoadley, 2007). The avatar is the key to communication within the VLE as well; participants speak to one another via their avatars, responding to the virtual representation of the person.

In this way, avatars tap into one of the most powerful forces in the human psyche: the need for social interaction (Garrison et al., 2000; Moshell, Hughes, 2002), and social presence[2]. A positive sense of social presence has been associated with enhanced online social interaction (Tu, McIsaac, 2002), and has been shown to be a strong predictor of satisfaction with computer-mediated communication (Gunawardena, Zittle, 1997). The concept of social

2. http://innovateonline.info/extra.php?id=1956

presence suggests that the presence of other people (in the form of avatars) in a VLE provides evidence that the VLE actually exists. Correspondingly, the acknowledgment of a participant's presence in the VLE by other participants offers affirmation that one actually exists in that environment (Sadowski, Stanney, 2002). Hence, the existence of avatars and the interactions between them can build and sustain group commitment (Rourke et al., 2001). Richardson and Swan demonstrate that a student's positive perceptions of his own social presence within the online community positively correlate with better performance in general, not only in online activities generally designated as group projects, but also in those activities usually designated as individual projects (Richardson, Swan, 2003).

In this context, avatar design takes on real importance as the mechanism by which students develop an identity, and a corresponding sense of presence within the VLE. A case study by Annetta and Holmes investigated the use of avatars in a synchronous online science education course as a tool for demonstrating social presence and building community within the course (Annetta, Holmes, 2006). Two cohorts of students were analyzed to ascertain each individual's sense of presence in a VLE. Data were collected through class observations, written server-side bots (a record of avatar changes and conversations), and interviews at the conclusion of the course. Group I was given the choice of 100 different avatars ranging from humans to abstract objects, such as a motorcycle, helicopter, or animal. Group II was given two choices, male or female, both depicted as tourist characters. Social presence was measured by focus group interviews in which the selected participants were asked to articulate why they chose their avatars and how that choice affected course satisfaction.

In the results of this study we found that, when given the choice, students frequently changed avatars to reflect their roles in the class assignment, the avatar's effect on the students as individuals, or even just the student's mood[3]. This behaviour does not differ greatly from what happens with students' self-presentation in the traditional classroom, where dress, attitude, and physical posture offer insights about a student's mood and approach to the class, as well as about the student's personality more generally. This study indicated that students preferred greater avatar selection within the VLE, and that a lack of selection negatively affected

3. See Table at http://innovateonline.info/extra.php?id=1889

students' sense of social presence; such results suggest that providing multiple avatar choices can help students establish themselves in the online community as unique individuals.

Personality and presence in avatar choice

Given our earlier results on avatar choice and social presence, we hypothesized that personality might play a role in avatar choice. Our earlier work suggested that students choose particular avatars, based on the look and function of the avatar; we hypothesized that the attraction to a particular avatar could be connected to the student's personality, perhaps in ways that are not obvious. For example, a student who is quiet or introverted in a traditional classroom setting, and chooses an avatar who looks like Julius Caesar, might be hiding behind the avatar, in a sense: that avatar could make the student feel more confident participating in the class. Whether a person is introverted, intuitive, thoughtful, or judgmental might be a factor in social presence, and the attributes directly related to it, and thus may shed light on a student's predisposition to be a successful learner in such an environment.

To investigate the hypothesis that avatar choices are connected to personality types, data were collected from seventeen undergraduates - 2 males and 15 females - participating in a seminar class, held in *WolfDen*, for seniors majoring in science education. The course is offered during the student teaching professional semester, and is designed to facilitate discussions around emerging topics the students face in their daily teaching practices. The class met in the VLE in real time; discussions were led by the instructor synchronously interacting with the students. Students were offered a choice of 100 avatars, and could change avatars at any time, so long as they noted the names of the avatars they chose.

Before the first class, students took a Jung-Myers-Briggs (JMB) personality test to ascertain their personality types (http://www.humanmetrics.com/cgi-win/JTypes2.asp). An online version of the most well-known and reliable personality test seemed to be the best approach to obtaining this information. The test, developed by Carl Jung, David Kiersey, Isabel Myers, and Katherine Briggs, is a hybrid of the Myers-Briggs Type Indicator and the Kiersey Temperament Sorter. The JMB categorizes individuals, based on four primary dichotomies, that define psychological function: introvert vs. extrovert, thinking

vs. feeling, intuition vs. sensing, and judging vs. perceiving (http://www.humanmetrics.com/cgi-win/JungType.htm). We chose this measure to see if conscious or subconscious factors influenced a student's choice of avatar. Thus, we hoped to determine whether or not students were representing themselves according to their psychological profiles.

During the final class, students were asked to share their avatar choices, and describe what prompted these selections. Responses were recorded and compared to the JMB results from the first class. Avatars were mapped to JMB categories by asking students to explain how they thought their JMB results might relate to their avatar choices. Students struggled to find this alignment, indicating that personality, at least as defined by the JMB, was not part of their process in choosing avatars. Following a double-blind review process to ensure interrater reliability, we concluded that there is not a very strong correlation between results from the JMB personality test and the avatars chosen.

The negative results of this study may have been partially an effect of the use of the JMB model as a measure of personality type. The lack of relationship between personality and avatar choice in a three-dimensional VLE may be explained, at least in part, by the general disagreement among students with their JMB results, which did not reflect their preconceived notions of their own personalities. For example, one student thought she was introverted, while the JMB said she was extroverted. In turn, the fact that the students knew the results of their personality tests prior to immersing themselves in the VLE could have affected some students' avatar choices, but this is not likely. This was the first experience any of these students had had in a VLE for educational purposes, and the results of the JMB were soon forgotten after the first class.

Instead, when the students learned how to change their avatars, many tried them all to see which one best represented them on a given day - and that seems to be the catalyst to avatar choice: a student's mood on a given day. Whether a student has a performance task or is simply interacting with his or her peers, avatar choice aligns closely with how a student wants to be seen on that day, and in that particular situation. While not conforming to any static, consistent personality profile, such student choices nevertheless remained consistent with our earlier findings, and indicate the key role of avatars in maintaining a sense of social presence.

Conclusion

This study provides evidence suggesting that, while identity and presence are critical components of student satisfaction in Virtual Learning Environments, personality type does not align with avatar choice, in any singular or schematic fashion. It is crucial to expand on this new knowledge when building synchronous, online environments that are sufficiently flexible for the purposes of distance learning. We would suggest a mechanism that allows both instructors and students to create their own avatars, and manipulate them throughout the duration of the course. Although our results point in this direction, the study was limited in its research design and rigor. A controlled study that investigates student personality and avatar choice might be more telling if the students could create their own avatars. This measure would eliminate the lack of choice, and would allow students to represent their personalities visually. Not unlike smilies or emotional icons in some course management software and chat rooms, avatars are a vehicle for student expression, and this expression gives them a uniqueness that builds a sense of social presence and satisfaction. As each day brings a different mood, allowing course participants to showcase their individuality on a daily basis might be the key element that connects attitudes to learning in an online environment.

References

All URLs checked June 2008

Activeworlds Website (2008), http://www.activeworlds.com:80/

Annetta Leonard A., Holmes Shawn (2006), *Creating presence and community in a synchronous virtual learning environment using avatars*, "International Journal of Instructional Technology and Distance Learning", v. 3, n. 8, http://www.itdl.org/Journal/Aug_06/article03.htm

Dickey Michele D. (2000), *3D virtual worlds and learning: an analysis of the impact of design affordances and limitations of active worlds, blaxxum interactive, and onlive! Traveler; and a study of the implementation of active worlds for formal and informal education*, Ohio State University [PhD thesis]

Garrison Randy, Anderson Terry, Archer Walter (2000), *Critical inquiry in a text-based environment: computer conferencing in higher education*, "The Internet and Higher Education", V. 2, n. 2-3, pp. 87-105

Gunawardena Charlotte, Zittle Frank (1997), *Social presence as a predictor of satisfaction within a computer-mediated conferencing environment*, "The American Journal of Distance Education", V. 11, n. 3, pp. 8-26

Halo 2 Website (2008), http://www.xbox.com/en-US/games/h/halo2

Kushner David (2004), *My avatar, my self*, "Technology Review", V. 107, n. 3, pp. 50-55

Lee Joey J., Hoadley Christopher M. (2007), *Leveraging identity to make learning fun: possible selves and experiential learning in massively multiplayer online games* (MMOGs), "Innovate", V. 3, n. 6, http://innovateonline.info/index.php?view=article&id=348

Moshell Michael J., Hughes Charles E. (2002), *Virtual environments as a tool for academic learning*, in Stanney Kay (ed.), *Handbook of virtual environments*, Mahwah, NJ, Lawrence Erlbaum Associates, Inc. pp. 893-910

North Carolina State University Website (2008), http://www.ncsu.edu/

Oblinger Diana (2006), *Simulations, games and learning*, EDUCAUSE Learning Initiative, http://www.educause.edu/ir/library/pdf/ELI3004.pdf (last retrieved 23 August 2007)

Richardson Jennifer, Swan Karen (2003), *Examining social presence in online courses in relation to students' perceived learning and satisfaction*, "Journal of Asynchronous Learning", V. 6, n. 1, pp. 21-40

Rourke Liam, Anderson Terry, Garrison Randy, Archer Walter (2001), *Assessing social presence in asynchronous text-based computer conferencing*, "Journal of Distance Education", V. 14, n. 2, pp. 50-71

Sadowski Wallace, Stanney Kay (2002), *Presence in virtual environments*, in Stanney Kay (ed.), *Handbook of virtual environments*, Mahwah, NJ, Lawrence Erlbaum Associates, Inc., pp. 893-910

Tu Chih-Hsiung, McIsaac Marina (2002), *The relationship of social presence and interaction in online classes*, "The American Journal of Distance Education", V. 16, n. 3, pp. 131-150

Sintesi

Gli ambienti virtuali tridimensionali di gioco, come quelli utilizzati correntemente da molti adolescenti in tutto il mondo, costituiscono un prototipo delle piattaforme per la formazione telematica più avanzata. L'utilizzo di tali ambienti permette infatti di soddisfare la richiesta di flessibilità di studenti ormai abituati alle molteplici offerte informatiche dei videogiochi tridimensionali. Tali strumenti, in campo educativo, si traducono in Ambienti Virtuali di Apprendimento, in cui studenti e docenti sono rappresentati attraverso avatar tridimensionali che si muovono e interagiscono tra di loro, in maniera generalmente sincrona, all'interno di un ambiente, anch'esso tridimensionale, che simula contesti reali.

Generalmente, gli utenti di un Virtual Learning Environment (VLE) possono selezionare il proprio avatar e cambiarlo nel corso delle attività svolte in piattaforma. In questo senso, è possibile interrogarsi su quale sia la relazione tra identità personale e scelta dell'avatar, e sulle forme di identificazione tra l'utente e l'avatar che lo rappresenta. Tale relazione è probabilmente meno lineare e scontata di quanto possa apparire, poiché il nesso identitario non necessariamente si esaurisce nella ricerca di un avatar dotato di caratteristiche che rispecchino direttamente il carattere dello studente che lo utilizza. Resta inoltre da chiarire se e in che modo tale relazione condizioni il processo di apprendimento.

Per studiare questi temi, la North Carolina State University ha avviato una ricerca sugli studenti che seguono corsi accademici virtuali utilizzando la piattaforma WolfDen dell'Ateneo. Si tratta della prima piattaforma tridimensionale recentemente adottata dall'Ateneo per l'erogazione di alcuni dei suoi corsi, tra cui un corso inaugurale sul design di videogiochi. La piattaforma è stata realizzata utilizzando un insieme di strumenti forniti da Activeworlds, cui si affiancano le

tecnologie VoIP per la comunicazione in tempo reale. WolfDen funziona come un videogame multiplayer, a cui possono partecipare contemporaneamente fino a 50 utenti, che possono scegliere tra 100 modelli di avatar. Lo studio evidenzia in primo luogo il fatto che la possibilità di scegliere tra numerosi avatar condiziona il senso di presenza sociale all'interno dell'ambiente virtuale di apprendimento. Infatti, gli avatar, che costituiscono il principale mezzo di comunicazione degli studenti tra di loro, vincolano la possibilità dell'interazione sociale che è, a sua volta, un fattore determinante per facilitare la comprensione e l'apprendimento. La scelta degli avatar contribuisce inoltre a creare uno spirito collaborativo tra i partecipanti, poiché ne facilita la comunicazione e migliora i risultati degli studenti, in tutte le attività proposte in piattaforma. Lo studio si avvale anche della letteratura sperimentale sul tema e dei risultati dimostrati da studi applicativi precedenti (Annetta, Holmes, 2006). In particolare, gli studi sulla frequenza con cui gli studenti cambiano l'avatar che li rappresenta indicano la netta preferenza per piattaforme che permettano di cambiare il proprio avatar e offrano una grande quantità di modelli, da utilizzare in diversi contesti e per varie attività. La disponibilità di pochi avatar tra i quali scegliere, al contrario, influisce negativamente sul senso di presenza sociale in piattaforma.

A partire da questi studi, la ricerca avviata dalla North Caroline State University ha cercato di chiarire la relazione tra la scelta dell'avatar e la personalità dello studente. Anche in questo caso, l'analisi del comportamento degli studenti di un corso erogato attraverso la piattaforma WolfDen ha permesso di chiarire alcuni aspetti del problema. La ricerca si è articolata in fasi successive. Gli studenti sono stati inizialmente sottoposti ad un test di classificazione della personalità (Jung-Myers-Briggs o JMB Personality Test) che identifica diverse tipologie caratteriali in base a quattro dicotomie (introvert/extrovert; thinking/feeling; intuition/sensing; judging/perceiving). In secondo luogo, è stato chiesto agli studenti di spiegare cosa avesse ispirato la scelta dell'avatar o degli avatar utilizzati. Si sono poi incrociati i dati ottenuti sugli studenti con i loro profili, le motivazioni fornite per la scelta degli avatar e le caratteristiche degli avatar stessi. L'ipotesi inizialmente formulata, secondo cui la scelta dell'avatar rifletterebbe il profilo psicologico dello studente, non è risultata confermata dalla ricerca, forse a causa del fatto che non sempre gli studenti stessi si riconoscevano nel profilo fornito dal test di personalità. In generale, però, sembrerebbe che la scelta degli avatar sia determinata più dall'umore del momento e del giorno, nonchè dal tipo di attività che si deve svolgere in piattaforma, che non dalla percezione della propria personalità. In questo senso, la possibilità di scegliere tra molti avatar è importante per favorire la socialità virtuale degli studenti. In definitiva, gli avatar si sono decisamente confermati come elementi fondamentali per garantire la presenza sociale degli studenti in ambienti virtuali e tridimensionali, ma non in base a schemi di personalità rigidi e stabili.