

Virtual worlds: An exploratory study of undergraduate behavior

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ABSTRACT

Studies suggested that electronic social sites are popular with undergraduates. Virtual worlds, one of the emergent facets of the Internet, are also seeing tremendous worldwide participation. Of interest to educators is the applicability of this new technology as a learning tool. As a result, this study was undertaken to empirically examine undergraduate familiarity and interest in virtual worlds as compared to electronic social networking. Student surveys were utilized to measure participation and importance of virtual worlds and social networking. Findings reveal that with regard to students, virtual worlds are in their infancy. While nearly all students visit social sites, only two percent of students participated in virtual worlds and only six percent indicated that virtual worlds were at least somewhat important to him/her. Moreover, gender does not appear to be a factor. Females and males indicate similar levels of participation, social activity, and degree of importance.

Keywords: Virtual worlds, learning, social networking, undergraduates

INTRODUCTION

The Internet is increasingly being woven more deeply into the fabric of society. A 2007 study of US consumers ages 12+, for example, found that 33% of respondents indicated that the Internet was the most essential medium in their lives (Edison Media Research, 2007). In 2002, only 13% indicated this importance.

One aspect that has dramatically risen is the use of social networking. Individual social networks such as MySpace and Facebook have seen incredible growth. MySpace had approximately 3,000 unique visitors in October 2004 but by December 2008, usage rose to 125 million unique visitors (eweek, 2005; Pratt, 2009). In November 2006, it passed Yahoo Incorporated in U.S. page views (Gentile, 2006). Facebook had approximately 9,000 unique visitors in October 2005 but by December 2008, there were 200 million visitors (Kirkpatrick, 2007; Pratt, 2009).

A recent development within Internet social networking is the implementation of online virtual worlds. Virtual worlds provide users with an alternative to the real world. Currently, there are more than 45 virtual worlds, used primarily for social networking, entertainment, commerce, and education (Wood, et al., 2008). In terms of commerce, 48% of brand marketers developed marketing campaigns in social network channels in 2007, a 26% increase from 2006 (Garcia and Fernandez, 2008). In 2007, 48%, or nearly half, of brand marketers conducted such campaigns. In 2007, the hotel chain Starwood Hotel & Resorts even used the virtual world Second Life to prototype and evaluate a new design for one of its hotel brands (Thilmany, 2008). Relative to education, there were more than 100 schools and educational institutions from more than 20 countries teaching using virtual worlds in 2007. Moreover, e-learning researchers suggest that by 2011, 53% of children and 80% of all active Internet users will be visiting virtual worlds.

Three of the most actively used virtual networks are Second Life, Activeworlds, and There. The most popular and original virtual world is Second Life, developed by Linden Lab and opened in 2003. Participants essentially create all content and the site homepage www.secondlife.com describes the site as a three-dimensional (3D) online digital world imagined, created and owned by its residents. Second Life is an environment that appears similar to the real world with real life rules such as gravity, topography, locomotion, real-time actions, and communications (Good, 2007). It is an entire online community created around the concept of shared social interest and in which users, known as residents, can interact, play, conduct business, communicate, and socialize. Second Life claims to have over 8 million residents, yet it is important to note that an individual can have as many avatars (virtual residents) as he/she would desire. In addition, more than 170 educational institutions worldwide currently maintain a presence on Second Life (Wood et al., 2008). It is important to note that although Second Life is similar to popular video games that take place in a virtual world (e.g. Sims), it is not a game. There are no defined objectives, no scoring, no rankings, and no formal competition. It is similar to the reality in that residents roam the streets, hang out with friends at their homes and in cafés, operate businesses, participate in individual and group activities, and create and trade items and services. Residents can shop in virtual stores and purchase land, real estate, clothing, cars, and so on with real dollars. The currency in Second Life is the Linden Dollar, which trades against the US dollar, and is linked directly to your actual bank account. The current exchange is approximately \$1 USD to \$ 267 Linden Dollars. Prices are generally less than those in the real

world. For example, clothes might cost the equivalent of a few U.S. dollars and a private island could be purchased at a bargain price of \$1,600 USD. Each month, an average of \$35 million USD is traded between residents.

Second Life has seen remarkable growth. By the end of 2008, Second Life user hours increased by 61% over 2007 (Linden, 2009). User hours have increased steadily each quarter, culminating in a record-setting 112 million user hours in the fourth-quarter of 2008. From 2007 to the end of 2008, peak concurrent users increased by 31% to 76,000 users, land owned by residents increased by 82%, exchange volume increased by 33%, and user-to-user transactions increased by 54%.

Another virtual world is Activeworlds (www.activeworlds.com), an education-based virtual world. Activeworlds hosts a Universe of more than 1,000 3D virtual reality worlds. In these worlds, an individual can choose from a vast array of avatars that fit his/her personality (or perceived personality). Users can then move about, play online games, shop and make friends with people from all over the planet, stake claim to a piece of land, and build their own virtual home, mansion, estate or castle. The most popular world is "AlphaWorld," which consists of virtual real estate on which users can create virtual structures using objects from Activeworlds' library of more than 6,000 objects and textures (Activeworlds Overview, 2009). As of January 2005, users had placed more than 170 million building blocks on AlphaWorld. The developers of Activeworlds believe that 3D Internet applications provide enhanced richness that would be of interest to users developing Internet-based advertising, distance learning, training, entertainment, e-commerce, chat and other online activities. By February of 2008, more than 2 million individual users worldwide had downloaded the browser and visited the site and 70,000 users had registered to be a "citizen" of the Active Worlds universe (Activeworlds Index, 2009). Users who do not register are called "tourists" and have less capability than citizens. It is also estimated that more than 80 educational institutions have a home in Activeworlds (Wood et al., 2008). Overall, there are generally more than 1,000,000 hits to the universe server per day, and more than 500 new users download the browser each day.

A third virtual world can be found at There.com. There was founded in 2005 by entrepreneur Michael Wilson and is owned by Makena Technologies, Inc., a privately held corporation headquartered in Silicon Valley, CA. (There Company Info, 2009). There is for ages 13 and up and is designed to allow members to enjoy a variety of activities, from vehicle races to fashion shows to paintball games. Members can create their own character ("avatar"), own and decorate virtual homes, participate in trivia contests and other games, chat with friends, and participate in a variety of themed events. There is a non-violent online experience in which avatars cannot be hurt or killed (What is There, 2009).

One may ponder why an individual would spend money for products that essentially are not real. Interestingly, users purchase items in virtual worlds for many of the same reasons individuals purchase expensive cars and clothing in the real world, to impress others and flaunt social status. Even in Second Life, social hierarchy and status do exist. The economic crossover from virtual money (e.g. Second Life's Linden dollars) to actual currency has not gone unnoticed by entrepreneurs (Acello, 2008). Anshe Chung, the avatar persona of German languages teacher Ailin Graef, made the cover of *Business Week* in 2006 for becoming the first Second Life millionaire (literally, in U.S. dollars) by purchasing and building up large areas of land, then re-selling them at a profit (Hof, 2006).

Faculty are entrusted with teaching and encouraging positive behavior and determining

the optimum teaching pedagogy. This study was therefore undertaken to explore the state and incidence of undergraduate virtual world participation and electronic social networking. Is virtual world and e-socializing important and have students decided to participate? These results will provide a basis for further research in investigating the usefulness of virtual worlds as a teaching platform and tool.

PREVIOUS RESEARCH

Prior research has examined factors such as social norms, teamwork, information technology undergraduate student knowledge, and information system faculty participation.

A recent observational study by Yee et al. (2007) of the Second Life virtual community attempted to explore whether or not social norms of gender, interpersonal distance (IPD), and eye gaze transfer into virtual environments. The purpose of the research was to better understand if, and to what degree, a medium will change the way an individual will behave or respond to specific behavior and if the equilibrium effect could be documented in an online environment. According to Equilibrium Theory, the degree of intimacy between two individuals is maintained by compensatory changes in gaze or IPD. A triggered script was utilized to collect data from avatars and to notify observers when two or more individuals were interacting so that observations could be made. The sampling produced 417 snapshots from which the researchers extracted more than 8,000 unique dyads engaged in social interaction. Results indicate that many established social findings from typical face-to-face interactions did transfer into virtual environments and that social interactions in online virtual environments such as Second Life are governed by the same social norms as social interactions in the physical world. For example, as found in traditional research on gender differences in social interaction, IPD was significantly larger in the male-male dyads than in female-female dyads observed.

Because virtual worlds are immersive and experiential and thus have many of the characteristics that facilitate learning, Wagner performed a study in an academic environment (2008). The research examined a class entitled "Virtual Organizations and Global Teamwork" in which students were required to utilize Second Life to build a virtual organization for economic gain. Students were required to rent real estate, develop a service, build a product, attract customers to generate revenue, and report on their experiences. Four types of learning emerged: e-business insights, systems development insights, virtual work insights, and IT planning insights. Furthermore, all groups in the 4-week exercise were successful in creating revenue-oriented businesses generating Linden dollars. Twenty-nine anonymous post-assignment surveys revealed that students found the workload in the assignment highly demanding, but reported favorably on the assignments learning value and recommended the assignment be used in the future.

Two additional surveys were conducted in 2007 within the field of Information Systems. The first survey was administered at annual conference of Association Information Technology Professionals (Holmes et al., 2008). Of the 196 questionnaires, 78% were undergraduate students. Results indicate that only 28.6% had heard of Second Life and only 3.1% had played with Second Life. The second survey was administered at international information systems academic conference. Researchers found that 38.5% had heard of Second Life and with regard to using simulations in their class, 5.2% used simulations often, 25.6% never used them, 17.9% were thinking about it, and 35.9% had used some. The researchers concluded that faculty

members have not generally participated in virtual communications but most respondents, however, were in the information technology field.

Finally, McGann and Annabi (2008) even introduced a research framework to assess the viability of virtual communities of practice as an effective means of knowledge management. To promote this stream of research, virtual teams are mapped into the framework.

RESEARCH DESIGN

This study employs a survey research design. The research was conducted at a private, northeastern U.S. University. A Student Virtual World Behavior instrument was developed and administered during the last week in the Fall 2008 semester to students enrolled in a School of Business course. A convenience sample of class sections was selected. The courses included Business Information Systems, Accounting Information Systems, Introduction to Managerial Accounting, Business and Beyond, and Business Policy.

The survey instrument was utilized to collect student demographic data and examine student behavior with regard to virtual worlds and electronic social groups. The survey requested that each student estimate the number of hours per week spent visiting virtual world or social group sites and where each student has posted his/her personal information. In addition, students were prompted to identify the degree of importance that virtual worlds and social sites are to him/her. All surveys were anonymous and students were informed that results would have no effect on their semester grade.

RESULTS

A sample of 218 usable surveys was obtained. Fifty-seven percent were male and 43% were female (Table I). The response rate indicates that respondents are relatively equally distributed by class. Thirty percent of students were Freshmen, 26% were Sophomores, 18% were Juniors, and 26% were Seniors (Table II). Student majors included accounting (19%), marketing (30%), finance (10%), undecided business (20%) and non-business/other (21%).

TABLE I. RESPONSE RATE BY GENDER

	Percentage	Count
Male	57%	125
Female	43%	93
Total	100%	218

TABLE II. RESPONSE RATE BY ACADEMIC CLASS

	Percentage
Freshmen	30%
Sophomore	26%
Junior	18%
Senior	26%
Total	100%

To examine behavior, each student was requested to estimate the number of hours per week that he/she visited various virtual worlds and social sites. Table III details the activity, percentage of students who indicated that activity, and number of hours. Results show that 1% of students visit Second Life and 2% visit other virtual worlds each week. In addition, 87% of students visit Facebook, 18% visit MySpace and 7% visit social groups such as linkedIn and sports interest groups. In terms of time, 2.0 hours per week was spend in Second Life, 2.5 hours per week visiting other virtual worlds, 15.3 hours per week visiting Facebook, 10.6 hours visiting MySpace, and 9.4 hours visiting other social sites. Moreover, 4% indicated having an avatar and 78% of respondents indicated posting information about themselves on Facebook. Twenty-three percent post information on MySpace and 3% post on other sites. Overall, 87% of undergraduates indicated visiting a virtual world or using at least one social site. In addition, 18.2 hours were expended each week visiting virtual worlds or social sites. In terms of either having an avatar or site participation, there were no significant gender differences. When examining respondent perception of virtual world importance with the various behaviors, there was a correlation significant at the .01 level with having information posted on Facebook. When examining respondent perception of social site importance with the various behaviors, there was a correlation significant at the .01 level with having information posted on MySpace and a correlation significant at the .05 level with visiting Facebook and having information posted on Facebook.

TABLE III. E-SOCIALIZING BY TYPE

Activity	Percent of Students	Hours Per Week	Chi-Square Gender Differences	Pearson Correlation with Virtual World Importance	Pearson Correlation with Social Importance
Visit Second Life	1%	2.0		-.019	.026
Visit other virtual worlds	2%	2.5		-.019	.026
Visit Facebook	87%	15.3		-.042	.147*
Visit MySpace	18%	10.6		.066	.103
Visit another social site	7%	9.4		.032	.021
I have an avatar	4%		.079	.136	-.059
I have my information posted on Facebook	78%		.413	-.220**	.170*
I have my information posted on MySpace	23%		.827	.059	.186**
I have my information posted on another social site	3%		.444	.043	-.016
Overall visiting average	87%	18.2			

** Correlation is significant at the .01 level (2-tailed)

* Correlation is significant at the .05 level (2-tailed)

The study next examined behavior by gender (Table IV). Results indicate that two percent of males and one percent of females visit virtual worlds but 83% of males and 92% of females visit social sites. Moreover, 77% of males and 82% of females post personal information on social sites. Overall, 86% of males and 95% of females exhibited at least one of the behaviors.

TABLE IV. ACTIVITY BY GENDER

Activity	% of Males	% of Females
Visit virtual worlds	2%	1%
Visiting social sites	83%	92%
Posting personal information on a social site	77%	82%
Overall	86%	95%

Table V illustrates the respondent attitude regarding the importance of virtual worlds. Results indicate that 77% of males indicate that virtual worlds are not important to them. Moreover, 6% feel that virtual worlds are somewhat important and 2% feel that virtual worlds are very important. With regard to females, 77% indicate that virtual worlds are not important to them while 2% feel that virtual worlds are somewhat important and 0% feel that virtual worlds are very important. A Pearson Chi-Square test indicates no significance difference among gender with regard to the importance response.

TABLE V. IMPORTANCE OF VIRTUAL WORLDS BY GENDER

	Not	Somewhat	Very	No Response	Chi-Square Gender Differences
Male	77%	6%	2%	15%	
Female	77%	2%	0%	20%	
Overall	77%	5%	1%	17%	.219

Finally, the study found that 36% of males indicate that social sites are not important to them (Table VI). Moreover, 41% feel that social sites are somewhat important and 10% feel that social sites are very important. With regard to females, 25% indicate that social sites are not important to them while 55% feel that social sites are somewhat important and 12% feel that social sites are very important. A Pearson Chi-Square test indicates no significance difference among gender with regard to importance response.

TABLE VI. IMPORTANCE OF SOCIAL SITES BY GENDER

	Not	Somewhat	Very	No Response	Chi-Square Gender Differences
Male	36%	41%	10%	14%	
Female	25%	55%	12%	9%	
Overall	31%	47%	11%	11%	.120

CONCLUSIONS

Overall, this study is useful in providing a better understanding of the state of student virtual world participation and online socializing. Results show that only one percent of students visit Second Life, 2% visit other virtual worlds, and 4% have an avatar. However, 87% of

students admit to using electronic social sites. Eighty-seven percent visit Facebook, 18% visit MySpace, and 7% visit other sites. On average, 18.2 hours per week is expended visiting these sites. Respondents indicated spending 2 hours in Second Life, 2.5 hours in other virtual worlds, 15.3 hours visiting Facebook, 10.6 hours visiting MySpace, and 9.4 hours visiting other sites per week.

The study also found that having information on Facebook is negatively correlated with virtual world importance. Visiting Facebook, having information posted on Facebook, and having information posted on MySpace was positively correlated with social site importance. In terms of gender, two percent of males and one percent of females visit virtual worlds. Eighty-three percent of males and 92% of females visit social sites. Seventy-seven percent of males and 82% of females post information on a social site. Overall, 86% of males and 95% of females visit virtual worlds, visit social sites, or post personal information on a social group site.

Results also illustrate that only 6% of students perceive that virtual worlds have any importance to him/her. In terms of gender, 8% of males and 2% of females indicate that virtual worlds are at least somewhat important to him/her.

Finally, results indicate that 58% of students perceive that social sites have any importance to him/her. In terms of gender, 51% of males and 67% of females feel that social sites are at least somewhat important to him/her.

There are two important implications as a result of these findings. First, it appears that with regard to undergraduates, the virtual world is in its infancy. Although students heavily utilize social sites, few participate in virtual worlds. Only 1% visit Second Life, 2% visit other virtual worlds, 4% have an avatar, and 6% indicate that virtual worlds are at least somewhat important to him/her. On the other hand, 87% of students visit Facebook (expending an average of 15.3 hours per week), 78% of students have information posted on Facebook, and 58% of students indicate that social sites are at least somewhat important to him/her. These virtual world participation results are somewhat lower than the results from the Holmes et al. study but the Holmes et al. study involved technology students and information system faculty while this study measured behavior of students in all business disciplines. It would be plausible to hypothesize that those with a technology background would be more aware of the newest technologies. In terms of the radical disparity between undergraduate participation in virtual worlds and involvement in electronic social sites, it is possible that social sites satisfy the student desire for socialization. Moreover, because social networking is an older technology and students are comfortable with it, it may be that virtual world networking has simply not been explored by undergraduates.

A second implication is that gender is not a factor with regard to virtual world participation and social networking. There were no significant gender differences with regard to having an avatar, having information posted on a social site, degree of importance of virtual worlds, and degree of importance of social sites. In addition, there were nearly identical participation percentages by gender for visiting virtual worlds, visiting social sites, and posting information.

The limitations of this study are primarily a function of sample size, sample distribution, and type of research. A larger sample size, more equal distribution among academic class and gender, and use of additional universities would increase the robustness of results. Another limitation relates to the self-reported nature of the survey. The Wagner study suggests that virtual worlds can be utilized to teach business concepts but further study is needed to explore

the pedagogical benefits of introducing virtual worlds into the classroom. In addition, future research is needed to examine how to introduce virtual worlds into education, given the student's apparent lack of awareness or interest in this technology.

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