Innovation Program 2015

Telepresence Robots – Double Robotics (UW-Superior)

1. Executive Summary

Telepresence robots are a relatively new technology that allow the user to remotely access a robot from anywhere in the world. The robot gives the user a physical presence by having the ability to carry on live conversations with groups and individuals face to face. The telepresence robot chosen for this project is Double Robotics brand providing a light, maneuverable, low cost, simple operation and interactive unit that can be shipped to any location.

UW Superior purchased two of these robots through the Innovation Program Fund to utilize them on and off campus for remote access to meetings, conferences and classes. The robots were met with much interest and proved to provide a way to save time and travel costs by allowing UW Superior faculty, staff and students a way to attend off campus meetings without the cost of physically traveling to the location. Often time's meetings are 4-6 hours of travel time one way for a 2-8 hour meeting. Related travel costs for these meetings include vehicle rental, gas, hotel, food and lost time while on the road. The cost savings for 6-10 overnight trips will pay for the cost of one robot.

The overall response to the robots by meeting attendees was positive and accepting, proving that this technology is a viable alternative to physically attending off campus meetings and conferences.

This project proved real savings to UW Superior and revealed the possibility of overall savings throughout UW System by demonstrating that for a small monetary investment for each campus, at least one robot could be available at each campus for other campuses to utilize without the expense of shipping individual robots and onsite setup.

Although no on campus classes were attended remotely with the robots during this project, student and faculty interest is positive and we anticipate more integration into the classroom setting.

2. Purpose and Objectives

The purpose of this project is to investigate and introduce the use of Double Robotics telepresence robots on and off the UW Superior campus, in various applications, in order to save time and travel costs as well as providing an increased remote accessibility in various situations.

With the extreme northern location of UW Superior (UWS) resulting in a remoteness to other campuses throughout UW System, and especially to Madison, UWS incurs a lot of travel and related costs attending off campus meetings. Although a physical presence is often most desirable, budget and time often dictates the availability of UWS faculty and staff and their ability to attend meetings. Video

conferencing is sometimes an option, but attendees are often left out of the individual conversations that are quite often the most beneficial time spent while attending meetings or conferences.

The telepresence robots allow the user to attend meetings remotely with the ability to communicate with the group as well as have individual, private conversations. The robots can be easily shipped to off campus locations, and with very little setup, are able to operate anywhere in the world by the user through computer, IPad and smart phone interphases. The robot's integrated IPad allows a live audio and video image of the user to the attendees and vice versa.

This technology is also useful on campus allowing off campus faculty, staff and students to log into a robot and attend meetings and classes while off site. This allows better remote accessibility and exposes our faculty, staff and students to a technology that is gaining national and international usage in fields such as medical, business, technology and research.

Our objective is to introduce this technology to UW Superior faculty, staff and students and strive to integrate this technology into the daily work and educational environments on and off campus. Through a combined effort, UW Superior Facilities Management and Technology Services have worked to get two robots into the hands of UWS faculty, staff and students. We have also worked to get a robot stationed in Madison and scheduled for numerous meetings by several UWS staff members.

3. Organization and Approach

UW Superior Facilities Management and Technology Services staff worked together to get two telepresence robots on campus and into the hands of staff and students:

- Two Double Robotics telepresence robots were purchased with factory shipping cases to allow for shipping the robots to remote locations.
- The robots were configured to the UWS Wi-Fi network and user IPads were devoted to the operation of the robots.
- The UWS campus community was notified of the robots through the campus newspaper, staff and student digests and all staff emails.
- Departmental, hands on demonstrations were setup across campus in order to introduce the technology to campus faculty and staff. Questioners were distributed and collected after the demonstrations.
- A mass demonstration was implemented in the Yellow Jacket Union to get both robots in the hands of students and introduce them to the technology. Questioners were distributed and collected after the demonstrations.
- One robot was taken down to Madison for four individual meetings at various locations. Reactions to the robot by attendees and users were recorded.
- One robot was taken to UW Stout for a meeting. User reaction was recorded.

- Currently UWS Technology Services staff are working with UW Madison Technology Services staff to potentially station one of the robots semi permanently in Madison to more easily facilitate future usage of the robot by UWS faculty and staff and better streamline the process.
- The second of the two robots is currently being integrated into the UWS Technology Services equipment loan program. We are working to create a policy and procedure for the type of usage allowed on and off campus as well as creating a training for the operation of the robot.

4. Analysis and Findings

The telepresence robot technology was for the most part met with a positive response by faculty, staff and students. Questioner results showed an overall interest in the technology. Out of roughly 100 faculty, staff and students that took part in various demonstrations across the UWS campus, 67 questioners were collected.

The questioner started with an initial response to the robot prior to using or interacting with the robot. The two largest initial responses to the robots were “Nice Toy” and “Really Useful”. Question 2 referred to the initial reaction to the controls for operating the unit. The overall response was that the operation was intuitive. Question 3 was a follow up to question 2 after the user was able to operate the robot, did the controls get easier? The overwhelming response was that the operation of the robots got easier as the user operated the unit. Question 4 was “What do you think of the interaction between you and the other person?” with the two largest responses being “Was like talking in person” and “Was good, but would need to get used to”. Question 5 was a follow up to question 1 “What is your reaction to the robot after using it?” The largest response was “Like it more now”. The final question was “Could you see yourself using a robot if they were available to you?” The overwhelming response was “Yes”. Please see appendix “Robot Questioner Data” for the detailed questioner data.

Although the demonstrations for the most part were met with a positive response, getting UWS faculty, staff and students to start using the robots was difficult. Multiple emails were sent to individual departments trying to brainstorm how the robots could be used. Student and staff digest postings included Double Robotics videos with hopes that they would inspire some creative usage of the robots, but we received little response.

We have had three UWS staff members utilize a robot to attend an on campus meeting while out of town. The overall reaction was good and the users considered the experience to be useful and would consider utilizing the robots again.

Four meetings have been attended in Madison through one of the robots. We received some very good feedback from the user and the other attendees. For the most part the reaction was positive and accepting of the attendee utilizing this technology.

Challenges that we have experienced with the robots include:

- The robots are only as good as the WIFI connection to the robot and the internet connection to the user's operating device.
    - Off campus WIFI connections were not consistent if "visitor" WIFI connections were used. On location IT needs to configure the WIFI connection to the robot rather than depending on the general WIFI connection.
    - On and off campus WIFI connections often are inconsistent throughout the buildings causing intermittent connection issues and lagging of the sound and video on the robot, sometimes resulting in a disconnection of the robot to the user and the need to reinitiate connection to the robot, while causing a substantial interruption for the user from the meeting.
    - Limited usage in older, brick buildings were WIFI coverage is difficult.
    - Loss of WIFI connection when driving the robots through buildings.
- Setup of the robots off campus often times were incomplete and caused some technical difficulties
    - Volume was often times not turned up on the robot
    - The external speaker was disconnected from robot during transit and not reconnected properly resulting in low volume while trying to communicate with groups.
    - The charger/ docking station was not properly located and was left inaccessible to the robot.
- Off campus operation was best served when another attendee was familiar with the robot and able to assist with technical difficulties
    - We had good success in situations where one campus attendee took the robot with them to the meeting which allowed another campus attendee remote access to the meeting and support while using the robot at the meeting.
- Obstructions such as cords and bags created navigational obstacles for the robots when maneuvering throughout the spaces.

5. Conclusion and Recommendations

Telepresence robots have proven to be an emerging technology that can be greatly utilized at UW Superior as faculty staff and students become more familiar with the robots and their capabilities. Although we have experienced some challenges with this technology, faculty, staff and students still see the robots as a tool that can be utilized in many different applications to increase accessibility to meetings, conferences and classes on and off campus.

On campus utilization is starting to increase. With the inclusion of the robots into the Technology Services Equipment Loan Program and the implementation of a policy and procedure for the robots, we anticipate a growing interest and utilization of the robots.

Negotiations are currently underway to semi permanently station a UW Superior robot in Madison through a partnership with the UW Madison Technology Services department. We hope that this partnership will increase the use of the telepresence robots for meetings and conferences regularly held on the UW Madison campus by UW Superior faculty and staff. By having the robot stationed at UW Madison, UW Superior should, over time see substantial savings in travel costs and time lost while traveling to Madison.

The interactions UW Superior staff have had while utilizing the robots with other attendees has been for the most part positive and has sparked interest in other UWs potentially investing in their own robots. Our hope is that our continued use of the telepresence robots off campus will help to encourage the purchase of at least one telepresence robot per UW campus so all of the campuses could forgo the cost and scheduling of transporting robots and instead have the capability to provide a robot for others to log into and utilize. The travel and time savings across all of UW System could be substantial and more than justify the upfront costs of the robots.

The connectivity issues experienced when using the robots in areas with inconsistent or weak WIFI signals has caused, at times, a negative experience with the robots. UW Superior Technology Services is working to mitigate the connectivity issues by adding a cellular connection to one of the robots to test and see if this will stabilize the connection to the robot. Also with further usage of the robots off campus, locations with consistent WIFI can be determined on each campus and these spaces can become a priority location when robots are going to be used for a meeting.

UW Superior greatly appreciates the Innovation Program Funding and sees this project as a huge success and investment in our campus. With anticipated increases in the use of the robots, UW Superior will greatly benefit from the increased accessibility and cost savings the robots provide.

6. Appendix

Questioner Data

Student	Faculty	Staff	Dept./Major	Question 1						Question 2						Question 3				Question 4						Question 5						Question 6				Question 7 Comments
				A	B	C	D	E	Comment	A	B	C	D	E	Comment	A	B	C	Comment	A	B	C	D	E	Comment	A	B	C	D	Comment	A	B	C	Comment	
1			Comm Arts			1					1					1					1					1					1			Telepresence @ meetings-class activities	Seems very useful
	1		Comm Arts			1					1					1					1								1	Good	1				Could use this for DL Students/hybrid
	1		Comm Arts			1				1						1							1	Will Offer goal opportunities		1				1			Meetings, advisory DL interaction	Awesome!
1			Comm Arts	1							1					1				1						1				1			Help to bridge the communication gap	I love the potential...opens up the campus to other people
1			Comm Arts			1				1						1					1					1				1			Off campus communication	Awesome!
		1	Comm Arts			1					1					1					1			Reception in the building wasn't great		1				1			Use for DI Students & Staff/faculty	Great for DL advising
		1	Comm Arts	1							1			N/A bad Wi-Fi in HFA	1			easier understood		1					1				Interesting	1			Showing theatre space-props etc	Useful for others. Not sure how much use I would get out of it
		1	Comm Arts	1								1				1					1						1			1			Not sure	
1			Comp Science		1						1					1				1						1				1			Not this one but it's a start	Good beginning...could have better functions but harder to use
		1	Provost			1					1					1				1						1				1				
		1				1					1					1			N/A		1					1				1				
		1	Provost		1					1						1				1						1				1				
		1	Institutional			1					1					1					1					1				1			Meetings (remote)	
1			Poly Science			1					1					1				1						1				1				It was really cool
1			Element Ed			1			Very Cool	1						1				1						1				1				Very cool and useful
1						1				1						1					1					1				1			Maybe	
1			Comp Science	1							1					1					1								1	Like it slightly more now		1			
1			Math/Science	1					How would it handle doors and stairs		1					1			Easy from start				1	Couldn't tell w/background noise	1					1				Camera lag but that's technology today
1						1				1						1					1						1			1				Very cool technology
1			Exerc Science	1						1						1					1					1						1		
1			Element Ed			1						1				1					1						1			1				Good live use of technology to use to our advantage
1			Element Ed	1										1	Little laggy but good	1					1						1								
1						1					1					1					1						1			1				Very cool! Would like to go to a meeting in one of these
1			Broadfield SS		1						1					1					1						1			1				
1						1				1						1				1							1			1				
1						1					1					1					1					1				1				
1			Exer Science			1					1					1					1					1				1			Talk to my relatives in Brazil & attend meets	
1			Biology	1					Confused	1						1				1						1			Love it	1				Very fun to use. Cool idea
1			Biology	1							1					1					1					1				1				Very neat and seems semi-useful
1			HHP/TED		1						1					1						1				1						1			Very Interesting!
1				1							1					1					1					1				1				Very Cool, new way of going to class everyday
1				1						1						1				1						1				1				Really Cool
1				1						1						1				1						1				1				Cool! Cant wait it use it!
1			Business	1							1					1					1					1				1				
1			POLS/French			1			New Technology(only going to improve)		1					1					1					1				1			Maybe	Wondered how it'd work with communication with groups w/sound
1			Element Ed			1					1					1					1					1				1				Very Interesting
1			English Ed	1			1									1				1						1				1				Neat use/integration technology...further use in schools
1			CJUS			1				1						1				1						1				1				Great idea
1			Management	1						1						1							1	odd		1					1				
1						1							1			1					1					1			weird but cool	1			Anything going to class	
1			Exer Science	1							1					1					1					1				1			I bet there is productive things you can do	
1			Business Adm	1						1						1					1					1				1				
1			Music Ed					1	Its cool however it gliches a lot		1						1					1				1					1				
1			Exerc Science	1							1					1				1						1				1			Attending Meetings, etc.	
		1	Finance-HR	1						1						1					1					1				1			Help eliminate travel	Great use of technology
1				1								1				1						1				1			Cool and could be useful	1			Fun Yes	Thanks for letting me play
1			Criminal Just			1				1						1					1					1				1				Helpful for ones that are unable to attend meetings
1			Chemistry		1						1					1					1					1				1				
1						1				1						1				1						1				1				Very useful hope to see them in use soon
1						1				1						1				1						1				1				
1			Theatre/Writ					1	need more ways to use it effectively	1						1						1				1				1			Mutli-tasking...attending meetings off campus	Very Interesting idea
1			Marketing			1					1					1							1	Funny		1				1			Going to class, focus groups	Great tool for the marketing dept.
1			DBE Finance			1					1					1					1					1				1			Attending meetings	
1			Marketing			1				1						1				1						1				1				
1			Marketing			1					1					1					1					1				1				
1			Journalism		1						1					1					1					1				1			For going to class	
1			T & L			1				1						1				1						1				1				Needs faster speed , 360 degree camera
1			Business	1						1						1					1					1				1				Very Cool
1			Writing	1								1				1					1						1			1				
1			Business	1												1					1						1			1				Good easy control. Would be better if it looked like a person
1			Comm			1				1						1				1							1			1			If sick could still attend class	Very small invention...hope for mass production soon
1			Sociology	1							1					1					1					1				1				
1				1							1					1					1						1			1				Super Cool idea
1			LSTV/POLS		1						1					1							1			1				1				
1								1	Super Cool-Fun to play with		1					1						1				1				1					
1			Biology			1					1					1					1					1				1				Really like it
		1	HR			1					1					1					1					1				1				
56	2	9		24	7	32	1	3		25	37	3	1	1		66	1	0		17	39	4	2	5		11	53	1	2		63	4	0		
Student	Faculty	Staff	Department	Nice Toy	Cool, Not Useful	Really Useful	Waste of $	Other	Intial Reaction Comments	Very Intuitive	Intuitive	Clumsy	Difficult	Other	Initial Ease of Use Comments	Get Easier? - Yes	Get Easier? - No	Other	Ease of Use Changed? Comments	Like Talking In Person	Good But Not Used To	Good But Not Personal	Odd and Not Useful	Other	Use Reaction Comments	Like It Same	Like It More Now	Dislike It More Now	Other	Like/ Dislike Comments	Would You Use? - Yes	Would You Use? - No	What Function?	Function? Comments	Overall Comments

Telepresence Robot Test Drive Questioner

Return to Dustin Johnson at Facilities Management – djohns75@uwsuper.edu

Name: _____

Circle one: Student Faculty Staff Department/ Major: _____

Date: _____

1) What was your initial reaction to the robot?
   a) Nice toy.
   b) That's cool, but not useful.
   c) I could really see using one of these.
   d) That's a waste of money.
   e) _____

2) What did you think initially about the controls?
   a) Very intuitive
   b) Intuitive
   c) Clumsy
   d) Difficult
   e) _____

3) Did it get easier to use?
   a) Yes
   b) No
   c) _____

4) What do you think of the interaction between you and the other person?
   a) Was like talking with them in person.
   b) Was good but would need to get used to.
   c) Was good, but not very personal.
   d) Was odd and not useful.

e) _____

5) What was your reaction to the robot after using it?
   a) Same
   b) Like it more now.
   c) Dislike it more now.
   d) _____

6) Could you see yourself using a robot if they were available to you?
   a) Yes
   b) No
   c) For what function? _____

7) Comments: _____
_____

_____