

The ConnectR From Mission Failed to Mission Accomplished: A Social Study of Why the ConnectR Was Discontinued

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Introduction

Communication between people who are not collocated is an area of study where technological innovation has soared. Methods of conversing have evolved from text-based communication to telepresence systems and are increasingly approaching more authentic computer mediated forms. However, computer mediated technology does not seem to be enough. Technological design is approaching levels that enable people to be in two places at once – something reality does not afford. Actually being in two places at once is not physically possible, but with the introduction of virtual visiting robots we can be remotely present in two locations. Virtual visiting robots allow you to interact with people in a different location without physically being there.

Rodney Brooks (2003, p. 142), professor of Robotics at MIT and author of *Flesh and Machines*, states that, “There is a natural desire for people to group together and have discussions of common interest.” He describes traditional garden parties where travel can pose a significant barrier, causing members to be collocated in order to participate regularly. However, with a virtual visiting robot system, all the members can call in to the host’s robot and they can wander around the garden viewing the different plants and flowers while engaging in conversation with other members. “The other members will all hear and see exactly what the robot is seeing and hearing, and be able to add their voices to what its says” (Brooks, 2003, p. 142). Brooks’ idea of virtual visiting robots is advanced for what the current technology affords. However, that does not leave us without hope. Many robotic companies are working on such robots; iRobot, a well-known robotics company, attempted its own consumer version called the ConnectR. This particular robot was specially made for families that have at least one frequent traveler. Its purpose was to be a facilitator of communication.

Unlike Brooks’ dream of virtual visiting robots, the ConnectR was discontinued by the iRobot Corporation. It failed to withstand the market in which it was designed. The ConnectR was initially sent through a pilot program, but was discontinued for unspecified reasons. (“iRobot”). This

paper highlights the reasons why the ConnectR failed and what can be done in the future to ensure a successful launch in the way Brooks describes. Through previous literature and surveys, the main reason this robot failed was due to the lack of social knowledge integrated into the design. According to Kerstin Dautenhahn (2002, p. 5), an adaptive systems researcher at the University of Hertfordshire, a “believable design of robots is a matter of balance: finding the appropriate level of similarity with humans, and taking into account movement and appearance, and possibly many other factors. Various aspects of how the agent looks and behaves need to be consistent.” Based on this and Jodi Forlizzi’s (2007, p. 131) research, social knowledge can be described according to three categories: aesthetics and price; privacy and security concerns; and environmental issues. This paper will look at these three categories separately in conjunction with survey responses to offer insight into the possible reasons why the ConnectR was discontinued.

The Survey

In my own research, I surveyed fifty people from Stanford University and the Northern and Southern regions of the United States who knew little if anything about iRobot’s ConnectR. 25 of the participants were male and 25 were female. Ten participants were in each age group including: 15-22, 23-30, 31-40, 41-60, and 61-75. The survey was sent through email and included a few pictures suggesting the use of the robot, a description of its features and price, and a list of ten questions. Overall, the results suggested that the design and cost of the ConnectR hindered its success in the consumer market. Throughout the paper, some of the important responses will be cited to clarify related points. More information about the methodology and survey results is included in Appendix 1.

A Description of the Machine

A description of the features of the ConnectR is necessary to offer a better understanding of how the design affected its demise. The ConnectR is specifically designed to enhance communication among family members, close relationships, and pets that are not collocated. The ConnectR has many similarities to the Roomba (iRobot’s famous vacuum cleaner robot). It has a red circular body shape with control buttons on top and resembles a family pet. iRobot describes the machine as such: “ConnectR is designed for anyone seeking more involvement with family, friends, and pets when you can’t be there in person. With ConnectR, you can see, hear, and interact with loved ones while traveling, working, or living afar” (“iRobot - ConnectR”). Its design aesthetics did not give affordances to corporate settings. In contrast, Anybot has created a virtual visiting robot for corporate settings that stands up and looks more like a human than the ConnectR. It can move its head to look at certain things and contains an LCD screen for collaboration purposes. Anybot describes its robot as such: “QA[the name of the robot] operates simply, cleanly, and quietly

while still giving you a full physical presence. It allows you to see and be seen, talk and listen, and collaborate in ways and places never before possible” (“Anybots”). As you can surmise from the different descriptions, these two robots were made for completely different environments. For reference, pictures of the two machines are included in Appendix 2.

The ConnectR was specially designed for family life. Josh Clark (2007), outlines all the affordances of the ConnectR. It features two high-resolution cameras that give it a single feed. These cameras have a wide range of motion: they can zoom up to 16.7x, move vertically 220 degrees, and combined with the wheels they can move horizontally 360 degrees. However, one important thing to note is that the video function is one-way, meaning that only the person controlling the robot, from the remote location, can see the people they are interacting with via the machine. The members interacting with the robot cannot see the person who is remotely located (Clark, 2007).

The ConnectR also contains a two-way audio feature through which both sides can converse with each other. The audio works through a voice-over internet connection through wireless settings. The robot is embedded with software that allows the storage of ten pin numbers for security (Clark, 2007). Even though these features seem to provide the necessary tools to stay in touch with your loved ones, the ConnectR failed in the market and was discontinued. From this point in the paper, the focus will be the key reasons why iRobot might have had to discontinue the ConnectR. These reasons have not been validated by the company, but rather are reflections of the lack of social knowledge considered in the design.

Aesthetics and Price

Price

Generally, aesthetics and price are very important when determining how successful a product will be on the market. Many people stated that the price was just too high to actually consider buying the ConnectR. 75 percent of respondents agreed that if the price were under a hundred dollars they might buy it despite its lack of design features. The ConnectR was valued at five hundred dollars, and most participants concurred that it was too expensive considering the problems they saw with the design. Even though the initial likeability of the product was high, the popularity and the price ranked as a negative feature compared to other robots in the market (“iRobot: iRobot ConnectR”). Many of the participants in the survey compared the robot to other applications such as videoconferencing or telepresence systems. They explained that videoconferencing was better than the ConnectR because it had two-way video and audio capabilities and cost less (in some cases you can even use applications for free). A combination of high price and design flaws played a significant role in the robot’s inability to be a successful facilitator of communication.

Aesthetics

Another issue that concerned the potential market was the aesthetics of the ConnectR. iRobot designers wanted to bank on the success of the Roomba design to tempt the consumer to buy a similarly designed virtual visiting robot. Both consumer markets are based on the nuclear family, but one robot is used for service while the other one is a social interactive machine. Designing the ConnectR (the social robot) to resemble the Roomba (the service robot) was a misguided attempt to imitate the success of one design. Based on the survey research, many people thought the ConnectR was an advanced version of the Roomba. After understanding the purpose of the ConnectR, the majority decided that unlike the Roomba, it was not cost effective. Many complaints centered on the fact that it did not allow two-way video and that it was so low to the ground that one had to bend down to interact with it. One informant stated, “I don’t understand the use of the robot. When I look at it, it reminds me of a Frisbee or some type of children’s toy.” Some participants thought that it could be used to monitor their pets, but others were afraid that their pet might destroy the machine so they were concerned about its durability.

The ConnectR was supposed to help enable remote care for the elderly. However, eight survey participants over the age of 60 claimed that design was not user-friendly. They did not feel like they were conversing with real people and they disliked the idea of a robot following them around. One elderly participant stated, “I would not buy that ugly looking thing. What’s the purpose of it anyhow? I don’t want my children checking up on me like that. If they want to see if I’m ok they can call me or come visit. I am not going to let some creepy little gadget follow me around in my own house.” From the results of the survey, the design of the ConnectR proved to be problematic and not user-friendly in all the age groups.

Furthermore, authenticity brings about a compelling issue about aesthetics. Sherry Turkle, a professor of science and technology at MIT, poses an intriguing question as to whether there are some tasks that only humans can achieve. The ConnectR poses a thought-provoking issue in that the physical body is not authentic but the voice is. Turkle (2007) discusses how children do not see authenticity as being an important issue. The fact that children are growing up in the age of less authenticity means that these computer-mediated relationships are capable and expected (Turkle, 2007, pp. 501-517). While this may be true, it is not necessarily a good thing. If children are accustomed to interacting with a family member through a virtual visiting robot, which physical presence do they associate as family? Is it the robot, the actual person, or both? A lot of parents liked the idea of being able to check in on their family while they were away. Eight survey respondents were concerned that their young children might associate them with the robot because they traveled so much. In that case, they did not want to introduce the robot until their children could distinguish between a person and a machine. One

participant claimed, “I would definitely use this machine once my little girl became a teenager. I want to check up on her. I only wish I could follow her wherever she goes. But I think it is a little early to introduce a robot to her now. She’s only two and a half.” However, the robot posed a privacy concern for the teenage population. The small nature of the robot allows it to travel unnoticed which concerned all five of the teenage respondents.

Privacy and Security

Privacy

Accordingly, privacy and security are very important issues that need to be addressed. 22 participants were concerned with privacy issues. Eight participants were concerned about the potential of having their significant other spy on them. Five females thought that it would be too easy for someone like their boyfriend to watch them getting dressed or stare at parts of their body while conversing. They did not like the fact that they could not see the other person’s reactions to what they were saying, but the other person could see theirs. Five participants thought that it was creepy to think that their parents could check up on them without their knowledge. One respondent complained, “Wait you mean the other person can see me and what I’m doing, but I can’t see them? That’s a little freaky. I don’t want my dad checking on me and I can’t even see him. That’s not fair.” This privacy concern mainly stemmed from the fact that the ConnectR has a one-way video system, allowing audio and video for one participant, but only audio for the other. This proved to be a big privacy breach for 38 respondents.

In contrast, David Nye (2007), a professor of history at the University of Southern Denmark, suggests that privacy is not a pertinent issue and that it might even become irrelevant. He argues in his book, *Technology Matters*, that, “Privacy was not possible for many before the second half of the 19th century. Before then most houses were small with shared public rooms and shared sleeping rooms. The idea that children could and should have individual bedrooms is at most a few hundred years old” (Nye, 2007, p. 188). Even though privacy was not a concern in the past does not mean that it is not a current issue in society. Nye (2007) overlooks an important point about how people in today’s society are used to a certain degree of privacy and are not willing to lose it. Today’s culture is not technologically deterministic, meaning that if the utility of a product is not worth the cost, then the public will not invest in it. This is the fate that the ConnectR was dealt.

Security

Security risks also pose a significant threat to the success of the ConnectR. The robot is designed with software connecting it to the web with voice-over internet capabilities. It has the space to store ten different pin numbers for security purposes. However, with the Internet, nothing is truly

safe because hackers have the ability to break codes and enter systems that were thought to be protected. This is dangerous when one considers how a hacker could break into a ConnectR system, track the patterns of a family and the dimensions of their house for a robbery (Clark, 2007). iRobot needs to create a security system that is more appropriate for this type of technology.

Environment

In addition to other challenges, environment plays an essential role in how humans interact with robots. A lot of technological visions do not incorporate social implications into their design and therefore cannot create a truly functioning robot in the world we live in today. Jodi Forlizzi (2007) studied how robotic products become social products. She insisted, “one interesting finding is that fundamental changes in the structure and infrastructure of the home will need to take place to support autonomous service robots in the near future” (Forlizzi, 2007, p. 129). This is particularly interesting with the ConnectR because it has some limitations in a home environment. Forlizzi (2006, p. 262) stated that, “Multi-level homes with stairs, area rugs with fringes, and curtains that touched the floor created obstacles for using the product. Consequently, participants had to decide if and when to intervene in the operation of the Roomba.” This poses a significant constraint on the ConnectR. If the user’s children ran upstairs to play and said, “Daddy come play with us,” the ConnectR would not be able to follow the children upstairs. Instead, the children would have to acknowledge the limitations of the machine and carry it upstairs with them.

Other environmental problems include the fact that the ConnectR has limited camera movement. It can move the camera 220 degrees (Clark, 2007) vertically but that does not afford a large range of motion, especially if family members are tall. Many promotional pictures and ads have the ConnectR playing with children or pets that are quite small. However, adults are not that small and it would require them to bend down to fully interact with the ConnectR. This disrupts the actions of adults because unlike the telephone, it is hard to interact with this machine (like bending down) while cooking dinner, washing clothes, or bathing children. The ConnectR’s aesthetic features do not enable a wide variety of usage in different environments. Currently, the environment has to change to fit the limitations of the robot.

Moreover, environmental concerns are especially important with elderly users because it is not safe for them to bend down and there is potential for an injury to occur. Many people are not capable of bending down and would find it very difficult to interact with the machine otherwise. However, Rodney Brooks (2003, p. 141) argues that virtual visiting robots are good innovations for the care of the elderly. He states, “Now think for a moment about your elderly parents or grandparents. A remote presence robot installed in their home could be used in a number of

ways to extend the time for which it is safe for them to live at home without managed care.” Granted that virtual visiting robots will enhance the care of the elderly, Brooks fails to incorporate environmental challenges in his robot visions.

In opposition to Brooks, Robert and Linda Sparrow (2006) describe some concerns with robots for the elderly. For example, “the homes of older people are likely to be a more challenging environment for robot cleaners [the ConnectR design included] than other environments because they are often more cluttered with treasured possessions accumulated over many years” (Sparrow and Sparrow, 2006, p. 146). Another concern with robots that are low to the ground is that “the frailty of older persons may mean that here is an increased danger that older people may trip on the robots and injure themselves” (ibid). Even in Brooks’ ideal world, there would be robots that could take care of the elderly, but there are still a lot of social and environmental concerns that need to be addressed.

Conclusion

In conclusion, the ConnectR had the beginning of a great product for the consumer market. It gave technological affordances to a social communication machine that other communication tools did not then possess. Nevertheless, the technological vision failed to incorporate social issues into the design, which in the end led to the demise of the ConnectR. Aesthetics (price), privacy, and environmental challenges all were major concerns of the consumers, which the designers failed to address. In order to correct the problems of the ConnectR, one must include more human-like features. Its physical appearance should resemble a human being so that it gives contextual clues as to how it should be used. In addition, it must have two-way video capabilities along with the two-way audio feature. This is a necessity to alleviate privacy concerns and create a more authentic communication experience.

Moreover, iRobot also needs to invest in better security options for the software to protect its consumers. For example, some online banking websites have created systems to ensure security. Bank of America requires the user to enter their online id and then they must recognize their specific site key. After that sequence, the online system sends a random password to their cell phone through a text message. This password will finally give the user access to their banking information (“Privacy and Security: Preventing Fraud”). Following this system, an iRobot user would have to log in to an online account by entering their online id and recognizing their own site key. Afterwards, the system would send text messages to both the remote user and the person interacting with the robot. At this point, the person with the robot would type that password into a proposed keypad on the robot. The user would type in that same password into the online account. In this way, both security and privacy concerns are alleviated.

In conclusion, the physical appearance of the Anybot is a better example of what the ConnectR should resemble in order to meet the social needs of the suggested market. The Anybot stands straight and mirrors a more human-like figure than the ConnectR. It allows two-way video and audio and is average human height. It has a wide range of motion and is harder to trip over (“Anybots”). However, environmental issues will still be a concern because these robots are not yet fashioned to travel up and down stairs. Also the Anybot is more expensive than the ConnectR. Price is a very important factor in determining consumer behavior. The price must decrease in order for consumers to buy the product in mass quantities. Even though these reasons are hypothetical in the failure of the ConnectR, these conclusions will have significant applications in incorporating social knowledge into technological design. In the future, roboticists must engage social concerns in their designs to innovate a successful product.

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Appendix 1

ConnectR Survey

Please complete the following questions to the best of your ability based on the given information below. Remember there are no right or wrong answers and this survey is purely based on your initial reactions. Your responses will be used for academic purposes only but your identity will remain unknown. If at any point you don't feel comfortable completing the rest of the survey then your responses will not be counted amongst the results. Thank you for your time.

Here is a description of a robot that was made for families:



This is a picture of iRobot's new ConnectR. The ConnectR was created to help families stay in touch when they are apart.

Features include:

- * 2 way audio
 - * 1 one video
 - * Camera that can move 220 degrees vertically and 360 degrees horizontally
 - * Software that allows the storage of 10 pin numbers for security
 - * Voice over Internet capabilities
 - * wheels so it can move around
- Price: \$500

Please answer the following questions:

1. What is your age and gender?
2. How often are you away from members of your immediate family?
3. Do you currently own any iRobot products? If so, what is it and how often do you use it?
4. What was your first initial reaction towards the ConnectR? Please be as elaborate as possible.
5. If you owned a ConnectR how would you or your family using it? And how often? Please elaborate.
6. What are the appealing features of this product? What makes you interested in this product?
7. What are some of the concerns you have with this product?
8. If you could add one feature to the robot, what would it be?
9. Would you consider buying this product? If not, explain why and under what criteria would you consider buying this product?
10. If you had to design your own robot with the same function as the ConnectR, explain what it would look like and the features.

Appendix 2

Contrasting pictures of the ConnectR and the Anybot to show the different affordances in design.

The ConnectR



<http://www.techdigest.tv/2007/09/5.html>

The Anybot



<http://anybots.com/>