LEARNERS AND COLLABORATIVE LEARNING IN VIRTUAL WORLDS:
A Review of the Literature

Ria HANEWALD
Deakin University
Faculty of Arts and Education
School of Education, Burwood, 3152, AUSTRALIA

ABSTRACT

The purpose of this paper is to present selected literature on learners and collaborative learning in virtual worlds. Research in virtual worlds on collaborative learners is gradually emerging and will gain in significance, particularly in online and distance education environments. It will be argued that the design and functionality of virtual worlds provides a platform for collaboration, particularly for learners that have grown up with digitalized learning environments and may have developed a preference for them.

The paper starts with a clarification of terms, a description of the various categories and a chronological overview of the emergence and development of these environments. The familiarisation with the subject matter continues through a discussion of the significance, opportunities and barriers that this medium offers and is followed by an examination of learners' characteristics and their implications for teaching and learning in virtual worlds.

Drawing on recent examples of virtual worlds in education and some current statistics, the paper strives to meet the continuing education needs of practitioners and educator using virtual worlds. It concludes with an examination of the challenges and perspectives on collaborative learning in these environments and the trends in virtual worlds that impact the delivery of student learning.

Keywords: Virtual Worlds, learner characteristics, collaborative learning.

INTRODUCTION

In examining the literature for this chapter, two major themes were considered: learners in virtual worlds and collaborative learning in virtual worlds. Four specific databases (ERIC, ISI Web of Knowledge, Education Research Complete, Computers and Applied Sciences Complete) were used through EBSCO host advanced search facilities, applying the criteria of English language only, scholarly (peer reviewed journals), January 2008 to January 2013 with the Boolean search terms of 'learn*', and 'collaborat*'and 'virtual*' and 'world*' in the abstract and keywords. From each of those four data bases, the ten most cited papers were selected and then checked for duplicates. These were subsequently eliminated to establish the source literature for the review. The examination revealed different terminology and descriptions, which lead to this clarifying opening:

233

Virtual worlds are often also called simulated worlds or digital worlds. They are defined by a set of features, such as persistence (the online world that is available 24/7, regardless if the user is logged in or not) and interactivity (it allows users to build and customise content). Another aspect is the Graphical User Interface (GUI), which ranges from 2-D cartoon image style to 3-D immersive environments. It affords a shared space for multiple users to interact in real time with other users through their avatars. The immediacy of these environments enables socialization and the building of communities with the world, thus encouraging in-world teams, guilds and cliques (Cherbakov, Brunner, Lu and Smart, 2009, pp.4-5).

According to Hew & Cheung (2010, p. 34) virtual worlds are characterised by four elements : the impression of a 3-D space, the use of avatars as visual representations of participants, the interactive chat tools that allow communication with others and the ability to manipulate objects. Avatars are able to walk, run, fly and even teleport inside the virtual world. Users can give non-verbal communication clues such as gestures and emotive actions which defeat the limitations of text-based exchanges.

Given the attributes and interactivity of these environments it could be argued that they provide an excellent opportunity for collaboration, especially when defining collaborative learning as two or more people learning or trying to learn something together by using each other's knowledge, skills, experience and resources. Lee (2009, p. 150) elucidated that the term of 'cooperative' learning is also used and described it as "... a student-centred approach in which groups of individuals work jointly on a well-defined learning task". He clarified that it functioned as an umbrella term for a range of instructional techniques such as writing groups, learning communities and problem-centred teaching and contains six procedural elements: intentionally formed groups, group interactions over a period of time, interdependence amongst group members, accountability of individual members to the group, explicit instructions to develop social skills and the instructor as facilitator (Lee, 2009, pp. 150-151).

Initially virtual worlds replicated real life interactions in classrooms, lectures and meetings with the main advantage being that learning and collaboration in-word negated geographical distance and afforded cross-national teams and co-operation beyond individuals' physical location. Later on, the evolving of unique features within virtual world spaces such as 3D models and virtual world mind mapping tools to record and map the flow of ideas offers new and exciting elements for in-world collaborative learning. The following section will trace this development in more detail to give the novice reader some sense of the domain's conception and growth.

EMERGENCE AND DEVELOPMENT OF VIRTUAL WORLDS

Wave 1:
Birth and Embryonic Development (prior to the year 2000)
Text-based role playing games of the 1970s and 1980s on PLATO such as Adventure, Avatar and the first MUDs (Multi-User Dungeons) were replaced by graphical computing in the mid-1980s when it became affordable. It allowed the creation of digital, visual versions of these games which spawned virtual world experiences across many genres including shared board and game tables, fantasy-role playing games, simulators, and social virtual worlds. Personal computers such as the Commodore 64 and low speed dial up networks interfaces set the stage the first graphical social virtual word called Habitat.

234

Users were now called avatars and were able to move around environments, interact through text chat and barter for objects. The first generation of social virtual worlds had arrived. In 1995, Worlds Chat was launched, which used teleportation and rich sound and spatial experiences. Three months later, the launch of Alphaworld allowed building inside its world by using pre-fabricated objects. The year also saw the coining of the term 'in-world' to describe the time while being inside a virtual world. By the end of the 1990s most companies vanished or changed hands due to a lack of money and the dotcom crash of 2000. For a time it was doubtful if social virtual worlds were feasible (Damer 2008, pp.2-14).

Wave 2:
Emergence and Growth (the last 5 to 10 years)

During the late 2006, media awareness grew and users began to notice the metaverse. While 2007 saw over 100 brands set up islands in Second Life, the growth across other segments came a little later in 2008. It saw established worlds continuing their user growth but new worlds had to battle it out. The global financial crisis and a lack or drop in funding caused new world launches to slow, with predictions of a total of 300 worlds by the end of 2010.Revenues from 2009 to 2011 are predicted to increase by $ 1 billion every year, with forecasted revenues for 2012 and 2013 to reach $ 6 billion and $ 9 billion respectively (KZero, 2009).

Damer (2008) suggests that the rise of social networking sites such as Facebook, MySpace, LinkedIn, voice and video over IP such as Skype and YouTube, mobiles devices with SMS, Cyworld, DoCoMo and collectively constructed knowledge repositories like Wikipedia produced an entirely new appreciation in consumers. It re-vitalized the social virtual world space which lead to the launch of a beta version of Second Life and There in early 2003. Second Life used two keys concepts of the first generation virtual worlds, the object economy of Habitat and the user -empowering building methods of Alphaworld. It formed the marketplace for objects that can be sold and bought. Subsequently, a community of object makers and marketers emerged (Damer, 2008, pp.14-15).

At this point, greater differentiation transpired as virtual worlds could be synchronous or asynchronous, open or have a content focus or focus on age. The latter is now evident in the existence of several virtual worlds for children (e.g.. Club Penguin, Disney's Toontown, Neopets, Mokitown, Virtual Magic Kingsdom, Whyville). For example, Whyville, which aims to provide educational experiences, has had its twelfth anniversary in March 2011. This longevity of virtual worlds specifically for children is a testimony for a need for age specific environments, which is further apparent in those explicitly aimed at teenagers. These include Coke Studio, Dubit, Habbo Hotel, The Manor, The Palace, Playdo, Second Life for Teens, The Sims Online, Sora City, Yohoho! Puzzle Pirates. Combined with those for adults (i.e. Active Worlds, Kaneva, Entropia Universe, Second Life, There, Traveler, Tower Chat, Virtual Magic Kingdom, Worlds.com) an online search during January 2012 revealed that there are in excess of thirty different virtual worlds currently in existence.

According to KZero (2011a) were 1.4 billion registered accounts in virtual worlds in August 2011. However, only about five to ten percent are actual, active users as many are trying out one world then moving to another only to return to a previously used world to open a new account and so on.

This 'churn' has to be considered when looking at an almost 20 percent quarterly growth, with an increase of 132 million accounts every three months. For example Habbo grew 20 million accounts (to a total of 220 million) in the second quarter of 2011 but has only 13 million monthly active users. Similarly, Disney's Club Penguin had 70 million registered accounts but only 6.7 million active users. .

By December 2011, the 10 to 15 year old segment (787 million accounts) was the largest in virtual worlds (e.g. Stardoll, Club Penguin, Moshi Monsters, Neopets, Poptropica), followed by 596 million accounts in the 15 to 25 year old segment. Not surprising, Western Europe and North America dominated in terms of registered accounts, with South America and Eastern Europe on the rise (Kzero, 2011 b).

In terms of the time spend, Second Life users were 481 million hours in-world during 2009, which is a growth of 21 percent compared to the previous year. More than 1,400 businesses and government organisations have used Second Life to hold meetings. In 2009, user to user transactions totalled US $ 567 million, which is a growth of 65 percent from the previous year. Second Life residents earned approximately US $ 55 million in real money (Second Life, 2011).

Virtual goods - such as a digital bottle of champagne or weapons - that are traded in the U.S.A. could be worth $ 5 billion in the next five years. Sales are already around the $5 billion mark in Asia and are rapidly growing (BBC, 2011). These statistics show that virtual worlds are becoming a greater part of many people's lives, as an increasing portion of the population spends large amounts of time in these environments. The next section might illuminate this popularity but at the least inform about the present situation.

Wave 3:
Current State and Future Directions (immersion, simulation, games)

Virtual worlds allow rich interactions between participants by exchanging messages, objects or money and by talking to each other over a headset and microphone. Players are immersed in and thus can experience the virtual world through a range of activities such as changing their avatar's shape and clothes, creating and owning items, engaging in quests, dancing, hugging, kissing or doing sports. While most of these pursuits are entertaining, some opportunities in virtual worlds are designed for education and business (Messinger, Stroulia and Lyons, 2008, p.13).

Predictions are that by the end of 2011, 80 percent of Internet users will have a virtual presence or an avatar in one of the virtual communities, which indicates their increasing significance as 3-D representations. Therefore, Google is developing universal avatars that allow moving between worlds as it is anticipated that the next five years will see the 3-D Internet becoming as important as the Web is now (Messinger et al., 2008, p.2).

While some virtual environments are free, others are revenue generating though either a once-off registration fee, a reoccurring fee charged per use, a subscription fee, advertising-based income from sponsors, pay-as-you-go extras that purchase virtual assets such as land or clothing for the avatar (i.e. Second Life, Battlefield Heroes) and the sale of merchandise such as stuffed animals (e.g.. Webkinz) and accessories (Messinger et al., 2008, p. 7).Given the statistics, it becomes clear that social spaces and avatars are spreading and will soon be available everywhere.

To facilitate access, mobile phones for example are sizing the pixel density curve and performance to host social worlds, and social enclaves on game console allow the creation of individual home worlds by users while they are outside the game play. It is conceivable that a connection to GPS would support a mixed-reality view that merges the real and virtual worlds (Damer, 2008, p.16).

Therefore - in recognising their growing significance - it is essential to have an understanding of the kinds of simulated worlds to appreciate their spectrum.

TYPES AND CATEGORIES OF VIRTUAL WORLDS

After reviewing the literature on virtual worlds, Hew and Cheung (2010) classified three categories of usage for virtual worlds.

> ➢ One was as communication spaces to transfer information from one person to another, for example in learning an additional language or completing a task.
> ➢ A second usage of virtual worlds was for simulation of space, where users can be immersed in the 3-D environment through their avatar to explore new surroundings. An example of this was of students exploring their new university first in virtual mode to familiarise themselves with the layout and facilities as an initiation to the actual space, that is before attending the physical campus.
> ➢ The third usage was as experiential spaces where students can learn by doing, to test their hypothesis by manipulating objects and observing the outcomes of their actions.

Another way of classifying virtual worlds is in looking at their purpose. It then becomes apparent that there are several types of virtual worlds such as gaming virtual words, social virtual worlds, virtual learning environments (e.g. for education, business or military training) and Educational Institutions that are operating virtual classroom in Second Life. The following part will discuss each type in more detail.

Gaming Virtual Worlds

EverQuest, Lineage 2 or World of Warcraft are gaming virtual worlds that typically feature a singular fictional theme, with a character-based avatar who progresses through an interactive narrative storyline. Usually, the in-world experience involves players interacting and creating content with others. In games such as EverQuest, Lord of the Rings Online or Age of Conan avatars can develop particular skills and strengths if they earn experience points, which will help succeed in a series of competitive events. Games can have strategic, tactical or thematic appeal. Popular are the medieval, fantasy and literary genre or science fiction settings.

The players' amount of control over the environment and their ability to create content underpinned the success of The Sims (and sequels The Sims Online, The Sims 2) as it provided the creativity and freedom to design new pieces of furniture or decor for their homes and even skin for their avatars. 'Unstructured', 'open' or 'sandbox' games allow players to roam around a large world. The freedom, the elaborative setting and the time progression (1 second virtual time equals 1 minute in daily time) for example in Grand Theft Auto created an immersive environment (Messinger et al., 2008, pp.3-4).

237

Social Virtual Worlds

Active Worlds, Twinity, Kaneva, Second Life, Croquet, Smallworlds, Onverse and Astra Grid are social virtual worlds that emphasize socialising with others through their avatars.

The in-world experience is usually a 3-D immersive shared environment, open-ended and based on speaking and sharing of textual, pictorial, audio and video content. The settings are usually realistic, modern day environments either on tropical islands, or replicate exotic travel locations and tourist attractions, shopping centres or mundane suburbia (Pfeil, Ang and Zaphiris, 2009).

In these worlds, people can from relationships for business, romance, substitute families or community members, introductions to friends of friends and create items, which can be given or even sold. If the created objects are desired by other people, they will have value not only in the virtual but also the real-world economy. Public organizations, businesses and cultural groups are using virtual environments for public meetings, conferences, information delivery services, and performances or exhibits (Messinger et al., 2008, pp.5-6).

Gaming and virtual worlds have developed into massive types for entertainment and community building and some are designed for education, training in business and military, work, research and politics. In addition, there are virtual learning environments, which the next paragraphs describe.

Educational Virtual Worlds

Virtual learning environments such as Active World Education Universe, Eduism and Sloodle are used for educational and are often sponsored by academic institutions or non-profit organizations. The in-world experience is based on learning particular content or practising professional behaviour in simulations. Virtual learning environments can be engaging spaces where students can meet for lectures, class activities, group work, discussion, projects or socialise with their peers. They are either used in addition to traditional classrooms or as a supplemental mode in distance education delivery programs. It is estimated that over 200 universities and other educational institutions operating virtual classroom in Second Life with examples being the British Open University, MIT, Harvard and Princeton. These are either replicas of real universities or fictional universities embedded in Second Life. The in-world experience is based on collaborative learning, sharing of knowledge, resources and experiences (Pfeil, Ang and Zaphiris, 2009). Hence, it might be appropriate to examine some of the points relating to collaboration of learners in these simulated environments.

ISSUES, CHOICES AND CHALLENGES OF COLLABORATIVE LEARNING IN VIRTUAL WORLDS

"Virtual worlds can be very effective learning spaces" (Kluge and Riley, 2008, p.129).

Significance of Virtual Worlds

Chang, Gütl, Kopeinik and Williams (2009) postulated that 80 percent of active Internet users will have an avatar or some sort of presence in a virtual world in 2011, which indicates the increasing popularity of these environments amongst the general population.

Kluge and Riley (2008) believed that one of the advantages of virtual worlds is the potential of students anywhere in the world to participate in learning activities and being part of culturally, ethnically and linguistically diverse learning communities, which prepares them for living and working in a complex, global society. Another advantage is the general environment of virtual worlds which allows application to nearly all disciplines due to the fact that settings (locations, artefacts, avatars, etc.) can be customized to suit any subject or area of study. Virtual environments offer an opportunity to shift from a teacher-centered to a student-centered model of teaching or implement constructivist, inquiry or problem-based pedagogies. This 'learning by doing' is facilitated in virtual worlds as students are able to actively engage and construct meaning from experiences. Authentic learning experiences such as role-play exercises, case studies, problem-based activities or involvement in a virtual community of practice might be easier to do due to the lower cost, risk and complexity of doing these tasks in regular classrooms. (Kluge and Riley, 2008, pp.130-131)

One example of this case in point is the Stanford Medical School and their Media and Information Technology group. They created a replica of their emergency driveway, waiting area, treatment area, hospital beds, equipment, hospital staff-avatars and patient-avatars. The latter could be programmed to exhibit signs and symptoms of a range of diseases in various stages of progression and responded to treatment and interventions (both correct and incorrect) with realistic reactions. There were also two mock-up scenarios for practice of a chemical exposure incident and one for trauma injuries from a radioactive bomb. Trainees had to make decisions about clinical management including triaging (arrangement in order of urgency if more than one patient arrives), taking vital signs, assessing the severity of the blast injuries or dose of toxin, considering the age, sex and pre-existing conditions and so on. In this particular virtual world, the aim was to practice assessment and management of patients in a mass casualty incident (de Freitas, 2008, p.15).

This kind of mirroring of real spaces for training and education can be used in other professions and for other applications such as students building houses if they are studying to become architects, flying planes if they are preparing to become pilots, solving crimes if they are training to be in law enforcement and so on. Disaster recovery training, virtual tourism or virtual laboratories that replicate real life would enable trainees to perform tasks and practice their skills without real-world consequences. These kinds of re-enactments of scenarios in a safe environment for training, rehearsal or analysis facilitates proficiency, which is not possible in the real world as it is too complex, expensive or dangerous to do in the real world.

Dalgarno, Lee, Carlson, Gregory and Tynan (2011) undertook a scoping study of 3-D virtual world applications by universities across Australia and New Zealand with findings indicating that there was a year to year increase of usage over the last decade. Their conclusion also indicated the development of 'bespoke' or custom made virtual worlds that are hosted on university owned servers and networks, which gives independence from generic or commercial multi user virtual worlds (e.g. Second Life, Active Worlds, Kaneva). They warn that these money-making ventures are vulnerable to market forces and can be terminated if no longer profitable.

Given this risk, they recommend that educators have plans in place in case resources may need to be moved to another platform.

Although custom made materials offer greater levels of control, flexibility and functionality, the trade-off for these benefits however involves a higher time and cost commitment in the development of such a specifically designed platform. While these are some of the challenges, these environments also hold new potential which will be discussed in the next section.

Opportunities Afforded by Virtual Worlds

Abbastista, Calefato, Lucia, Francese, Lanubile, Passero and Tortora (2009) asserted that virtual worlds provide a number of features that enable informal communication and the creation of communities, which is why many universities and organizations have adopted them to support distance learning. People can actively experiment situations that are useful for understanding concepts as well as learning to accomplish specific tasks while interacting with these environments.

The use of virtual worlds as experiential spaces enables users to learn by doing. They can test their hypotheses by observing action and outcomes on objects in the virtual world. Without doubt, this is a far more superior way of learning than just reading text. Hew and Cheung (2010) exemplified this argument by citing Tessa Cooper's 2007 study of nutrition scenarios for students in Second Life. Players simulated food choices for breakfast, lunch and dinner. Based on their selected 'virtual' diet, they were informed on the fat and cholesterol level, likely health problems and any change in their body weight (Hew and Cheung, 2010, p.37).

Students can interact through virtual worlds with peers in another country or culture, which might not be possible in the real world as travel might be too costly, time consuming or risky. Also, students' self-report may indicate that virtual worlds help them learn, examinations scores and teacher observation might be needed to validate those declarations. It is reasonable to assume that conventional classroom teaching is seen nowadays by some students as boring and old-fashioned. This hypothesis seems confirmed by Shen and Eder (2009) who found in their study of 77 students' use of Second Life "...that the 'fun factor' is significantly related to acceptance and use". Specifically, students reported in the open-ended section of the survey that the creation of avatar, teleporting to various islands and flying around was fun, which significantly related to acceptance and use, encouraged sustained engagement and thus "...a greater likelihood of successful learning outcomes (Shen and Eder, 2009, p. 231).

Notwithstanding, it could equally be envisaged that students will lose interest in online learning experiences if they are poorly designed. Too many features and intricacies may distract or discourage students from focusing on the key conceptual tasks thus preventing effective learning (Jacobson, Kim, Lee, Lim, and Low, 2008). Learning can also be hindered by the additional cognitive load required from learners while they are navigating, exploring and manipulating objects in-world and have to use specific interfaces or hard devices (e.g. mobile devices) to complete tasks (Chen and Wan, 2008).

Nevertheless, it could be argued that virtual worlds offer opportunities to help prepare young people for an unknown future where skills and experience in online environments are needed for employment and life-long learning. After reflecting on the significance and potential of these simulated worlds, the next paragraph will consider the hindrances of implementing simulated environments.

Barriers in Virtual Worlds

Kluge and Riley (2008, p.133) summarize the impediments to teaching and learning in virtual worlds:

> *Costs, accessibility issues, legal issues, and increased development time remain the primary forces holding institutions back from taking advantage of this resource.*

Approaches in virtual worlds that are explored by institutions are discussed by Warburton (2009), who also critically analyses the barriers to successful implementation of virtual worlds as an educational tool while also mapping a number of developments that are underway to address these issues.

The time consuming task of signing up and preparing for learning (which can take around two hours) was one of the impediments found by Pfeil, Ang and Zaphiris (2009) in their study of thirty participants. Others were the initial orientation and navigation in terms of virtual geography, which is a complicated issues and especially challenging for students without prior gaming experience. Virtual worlds are usually massive and students don't know what is going on, what to do and where to go with the concept of teleporting further adding to the sense of disorientation. While unrecognisable avatars with nicknames created anonymity and helped some students overcome shyness, other students did not recognise each other which thwarted socialisation, communication and collaborative learning and made it also difficult for educators to keep track of who was doing what.

Hew and Cheung (2010, p. 43) found that primary school children enjoyed creating their own avatar and making it look like them. The avatar proved to be the way to initiate contact and hold conversations with peers in other schools, which was one of the most anticipated tasks by students. It seems that the younger-aged users revelled in the novelty and social connections across geographical boundaries, which are otherwise inaccessible due to lacking mobility and finances.

Conversely, it appeared that the young people in the adolescent cohort dissociated from their real body. They divorced their true identity by using a virtual proxy such as their avatar. This disconnect of the self from the physical representation lead to objectionable conduct. The social consequences for inappropriate behaviour are usually just rejection or shunning. If an abuse report or a complaint for inappropriate content is lodged, the offending player might gain a temporary or permanent suspension of their account and thus loose the privilege of participating. Another factor for improper online conduct might be the absence of any real punishment for in-world behaviour, which is often why 'griefers' indulge in tomfoolery just for the fun of it. To prevent such waywardness, the environment in most virtual worlds has been designed in such a way that violating the rules is not possible due to the coding algorithms that govern actions.

These might include chat filters to curb the use of offensive language. In simulated worlds were economic value is attached to artefacts (e.g. clothing, property), 'theft' can be policed and law and order can be enforced through debiting virtual bank accounts.

Hew and Cheung (2010, p.39) take into account that many educators and researchers are not yet accustomed to the affordances and the pedagogy of virtual worlds due to the newness of the technology.

241

They speculated that virtual worlds are therefore used as mere replacements for something that is regularly performed in traditional classrooms. Exploring the functionality and possibility of this new medium is somewhat necessary as a stepping stone before the next stage is tackled, which is towards innovation or transformation. Hence, the current use of simulated worlds is mostly a replication of current practices and thus not ground-breaking or particularly exciting.

From the students' point of view, Kluge and Riley (2008, p.131) alert to the technological difficulties in accessing virtual worlds such as the need for robust hardware, speedy internet connections, accessibility for visually impaired users and navigation of these environments. Inappropriate or distracted behaviour is another problem with some students as they might get so engrossed in the virtual world that they lose track of time and their purpose for being in there. Others might become so overwhelmed by the virtual environment that they cannot cope and stop participating all together. For teachers, the barriers consist of a lack of skills and experience in teaching in virtual worlds and the necessity to devote large amounts of time to the development of classes. There is also little control over the sequence of lessons and student progression through course materials since virtual worlds have random access, navigation and exit points. The financial cost is a major hindrance for universities in creating and sustaining a safe, enjoyable and beneficial virtual learning environment for students and staff. Exposure to disruptive users, sexual, racist or sexist harassment of faculty staff and learners are a concern in publicly accessible virtual worlds, which might raise liability issues for the university. Bearing in mind Kluge and Riley's (2008) warnings, it is worth weighing up the impact of simulated worlds on the contemporary generation of learners to assess the value preposition that these environments hold, which the next paragraph attempts to do.

LEARNER CHARACTERISTICS AND IMPLICATIONS FOR TEACHING AND LEARNING IN VIRTUAL WORLDS

> *"...the learning preferences, styles and educational tendencies of the current generation..." are unique and not like those of previous generations (Chang, Gütl, Kopeinik and Williams, 2009, p.6)*

They described the latest generation of learners that is currently attending university as depending on technology as their support system, with independence, confidence, ambitiousness, adaptability, determination and team-orientation as personal characteristics.

The authors (2009, pp.6-7) continued to outline that this generation of learners have a sense of entitlement, hold unrealistic expectations, lack critical thinking skills, expect immediate feedback, have a short attention span and want to achieve success with little effort and time on tasks.

The negative attributes are balanced with positive traits, which include a preference for visual learning and for searching information on the Internet, learning from experimentation, interactive materials, multi-tasking, working in groups and a preference for 'edutainment'.

The latter is a combination of education and entertainment which is engaging and motivating if learning involves fun activities, interaction and support from peers.

Today's learners enjoy up-to-date technology, are comfortable with information-rich situations, at ease with an array of digital devices and like using media and new technological tools. Chang et al. (2009, p.6) therefore argued that

> *"...contemporary and sustainable learning environments must be created to cater for this generation of learners."*

These settings must be engaging and allow for collaboration, with technological games and activities that are embedded in the curriculum. This combination of activities requires teachers to be technologically savvy and take on the role of facilitator to enable peer-to-peer learning as well as student -entered learning.

McNaught, Lam and Ho (2009, p. 655) agreed with the observation that modern students are very different in behaviour from previous generations. Hence, they advocate radical changes in curriculum and learning design as a mismatch between teaching and learning styles have surfaced in a number of reports where technology use for formal education has not met the learning needs of students. They (2009, p. 663) found that the students' predominant domains for advanced strategies in using technology are socializing, gaming and entertainment. Since students differ considerably in their 'digital readiness' and 'digital orientation' and do not constitute a homogenous group, multiple, flexible and affordable designs are needed to achieve desired learning outcomes.

In examining student satisfaction in virtual worlds across fifteen different studies, Hew and Cheung (2010, p.42) summarized that the ability to fly and roam around freely in the 3-D space, to experience virtual field trips and simulated experiences and to meet and socialize with new people were most enjoyed. Students liked the avatars as they provided a sense of being co-present in the virtual environment and the feeling of 'being there' and reported enjoyment in using the avatar. In comparison to traditional one-dimensional text heavy digital interfaces such as learning management systems, virtual worlds were preferred by students. However, students disliked the pressure of instantaneous responses, the necessity for fast typing and the unfamiliarity with the virtual world software. They also resented the need for new computers and a fast Internet connection and the lack of access on public computers. Although Hew and Cheung (2010) weigh up the positive and negative aspects of learners' involvement in simulated environments, whether students' learning and learning outcomes will be improved in virtual worlds is a separate question. Findings from student self-reported studies suggested that the use of virtual environments could be beneficial to students learning. Cited examples included the improvement of English as a Second Language (ESL) skills, the benefit of 3-D worlds as instructional tools for environmental education and for learning about other cultures and countries (Hew and Cheung, 2010, p. 42).

Gregory, Lee, Ellis, Gregory, Wood, Hillier, Campbell, Grenfell, Pace, Farley, Thomas, Cram, Sinnappan, Smith, Hay, Kennedy-Clark, Warren, Grant, Craven, Dreher, Matthews, Murdoch and McKeown (2010) showcased a typology for teaching and learning in 3-D virtual worlds. These were applied to a number of case studies, which offered insights into the way academics transform their teaching by creating rich, authentic activities in virtual worlds for their students. In the quoted examples, educators were exploring virtual world technologies to learn about these new opportunities for being and for dealing with knowledge as avenues to prepare their students for an unknown future. 243

Collaborative Learning in Virtual Worlds

"Virtual worlds promote immersive, deep, authentic, active and constructivist learning" according to Kluge and Riley (2008, p.133).They argued their case by outlining that simulated worlds not only permit several learners to collaborate on the same issue simultaneously to create knowledge and meaning but that the unique environment also fosters collaboration as it is closer to face-to-face interaction than other Web 2.0 applications (e.g.. blogs, email, wikis). This enhanced sense of social interaction fosters collaborative efforts to finish tasks and to participate in a student learning community (Kluge and Riley, 2008).

Abbastista, Calefato, Lucia, Francese, Lanubile, Passero and Tortora (2009) believed that future learners will have grown up in technological environments such as multi-player online games and instant messaging. Therefore, "... it will be natural and pleasant for them to use a virtual world for collaborating" (Abbastista et al., 2009, p.1). They (2009) ran an empirical study to assess the value of 3-D virtual environments for collaborative learning and found it to be an effective delivery environment that can be customised and adopted as an alternative to collaborations in the real world. They suggested that a range of pursuits (e.g. lectures, socialising, networking, laboratory work, educational games) can be conducted inside a virtual campus as collaborative learning activities, which strengthens the sense of belonging and community of participants.

A growing popularity of virtual -D worlds within the context of simulated environments was used by modern generations of learners as knowledge and social tools according to Chang, Gütl, Kopeinik and Williams (2009, p.6) as "Today's learners rely heavily on technology as an integral part of their daily lives." Wired and wireless technology is almost everywhere, permitting learning anytime and anywhere. The convenience of learning without the constraints of time and place is underpinned through mobile devices that provide instant messaging and thus access to instant feedback. This generation of learners also gets pleasure from interacting with people online, by building connections, in becoming part of a community through online social networking and through the use of collaborative tools. According to Chang et al. (2009) today's young people prefer to learn by working with others and scaffolding knowledge together in teams, which helps these learners to gain confidence as they experience the support of their peers.

A simulated environment can promote more closeness and richer communication amongst members of a group due to the provided spatial and non-verbal clues and 'sense of place' compared to text-based alternatives (e.g. chat rooms, instant messaging, MUDs) as Dalgarno and Lee (2010) explained. They found that the affordances of 3-D virtual learning environments facilitated increased motivation and engagement and enhanced spatial knowledge representation. It also provided greater opportunities for experiential learning and enabled richer and more effective collaborative learning than those made possible in 2-D alternatives.

CONCLUSION

The rise of virtual worlds will continue according to Cherbakov et al. (2009) and with it collaborative learning due the characteristics and preferences of Net Gen users (McNaught, Lam and Ho, 2009). And with it, collaborative learning in virtual worlds as it strengthens the perception of belonging to a community of learners.

244

Embedding collaborative learning in-world as part of a range of activities offered at a virtual campus (i.e. synchronous distance lectures, virtual labs, socialization opportunities) will enable learners to study across geographical boundaries at a university of their preference and at a time of their choice. This enhanced convenience and ease of access will make virtual worlds a growth sector (Cherbakov et al., 2009).

Dalgarno et al. (2011) believed that the affordances of 3-D immersive virtual worlds are valuable but require research to be understood and employed in pedagogically sound ways. They also pointed to the necessity for teaching staff to develop the attitudes and skills to integrate activities into their teaching practices and the design of their curriculum. This needs to be supported by professional development and conversations about the methods and tools that are most suitable to accomplish intended learning outcomes for students. Given the considerable expenditure by organization into 3-D immersive worlds they argued for efforts to obtain staff's experiences with technology and capture good or best practice.

In tracing the emergence and history of virtual worlds, one of the major challenges had been the implementation and acceptance of this educational innovation. This chapter discussed the different types and categories of virtual environments as educational experimentation and change in this area continues. Throughout these iterations, the same elements remain - user, medium, content – and are the foundation for current work with virtual worlds, which also spawns future possibilities in addressing the needs and aspirations of twenty-first century users.

BIODATA and CONTACT ADDRESS of the AUTHOR

Dr. Ria HANEWALD is a Research Fellow in the Centre for Research in Educational Futures and Innovation at Deakin University, Australia. She has worked on funded research projects investigating Computer-Interactive Learning, contributed to the wider community as a state council member of the Computer in Education Group of Victoria (ICTEV) and as editor of the ICT in Education Journal. Her research interests include e-learning, open and flexible education and Web 2.0 social software.

Dr. Ria HANEWALD
Deakin University
Faculty of Arts and Education
School of Education, Burwood, 3152, AUSTRALIA
Email: r.hanewald@yahoo.com

REFERENCES

Abbastista, F., Calefato, F., Lucia, A.D., Francese, R., Lanubile, F., Passero, I. & Tortora, G., (2009). *Virtual Worlds: do we really need the third dimension to support collaborative learning?* ViWo workshop (ICWL 2009), 19-21 August, Aachen, Germany. http://www.iicm.tugraz.at/home/cguetl/Conferences/ViWo/ViWo2009Workshop/finalpapers/ViWo2009Workshop_03.pdf Retrieved June 8, 2012.

BBC (2011). *The US virtual economy is set to make billions*. Retrieved October 3, 2012 from http://news.bbc.co.uk/2/hi/technology/8425623.stm

245

Chang, V., Gütl, C., Kopeinik, S., & Williams, R. (2009). Evaluation of Collaborative Learning Settingsin 3D Virtual Worlds. *International. Journal of Emerging Technologies in Learning (iJET)*, Vol 4 (2009): Special Issue: ICL2009, 6-17. Retrieved 8 June 2012 http://www.iicm.tugraz.at/about/Homepages/cguetl/publications/2009/Chang%20et%20al.%202009%20-%20iJET.pdf

Chen, C.J., & Wan, F. (2008). Guiding exploration through three-dimensional virtual environments: a cognitive load reduction approach. *Journal of Interactive Learning Research,* Vol. 19, No 4, pp. 579-596.

Cherbakov, L., Brunner, R., Lu, C., & Smart, R., (2009). *Virtual Spaces: Enabling Immersive Collaborative Enterprise, Part 1: Introduction to the opportunities and technologies*. IBM, Developer Works. Retrieved June 8, 2012 from http://download.boulder.ibm.com/ibmdl/pub/software/dw/webservices/ws-virtualspaces/ws-virtualspaces-pdf.pdf

Damer, B. (2008).Meeting in the Ether. A brief history of virtual worlds as a medium for user-created events. *Journal of Virtual Worlds Research.* July, Vol. 1, No 1, pp.e 1-17.

de Freitas, S. (2008). *Serious virtual worlds: A scoping study.* Bristol, UK: Joint Information Systems Committee. Retrieved 6 October 2012, from http://www.jisc.ac.uk/media/documents/publications/seriousvirtualworldsv1.pdf

Gregory, S., Gregory, B., Campbell, M., Farley, H., Sinnappan, S., Kennedy-Clark, S., Craven, D., Murdoch, D., Lee, M. J.W., Wood, D., Grenfell, J., Thomas, A., Smith, K., Warren, I., Dreher, H., McKeown, L., Ellis, A., Hillier, M. Pace, S., Cram, A., Hay, L., Grant, S. & Matthews, C. (2010). Australian higher education institutions transforming the future of teaching and learning through 3D virtual worlds*,* In ascilite 2010: curriculum, technology & transformation for an unknown future : Proceedings of the Australian Society for Computers in Learning in Tertiary Education Conference, Australian Society for Computers in Learning in Tertiary Education, Sydney, NSW, pp. 399-415.

Hew, K.F. & Cheung, W.S. (2010). Use of three-dimensional (3-D) immersive virtual worlds in K-12 and higher education settings: A review of the research. *British Journal of Educational Technology.* Vol. 41, No1, pp. 33-55.

Kluge, S. & Riley, E. (2008). Teaching in Virtual Worlds: Opportunities and Challenges. *Issues in Informing Science and Information Technology* Vol. 5, pp. 127-135. Retrieved 8 June 2012, from http://proceedings.informingscience.org/InSITE2008/IISITv5p127-135Kluge459.pdf

KZero (2009). Growth forecast for the Virtual Worlds Sector. Retrieved 22 March 2012 from http://www.kzero.co.uk/blog/growth-forecasts-for-the-virtual-worlds-sector

KZero (2011a). Virtual World registered accounts reach 800m. Retrieved 3 October 2012 from http://www.kzero.co.uk/blog/virtual-world-registered-accounts-breakthrough-800m

KZero (2011b). Latest News. Retrieved 20 March 2012, from http://www.kzero.co.uk/blog

Lee, M. J. W. (2009). How Can 3d Virtual Worlds Be used To Support Collaborative Learning? An Analysis Of Cases From The Literature. *Journal of e-Learning and Knowledge Society*, Vol. 5, No 1, February 2009, pp. 149-158.

McNaught, Lam & Ho (2009). The digital divide between university students and teachers in Hong Kong. Proceedings ascilite Auckland 2009. Retrieved 22 October 2012, from http://www.ascilite.org.au/conferences/auckland09/procs/mcnaught.pdf

Messinger, P. R.; Stroulia, E. & Lyons, K. (2008). A Typology of Virtual Worlds: Historical Overview and Future directions. *Journal of Virtual Worlds Research*. July 2008. Vol. 1, No1 pp. 1-18.

Pfeil, U., Ang, C.S. & Zaphiris, P. (2009). Issues and challenges of teaching and learning in 3 D virtual worlds: real life case studies. *Educational Media International.* Vol. 46, No. 3 September 2009, pp. 223-238.

Second Life (2011). 2009 End of Year Second Life Economy Wrap up. Retrieved 3 October 2012, from http://community.secondlife.com/t5/Features/2009-End-of-Year-Second-Life-Economy-Wrap-up-including-Q4/ba-p/653078

Shen, J. & Eder, L. B. (2009). Intentions to Use Virtual Worlds for Education. *Journal of Information Systems Education*, Vol. 20, No 2, pp. 225-233.

Warburton, S. (2009). Second Life in higher education: Assessing the potential for and the barriers to deploying virtual worlds in learning and teaching. *British Journal of Educational Technology.* Vol. 40, No 3, pp.s 414–426) Retrieved 6 June 2012, from http://onlinelibrary.wiley.com/doi/10.1111/j.1467-8535.2009.00952.x/pdf