Trust in Automation among Volunteers Participating in a Virtual World Telehealth Mindfulness Meditation Training Program

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Learning over Virtual Worlds

- Human factors issues in group-based teaching over a Virtual World (VW) include considerations of
  - Input devices
  - Methods of communication
  - Keeping attendees engaged
  - Developing group cohesion
  - Response timing
  - Virtual environmental design
  - Technology competence and use

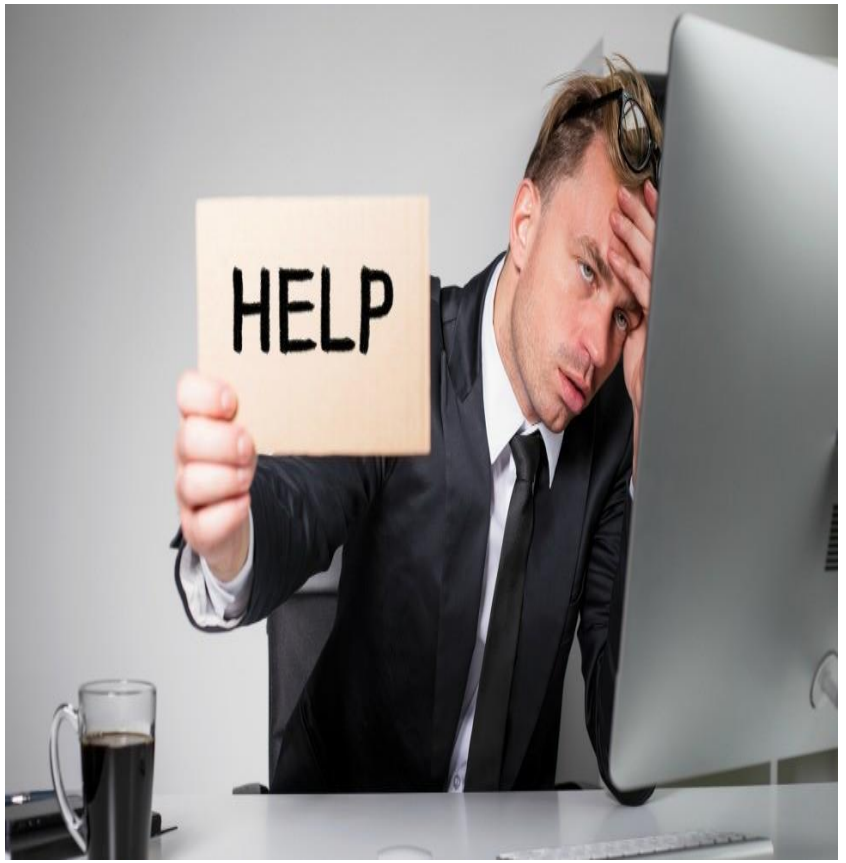
  (Hoffman, Johnson, & Bradshaw, 2013).

Trust in Automation

Trust: a key determinant of automation reliance and usage.

- Trust in automation includes:
  - Reliability
  - Validity
  - Utility
  - Robustness of the technology

(Brewster, Mountain, Wessels, Kelly, & Hawley, 2014)



Virtual Worlds

Virtual World (VW): “A synchronous, persistent network of people, represented by avatars, facilitated by computers” (Bell, 2008).

- Highly social & interactive,
- Both users and developers create the environment
- Interactions are free-flowing, person, and occur in real time.
- Trust is key to VW collaborations

- **Second Life**
  - Free to the public
  - Provides a means for people to connect socially

The Present Study

- **Purpose**: Examine self-reported relational trust (communication, confidentiality, and self-representation) and trust in automation after attending a telehealth mindfulness meditation class via the VW of SL.
- **Predictions/Hypotheses**: To freely and fully participate, participants would need to trust that the technology itself was safe and secure and their personal information was protected, as well as trusting in the functionality of the equipment and software.

Participants & Procedures

- **Participants**: 45 U.S. military active duty service members & veterans.
- **Measures**
  - Demographic Survey
  - Class Attendance
  - Virtual World Trust Questionnaire (VWT)
  - Trust in Automation Questionnaire (TIA)

Participant Demographics

Demographic	*n*	%
Gender		
Male	25	55.6
Female	20	44.4
Military status		
Active duty	14	31.1
Reserve	1	2.2
Guard	1	2.2
Veteran	29	64.4
Education		
High school	3	6.7
Some college/Associates	10	22.3
Bachelors	13	28.9
Masters/Doctorate	16	35.5
Other professional	3	6.7

Participant Demographics

Demographic	*n*	%
Ethnicity		
African American	9	20.1
Caucasian	29	64.4
Hispanic	4	8.9
Asian	1	2.2
Native American	1	2.2
Other	1	2.2
Marital status		
Married	28	62.2
Divorced/Seperated	9	20.1
Single	6	13.3
Widowed	1	2.2
Partnered	1	2.2
Computer Experience		
Little to no	1	2.2
Basic	3	6.7
Intermediate	14	31.1
Expert	23	51.1
Advanced	4	8.9

Trust in Virtual World

Item	*Mean*	*SD*	*n*
I felt comfortable speaking during my MBSR class over Second Life using my voice.	4.00	.95	45
I felt comfortable speaking during my MBSR class over Second Life using my text.	4.24	.83	45
I trust that my personal information will be kept confidential over Second Life	4.33	.67	45
I believe that my MBSR over Second Life classmates and instructors perceive me the way I intended using my avatar.	3.95	.81	44

Trust in automation

Item	*Mean*	*SD*	*n*
The system is deceptive	1.86	1.34	42
The system behaves in an underhanded manner	1.67	1.22	42
I am suspicious of the system's intent, action or outputs	1.90	1.36	42
I am wary of the system	2.02	1.47	42
The system's action will have a harmful or injurious outcomes	1.67	1.22	42
I am confident in the system	5.12	1.69	42
The system provides security	5.00	1.38	42
The system has integrity	5.00	1.33	42
The system is dependable	4.55	1.80	42
The system is reliable	4.48	1.85	40
I can trust the system	4.90	1.61	41
I am familiar with the system	4.59	1.50	39

Class Attendance

82.2% of participants attended 5 or more classes.

Classes Attended	*N*	%
2	4	(8.9)
4	4	(8.9)
5	4	(8.9)
6	9	(20.0)
7	9	(20.0)
8	12	(26.7)
9	3	(6.7)

Class Attendance & Trust

Measure	Item	*r*	*p*	*n*
VWT	I felt comfortable speaking during my MBSR class over Second Life using my voice.	.53**	.00	45
	I trust that my personal information will be kept confidential over Second Life	.30*	.04	45
TIA	I am wary of the system.	-.30*	.05	44
	I am confident in the system.	.41**	.01	44
	The system provides security.	.39**	.01	44
	The system has integrity.	.37*	.01	44
	The system is dependable.	.40**	.01	44
	The system is reliable.	.41**	.01	42
	I can trust the system.	.31*	.05	43

*p < .05, **p < .01

Discussion

- None of the demographic measures, except for hours of work-related computer use per day, were associated with trust.
- Association between longer hours of work-related computer use and trust
- Moderately high levels of trust & low levels of mistrust in the use of a VW technology system and high positive levels of relational trust when attending a wellness intervention via a VW.

Discussion

- 73% of the participants who returned for post-study assessments attended 6 or more classes during the study
- Greater trust was associated with higher attendance, while suspicion (“I am wary of the system”) was associated with lower attendance.
- System familiarity was not significantly associated with class attendance.

Discussion

- System familiarity was not significantly associated with class attendance.
  - 22% of participants had used a VW prior to participating in this study.
  - None of the participants had ever used SL prior to the study.
  - Agreement with the statement “I am wary of the system” (indicating lower system trust) was associated with more absences from class

Discussion

- Communications and interactions with patients should convey concern for the patient and his or her safety and privacy.
  - Patients are likely to be concerned about the safety and reliability of the telehealth service and software, and their interest may be weighted around the perceived risks and benefits from the experience.
- A foundation of relational trust between the provider and the patient will likely impact patients' trust in the telehealth technologies used by their provider

Limitations & Conclusions

- **Limitations**
  - homogeneity of the sample population
- **Conclusions**
  - Trust is key to the use of automation
  - Trust is vital in VW group work

Questions?

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