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RESEARCH ARTICLE

SOCIAL PRESENCE IN VIRTUAL WORLD COLLABORATION: AN UNCERTAINTY REDUCTION PERSPECTIVE USING A MIXED METHODS APPROACH

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Appendix A

Key Research on Virtual Worlds

Author	Methodology/Sample	Results
Animesh et al. (2011)	Survey of 354 residents of Second Life.	The results show the manner in which technological (interactivity and sociability) and spatial (density and stability) environments in VWs influence participants' virtual experiences (telepresence, social presence, and flow), which subsequently affect their response (intention to purchase virtual goods).
Berente et al. (2011)	Analysis of the written assessments of 59 business professionals who spent an extended period of time in Second Life.	The results show 12 common patterns of sense making for organizational value of VWs and indicate that themes of confirmation, open-ended rhetoric, demographics, and control are evident in the different types of claims that were addressed.
Cagnina and Poian (2009)	Qualitative methodology to sketch a radar map framework to identify value drivers and their subsequent impact on elements of value proposition.	This paper creates an analytical framework for understanding the conditions under which business models that hinge on VWs may find new sources of value.
Chandra et al. (2012)	Empirical study to test a model proposing reduction of perceived cognitive burden and minimization of risk as the two key motivations for adaptive use intention.	The results identify cognitive absorption and user trust in VWs as the mechanisms leading to the individual-level adaptive use decision.
Chaturvedi et al. (2011)	Reviews the characteristics of agent-based VWs to discern design requirements. A set of design principles are derived from the review.	This paper examines the design, development, validation, and use of VWs. Results are used to propose extended design principles.

Author	Methodology/Sample	Results
Chen et al. (2010)	Survey of online gaming participants.	The results suggest that Multimedia Realism for Social Interaction (MRSI) is related to dependency among players of Massively Multiplayer Online Games (MMOG). Further, MRSI is positively related to a sense of diversion, a positive aesthetic experience, and a sense of virtual community, as suggested by the theory of uses and gratifications.
Chesney et al. (2009)	Series of observations and focus groups with users.	The results show that negative behavior, or "griefing," is common in VWs. It is typically targeted at inexperienced residents by those with more knowledge about the VW.
Davis et al. (2009)	Proposes a conceptual model for research. The authors present an in-depth characterization of metaverse technology capabilities from a socio-technical perspective.	This paper aims to enhance research and practice in virtual teams in the context of metaverses through the development of a conceptual model that can be used to generate propositions and hypotheses across a range of key concepts.
Eschenbrenner et al. (2008)	Literature review.	This review presents VW capabilities, experiences, and factors associated with educational opportunities, as well as gaps in meeting pedagogical objectives.
Franceschi et al. (2009)	Experiment with voluntary participation of students to choose between a virtual or traditional learning experience.	The results show that 3-D VW environments provide a strong sense of group presence, which leads to engaging group-learning interactions.
Goel et al. (2011)	Quasi-experiment conducted within Second Life in a physical lab in which subjects had access to the same version of Second Life.	The results show that users' intentions to return to a VW are determined by a state of deep involvement (termed *cognitive absorption*) that users experience as they perform an activity and tend to lose track of time.
Goh and Wasko (2012)	Longitudinal study on the massively multiplayer online game EverQuest.	The results suggest that the leader–member relationship impacts members' allocation and development of resources, and that it is not only the quantity of members' resources, but also the type of member resources, that has a direct influence on performance. In addition, the results indicate that the influence of the leader–member relationship on member performance is fully mediated by the allocation and development of resources.
Greenhill and Fletcher (2013)	Structured ethnographic-style methodology to explore the daily working life found in virtual game environments.	Findings from empirical studies of the Puzzle Pirates and Farmville VWs explore emancipatory claims regarding labor practices in ICT-enabled work.
Junglas et al. (2013)	Laboratory controlled survey.	The results suggest that IS technology acceptance and adoption models should incorporate sociability of individuals along with usefulness and ease of use in order to predict their usage intentions.
Kohler et al. (2011)	Twenty-month action research project to study the experience of users and identify design principles for virtual co-creation systems.	The project created, deployed, evaluated, and improved a virtual co-creation system called the *Ideation Quest* as a model for designing co-creation systems in the VW context.
Mennecke and Triplett (2011)	Theoretical paper built on the analysis of reflection data from Second Life users.	The results suggest that users experience a greater sense of engagement, arousal, and task performance when they experience embodied social presence.
Montoya et al. (2011)	Controlled experiment consisting of 39 virtual teams of 91 individuals.	The findings provide a deep understanding of how the unique spatial and visual characteristics of VWs influence the collaborative behaviors and performance of virtual teams.

Author	Methodology/Sample	Results
Nah et al. (2010)	Survey approach in which subjects filled out a questionnaire before and after they experienced a 3-D VW branding site.	The findings suggest that the balance of skills and challenges in 3-D VWs influences users' flow experience, which in turn influences brand equity, and brand equity then increases the behavioral intention.
Nah et al. (2011)	Experimental design to compare 2-D and 3-D VWs. Total of 445 subjects, with 271 subjects assigned to 3-D version and 174 to 2-D version of a VW tour.	The findings suggest that, compared to a 2-D environment, a 3-D VW environment produces both positive and negative effects on brand equity.
Nardon and Aten (2012)	Qualitative study conducted in an organization that was in the process of adopting VWs to explore how individuals' interpretations of VWs influence their judgments about their value.	The results demonstrate that individuals' assessment of a technology varies with their interpretations and categorizations of the technology. The three categories for assessing the value of VWs in this study were: VW as a medium, VW as a place, and VW as an extension of reality.
Putzke et al. (2010)	Survey of all players of MMOGs over a six-month period.	The results indicate that structural effects and demographic variables active in the real world influence the evolution of players' interaction networks in MMOGs.
Roquilly (2011)	Analysis of contractual documents from a sample of 20 VWs, providing evidence of general trends and emphasizing differences between the VWs in terms of the business and gaming models sought by each game company.	The results show that game companies make use of copyright, codes, creativity, and community for control and development of VWs. They use the contract as a complementary component to reinforce their control over the four basic components in the "5Cs model" and to compensate for lacunae they may present.
Schmeil et al. (2012)	Proposes an avatar-based collaboration (ABC) framework to investigate collaboration patterns in VWs. Along with the framework, a case study of its first application in a global collaborative learning project is presented.	The case study illustrates how rich collaboration and collaborative learning experiences are created for VWs with the ABC framework.
Schultze and Orlikowski (2010)	Research commentary.	The commentary proposes that a performative perspective is useful for understanding the emergent aspects of VWs and their implications for organizations.
Suh et al. (2011)	Conceptual framework based on dual congruity perspectives (self-congruity and functional congruity) to examine how an avatar that resembles the user as much as possible affects usage and usefulness.	The results show that the greater an avatar's resemblance to its user, the more likely the user will have positive attitudes (e.g., affection, connection, and passion) toward the avatar, and the greater the user's ability to evaluate the quality and performance of apparel products will be.
Venkatesh and Windeler (2012)	Year-long comparative field study of two teams, one using traditional collaboration technologies, the other using a VW.	The results show that the use of VWs positively influences the relationship between technology use and team cohesion, which in turn predicts team performance. Also, agreeableness, conscientiousness, extraversion, openness, and computer self-efficacy interact with time and type of technology to positively influence team technology use.
Zhao et al. (2010)	Online survey of Second Life users.	The authors conceptualize the closeness of a human–avatar relationship as composed of interaction frequency, activity diversity, and relational influence, and identify its antecedents as perceived needs fulfillment, relationship irreplaceability, and resource investment.

Appendix B

Measurement Items for Principal Constructs

Emergent Use Intention (Based on Davis 1989; Davis et al. 1989; Venkatesh and Davis 2000), Cronbach's Alpha = 0.92
Given a chance, I intend to use the virtual world for collaborative tasks in my workplace in the future.
Given a chance, I predict that I will frequently use virtual world in the future for collaborative tasks in my workplace.
I will strongly recommend others in my workplace to use virtual world for collaborative tasks.
I foresee the use of virtual worlds for collaboration and information sharing in my workplace in the near future.
User Trust in Virtual Worlds (Gefen 2000; Jarvenpaa et al. 2000; Lee and Turban 2001; Pavlou and Gefen 2004; Pavlou 2003; Teo and Liu 2006), Cronbach's Alpha = 0.95
I trust virtual world to be reliable.
I believe the virtual world to be trustworthy.
I trust the virtual world.
Social presence (Gefen and Straub 2004), Cronbach's Alpha = 0.94
I believe there is a sense of human contact in using virtual world for interactions.
I believe there is a sense of personalness in using virtual world for interactions.
I believe there is a sense of human warmth in using virtual world for interactions.
Structural assurance (McKnight et al. 2002), Cronbach's Alpha = 0.91
I believe virtual world has enough safeguards to make me feel comfortable using it for collaboration.
I feel assured that legal and technological structures adequately protect me from problems on the virtual world.
I feel confident that encryption and other technological advances on the virtual world make it safe for me to collaborate.
Situational Normality (Gefen 2000; McKnight et al. 2002), Cronbach's Alpha = 0.87
I believe virtual world members understand other members they are working with.
I believe members in virtual world make promises that are reliable.
I believe members in virtual world have good intentions towards me.
Disposition to Trust (Gefen 2000), Cronbach's Alpha = 0.89
I generally trust other people.
I generally count on other people.
I generally have faith in humanity.
Playfulness (Agarwal and Karahanna 2000), Cronbach's Alpha = 0.94
When using the virtual world I perceive to be spontaneous.
When using the virtual world I perceive to be flexible.
When using the virtual world I perceive to be creative.
When using the virtual world I perceive to be playful.
Self-Efficacy (Compeau and Higgins 1995), Cronbach's Alpha = 0.76
I believe that I can use virtual world for collaborative tasks even if there is no one around to tell me what to do as I go.
I believe that I can use virtual world for collaborative tasks if I have a lot of time to carry out the task for which virtual worlds are provided.
I believe that I can use virtual world for collaborative tasks if I have the built-in help facility for assistance.

Perceived Usefulness (Davis 1989), Cronbach's Alpha = 0.96
Using virtual worlds would enable me to accomplish collaboration tasks more quickly.
Using virtual worlds for collaboration tasks would improve my performance.
Using virtual worlds for collaboration tasks would enhance my effectiveness.
Using virtual worlds for collaboration tasks would make it easier for me to carry out collaborative tasks.
Overall, I find that virtual worlds are useful for collaboration and sharing of ideas.
Perceived Ease of Use (Davis 1989), Cronbach's Alpha = 0.93
Learning to use virtual worlds would be easy for me.
It would be easy to get virtual worlds to do what I want it to do.
My interaction with virtual worlds would be clear and understandable.
It would be easy for me to become skillful at using virtual worlds.
Overall, I find virtual worlds easy to use.

Appendix C

Demographic Profile of Respondents

Demographic Variable	Category	Frequency (*N* = 197)	Percent
Gender	Male	84	42.6
	Female	113	57.4
Age	21 to less than 30 yrs	113	57.3
	30 to less than 40 yrs	72	36.6
	40 yrs and older	12	6.1
Education Level	Undergraduate	51	25.9
	Graduate	146	74.1
IT Professional	Yes	28	14.2
	No	169	85.8
Preferred VW	Second Life	155	78.7
	Other	42	21.3

Appendix D

Factor Loadings

	EUI	UTR	PLY	SEF	DTR	PU	PEOU	SOP	SIN	STA
EUI1	.62	.13	.31	.24	.08	.35	.30	.06	-.03	.22
EUI2	.63	.24	.18	.09	.07	.38	.26	.06	.12	.34
EUI3	.63	.29	.25	.20	.14	.27	.18	.23	.13	.22
EUI4	.69	.07	.14	.09	.21	.35	.16	.27	.16	.15
UTR1	.12	.72	.16	.11	.22	.31	.11	.22	.32	.18
UTR3	.19	.77	.13	.08	.20	.26	.16	.22	.23	.28
UTR4	.21	.72	.12	.17	.22	.26	.18	.24	.08	.31
PLY1	.13	.10	.79	.06	.10	.19	.28	.05	.14	.11
PLY2	.15	.04	.85	.03	.18	.08	.19	.10	.27	.04
PLY3	.14	.06	.87	.03	.14	.11	.16	.09	.16	.06
PLY4	.06	.12	.85	.14	.10	.10	.29	.16	.04	.08
SEF1	.21	.10	.19	.63	-.10	.17	.35	.11	.22	.10
SEF2	.04	.13	.17	.68	.19	.28	.03	.27	.12	-.06
SEF3	.13	.05	-.03	.80	.08	.13	.18	.15	.13	.21
DTR1	.12	.20	.05	.00	.84	.09	.12	.08	.13	.11
DTR2	.07	.14	.16	.04	.84	-.04	.08	.13	.23	.17
DTR3	.06	.04	.28	.15	.80	.17	.18	.14	.07	.07
PU1	.23	.08	.13	.16	.26	.76	.24	.17	.06	.17
PU2	.12	.21	.09	.08	.04	.87	.22	.18	.03	.12
PU3	.19	.18	.12	.09	.00	.83	.26	.17	.09	.15
PU4	.18	.15	.18	.12	.03	.80	.27	.16	.19	.16
PU5	.16	.08	.08	.22	.05	.80	.25	.11	.06	.15
PEOU1	.05	.12	.18	.15	.03	.29	.82	.01	.09	.04
PEOU2	.24	.00	.20	.05	.08	.15	.80	.09	.13	.13
PEOU3	.10	.11	.18	.15	.13	.17	.80	.09	.06	.19
PEOU4	.00	.06	.26	.06	.17	.24	.82	.09	-.01	.04
PEOU5	.22	.12	.19	.12	.12	.34	.65	.15	.12	.02
SOP1	.11	.17	.15	.16	.09	.33	.07	.82	.10	.10
SOP2	.14	.19	.13	.17	.18	.14	.16	.81	.20	.19
SOP3	.16	.15	.14	.22	.18	.24	.16	.74	.26	.19
SIN1	.05	.10	.22	.18	.21	.04	.17	.06	.82	.13
SIN2	.16	.16	.18	.10	.19	.08	.07	.20	.81	.14
SIN3	.00	.19	.22	.14	.08	.24	.06	.31	.65	.22
STA1	.18	.22	.14	.15	.09	.32	.08	.15	.15	.78
STA2	.23	.15	.01	.15	.13	.30	.05	.27	.22	.73
STA3	.15	.21	.13	.01	.22	.10	.25	.09	.15	.80

Key: EUI: Emergent Use Intention, UTR: User Trust, PLY: Perceived Playfulness, SEF: Self-Efficacy, DTR: Disposition to Trust, PU: Perceived Usefulness, SOP: Social Presence, PEOU: Perceived Ease of Use, SIN: Situational Normality, STA: Structural Assurance.

Appendix E

Descriptives, Correlations, CR, and AVE of Research Constructs

Construct (CR) (AVE)	Mean	SD	DTR	EUI	PEOU	PLY	PU	SEF	SIN	SOP	STA	UTR
DTR (0.93) (0.81)	4.43	1.48	0.90**									
EUI (0.94) (0.80)	4.22	1.50	0.42**	0.89**								
PEOU (0.94) (0.77)	4.37	1.40	0.37**	0.60**	0.88**							
PLY (0.95) (0.82)	4.15	1.43	0.41**	0.54**	0.54**	0.90**						
PU (0.97) (0.87)	4.77	1.61	0.31**	0.71**	0.61**	0.41**	0.93**					
SEF (0.86) (0.68)	3.96	1.63	0.29**	0.56**	0.50**	0.37**	0.53**	0.82**				
SIN (0.92) (0.79)	3.71	1.37	0.46**	0.47**	0.37**	0.50**	0.40**	0.49**	0.89**			
SOP (0.96) (0.89)	3.93	1.52	0.43**	0.57**	0.42**	0.41**	0.56**	0.56**	0.57**	0.94**		
STA (0.94) (0.85)	3.83	1.54	0.42**	0.66**	0.42**	0.36**	0.55**	0.44**	0.52**	0.55**	0.92**	
UTR (0.97) (0.91)	3.52	1.48	0.50**	0.65**	0.46**	0.42**	0.60**	0.48**	0.58**	0.62**	0.67**	0.95**

Key: DTR: Disposition to Trust, EUI: Emergent Use Intention, PEOU: Perceived Ease of Use, PLY: Perceived Playfulness, PU: Perceived Usefulness, SEF: Self-Efficacy, SIN: Situational Normality, SOP: Social Presence, STA: Structural Assurance, UTR: User Trust

CR: Composite Reliability**, AVE:** Average Variance Extracted

Note: The shaded numbers in the diagonal row are the square roots of the AVE.

n = 197, *p < 0.05, **p < 0.01

Appendix F

Testing for Common Method Bias

Common method bias concerns the amount of spurious covariance shared among variables due to a common data collection method (Malhotra et al. 2006). As the present research employs a cross-sectional study, we had to make sure that no systematic bias influences our data due to the single method of data collection. We took several steps to reduce the common method bias. These included appropriate instrument design and data collection procedures, as suggested by Podsakoff et al. (2003). In addition, we performed statistical analyses to assess the severity of common method bias in the data. First, we performed Harman's one-factor test (Podsakoff and Organ 1986), which is arguably the most widely known test for common method bias in a single-method research design (Podsakoff et al. 2003; Podsakoff and Organ 1986). It requires conducting an exploratory factor analysis on all the measures used in the research, based on the assumption that if common method bias exists, a single factor or a general factor accounting for the majority of the covariance among the measures will emerge (Podsakoff et al. 2003). Accordingly, we examined the factor structure solution emerging from an exploratory factor analysis of all the research variables to determine the number of factors necessary to account for the variance in the variables (Podsakoff et al. 2003).

The test indicated the presence of four major factors accounting for a total of 75 percent of the variance, and the first (largest) factor did not account for a majority of the variance (28%). Because a single factor did not emerge and one general factor did not account for most of the variance, we conclude that common method bias is not a significant problem with the data (Podsakoff et al. 2003). However, Podsakoff et al. (2003) argued that the emergence of multiple factors does not always indicate the absence of common method bias, and additional tests are recommended (Sharma et al. 2009). This is because as the number of latent variables increases in the research model, it is quite unlikely that one factor will explain the majority of variance in the manifested variables. Lindell and Whitney (2001) suggested the use of a marker-variable test for common method bias, as it addresses most of the problems related to Harman's one-factor test. Therefore, we further tested our data for common method variance using Lindell and Whitney's marker-variable method. The results from these tests, discussed below, show that there is no significant problem of common method bias. These tests thus rule out the possibility that common method bias contaminated the results in this research.

Marker-Variable Technique

The marker-variable technique requires the inclusion of a variable that is theoretically unrelated and dissimilar to other variables in the model. As the marker variable is assumed to have no relationship with single or multiple variables in the study, common method bias can be assessed based on the correlation between the marker variable and the theoretically unrelated variables.

We added an additional variable "anxiety" as a marker variable in the model, as it is not very related to the other focal variables in this study. Any correlation observed between the marker variable and the theoretically unrelated variables is possibly due to some systematic influence and is thus interpreted as an estimate of common method variance (Lindell and Whitney 2001). The correlations between the marker variable and other research variables are very low, as indicated in Table 1, Appendix F. In fact, the highest correlation is between structural assurance (STA) and the marker variable, and it is only -0.11. Further, if we square the correlations, we get the maximum shared variance with the other variables in the model, which is about 2%. This shared variance is very low and thus shows that there is no significant problem of common method bias. These results therefore rule out the possibility that common method bias contaminated the results in this research.

Table F1. Correlations of Marker Variable with Other Constructs: Marker-Variable Test for Common Method Bias

	DTR	EUI	Marker	SIN	SOP	STA	UTR
DTR	1**						
EUI	0.42**	1**					
Marker	-0.03	-0.05	1**				
SIN	0.46**	0.47**	0.03	1**			
SOP	0.43**	0.58**	0.13	0.57**	1**		
STA	0.42**	0.66**	-0.11	0.52**	0.55**	1**	
UTR	0.50**		-0.10	0.58**	0.62**	0.67**	1**

Key: DTR: Disposition to Trust; EUI: Emergent Use Intention; SIN: Situational Normality; SOP: Social Presence; STA: Structural Assurance; UTR: User Trust
n = 197; *p < 0.05, **p < 0.01

Appendix G

Interview Questions

1. Which virtual world (e.g., Second Life, Kaneva, etc.) do you prefer? Why? What do you use virtual worlds for?
2. How often do you use a virtual world (usage frequency)?
3. Do you foresee the usage of virtual worlds as an organizational workplace collaboration tool in the near future? If yes, what would be the prime factors that would facilitate their acceptance as an organizational collaboration tool?
4. What are the different types of uncertainties and risks that prevail in virtual worlds?
5. Do you think it is important for users to trust a virtual world in order to use it as a workplace collaboration tool?
6. Which virtual world features mitigate users' perceived risks, thereby enabling development of adequate trust for facilitating utilization of a virtual world in important tasks?
7. In virtual worlds, other avatars are socially present and interacting with other virtual world members. Do you feel that this notion of others being socially present in virtual worlds through their avatars helps you in developing/enhancing your trust in virtual worlds?
8. If you are assured of all the safety and security measures in virtual worlds, does this help you develop trust in the virtual world platform as a collaboration tool?
9. Does the social presence of other virtual world members as avatars help in amplifying the impact of safety/security measures in place? If so, how?
10. Do you think that the presence of other users as avatars in a virtual world helps you perceive the interaction as normal and natural, thereby helping you develop adequate trust in the virtual world platform? If so, how?
11. Do you believe that your creativity and playfulness in using new technologies like virtual worlds helps in developing your intentions to use virtual worlds for organizational tasks like meetings and collaborations? If so, how?
12. Do you believe that your ability and expertise in using virtual worlds helps in developing your intentions to use virtual worlds for organizational tasks like meetings and collaborations? If so, how?
13. Please give any other suggestions you may have for enhancing the usage of a virtual world as a collaboration tool in organizations.

Appendix H

Demographic Profile of Interview Respondents

Gender (Resp. #)	Age	VW Exp. (yrs)	VW Usage Frequency	Nationality	Real-World Profession	VW Profession
F1	27	1.5	Every day	Danish	Quality Assurance	Builder
M1	40	5	Twice a week	Portuguese	Professor	Teaching
M2	40	5	8-10 hours/ week	German	Professor	Teaching
M3	27	0.5	Every day	Chinese	Software Engineer	VW Project Manager
F2	51	5	Every day	Portuguese	Professor	Teaching
F3	Undisclosed	3	Every day	Chinese	Professor	Virtual Education and Multimedia Technology
F4	31	1.5	Every day	Spanish	Accountant	Photography and Fashion Designing
M4	31	8	Every day	Portuguese	Researcher	VW Developer
F5	33	4	Every day	Singaporean	Banker	Model in SL
F6	33	5	Every day	American	Hairstylist	Model in SL
M5	36	4	Every day	Portuguese	Teacher	3-D Builder
M6	49	4.5	Every day	Turkish	Writer	Content Creator
M7	36		Every day	Italian	Shop Owner	Business
M8	27	9	4 times a week	Chinese	System Analyst	Research
M9	49	15	5-9 hours every day	American	3-D Animator	Market Animations
F7	48	4.5	Daily, 12-16 hours/ week	Portuguese	Sales Analyst at a Telecom Company	Tutoring and Photography
F8	41	7	Every day	Portuguese and German	IT Consultant and System Administrator	Develops Virtual Organizations for Companies
M10	58	7	Several times a week	American	Consultant	Strategist and Expediter for Virtual World Projects in Business, Music, Tourism, Arts
F9	35	4	Project-based	Spanish	Science and Culture Communicator	Uses SL for Science Communication Projects
M11	56	5	Every day	Netherlands	Music Professor	Uses SL for Promoting His Music and Himself
M12	27	5	5 hours/ week	Indian	Student	Organizational Tasks
M13	“GenX”	10	1-3 hours/ week	American	Writer	Writes about SL and Develops Projects in SL
M14	55	9	5 hours/day every day	French	Executive in Human Resources in a Company	Uses SL to Create and Sell Virtual Goods
F10	47	6	Every day	American	OpenSim Hosting Provider	OpenSim Hosting Provider

Gender (Resp. #)	Age	VW Exp. (yrs)	VW Usage Frequency	Nationality	Real-World Profession	VW Profession
F11	46	10	70 hours/ week	American	Owner and Designer of a Company that Develops VW Content	Develops Projects for Clients
F12	40	6	Several hours every day	American	VW Developer	VW Developer
F13	45	1.5	Every day	Portuguese	Teacher	Participates in Meetings
F14	27	3	One day/ week	Portuguese	Pedagogical Consultant	Educational and Working Proposals
M15	37	5	Twice per week	Portuguese	Computer Science Researcher	Virtual World Researcher

Appendix I

Illustrative Example of Template for Qualitative Analysis of VW User Responses

Responses	Initial Coding		Consensus Coding
	Coder 1	Coder 2	
I am pretty sure of its (VW's) safety and security, as long as you keep the things in control.	STA(+)	STA(+) UTR(+)	STA(+)
I trust to use virtual worlds for serious workplace tasks like collaborations and meetings. At least in Second Life, there are all sorts of options to enable privacy and security in your virtual space.	STA(+) → UTR(+)	STA(+) → UTR(+)	STA(+) → UTR(+)
3-D Web is a workplace collaboration tool for me. In the beginning the collaboration was on building 3-D Web environments such as Dublin Virtually Live. Collaboration proceeded further on producing events transmitted through 3-D Web to audiences.	EUI(+)	EUI(+)	EUI(+)
I have made my living from graphical virtual worlds since 2003. Creativity and playfulness are what got me into the business in the first place.	PLY(+) → EUI(+)	PLY(+) → EUI(+)	PLY(+) → EUI(+)
I worked as a greeter in-world about 3 years ago and at that time, there were already many big name companies having their presence in-world to use Second Life as a workplace collaboration tool and hold meetings for their staffs in-world with employees that were located all over the world.	EUI(+)	EUI(+)	EUI(+)
It's an easy, convenient, and inexpensive way of having a group of people working together and feeling close through this virtual world, no matter where they really are.	PEOU(+)	PEOU(+)	PEOU(+)
Another reason for the usage of virtual world as a workplace collaboration tool is that company will be able to expose to a new target market that may not be reachable in real life, especially to overseas group of users in-world.	PU(+) EUI(+)	EUI(+)	EUI(+)
At the end, ability to use the technology is what counts. Putting ideas into concepts and finally into a working virtual world model/solution.	SEF(+)	SEF(+)	SEF(+)
Somebody who's already creative and gets into 3-D Web is always going to start thinking of ways to develop it for meetings and collaboration—in fact, that's going to have to happen, I think, for it to even to occur for an organization.	PLY(+) → EUI(+)	PLY(+) → EUI(+)	PLY(+) → EUI(+)
If another user tells me they think it's safe, that reassures me, and if another user tells me they think it's not safe, then that makes me feel anxious.	SIN(+)	SIN(+) → UTR(+)	SIN(+) → UTR(+)
Trust comes from track record from a series of good experiences and also just like in real life, if you have a bad experience and get over it successfully	UTR(+)	SIN(+) → UTR(+)	UTR(+)
All we need for more user trust and increased usage of virtual world for work-place collaborations is: reliability, flexibility, and usability. More solid platforms that do not crash often; sims that are maintained good with a 7/24 instant help desk solving all possible problems; good bandwidth and clean connection without lag; and an as smooth as possible learning curve for new users .	PEOU(+) → EUI(+)	PEOU(+) → EUI(+) UTR(+) → EUI(+)	PEOU(+) → EUI(+)
The 3-D VW will be accepted if there is minimum learning curve. So it is time to learn and become fluent with the browser.	SEF(+) → EUI(+)	SEF(+) → EUI(+)	SEF(+) → EUI(+)
Safety of the virtual world platform is essential. Anyway the interaction with other people improves the immersion of users. Users feel as if they are physically within the virtual world.	UTR(+)	SOP(+) UTR(+)	UTR(+)

Coding Scheme: EUI: Emergent Use Intention, UTR: User Trust, PLY: Perceived Playfulness, SEF: Self-Efficacy, DTR: Disposition to Trust, PU: Perceived Usefulness, SOP: Social Presence, PEOU: Perceived Ease of Use, SIN: Situational Normality, STA: Structural Assurance, OTR: Others; → implies cause-effect relationship

Appendix J

Results: Structural Model (with Individual and Technology Use Controls on UTR)

	UTR			EUI	
	Control Model	**Direct Model**	**Interaction Model**	**Control Model**	**Direct Model**
Control Variables	**β**	**β**	**β**	**β**	**β**
DTR	0.30**	0.16*	0.16**		
Age				0.02	0.02
Gender				0.02	0.02
IT Prof				0.00	0.00
Education				0.07	0.07
Individual Variables as Controls					
SEF	0.15**	0.01	0.04		
PLY	0.08	0.01	0.02		
Technology Use Variables as Controls					
PU	0.41**	0.22*	0.24**		
PEOU	-0.02	0.01	0.01		
Independent Variables					
SIN		0.15*	0.13*		
STA		0.30**	0.33**		
SOP		0.17*	0.16*		
UTR					0.66**
Interaction Terms					
SOP × SIN			0.23**		
SOP × STA			-0.15*		
R^2	**0.50**	**0.62**	**0.65**	**0.03**	**0.44**
ΔR^2		**0.12****	**0.03***		**0.41***

n = 197, *p < 0.05, **p < 0.01

Key: DTR: Disposition to Trust, EUI: Emergent Use Intention, SEF: Self Efficacy, PLY: Playfulness, PU: Perceived Usefulness, PEOU: Perceived Ease of Use, SIN: Situational Normality, STA: Structural Assurance, SOP: Social Presence, UTR: User Trust

Appendix K

Stepwise Results: Structural Model (with Individual and Technology Use Controls on EU)

	UTR			EUI	
	Control Model	**Direct Model**	**Interaction Model**	**Control Model**	**Direct Model**
Control Variables	**β**	**β**	**β**	**β**	**β**
DTR	0.50**	0.16*	0.16*		
Age				0.10*	0.10*
Gender				-0.01	0.01
IT Prof				-0.05	-0.03
Education				0.09*	0.08
Individual Variables as Controls					
SEF				0.18**	0.13*
PLY				0.23**	0.19**
Technology Use Variables as Controls					
PU				0.46**	0.37**
PEOU				0.12	0.12
Independent Variables					
SIN		0.16*	0.14*		
STA		0.38**	0.42**		
SOP		0.25**	0.25**		
UTR					0.25**
Interaction Terms					
SOP × SIN			0.18*		
SOP × STA			-0.16**		
R^2	**0.25**	**0.59**	**0.61**	**0.64**	**0.67**
ΔR^2		**0.34****	**0.02***		**0.03***

n = 197, *p < 0.05, **p < 0.01

Key: DTR: Disposition to Trust, EUI: Emergent Use Intention, SEF: Self Efficacy, PLY: Playfulness, PU: Perceived Usefulness, PEOU: Perceived Ease of Use, SIN: Situational Normality, STA: Structural Assurance, SOP: Social Presence, UTR: User Trust

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