
My Device, My Self: Wearables as a Specific Case of the Social Acceptability of Technology

Norene Kelly, Ph.D.

UEGroup

San Jose, CA 95125, USA

Norene@uegroup.com

Abstract

As technology proliferates and morphs, it is increasingly difficult to talk about its social acceptability in a *general* sense. Because human computer interaction is such a broad field, and because the underlying fields of study are very different for varying forms of technology, carving off particular topic areas is necessary. This paper discusses a specific case of technology social acceptance: wearables. The WEAR Scale measure was developed to assess the social acceptability of any given wearable device or prototype. WEAR Scale research showed that a wearable is a form of technology for which aspirational desires and avoidance of social fears play key roles in whether a device is found to be socially acceptable or not. For other forms of technology, very different factors drive social acceptance. Therefore, the research agenda for the social acceptability of technology should use a “divide and conquer” approach rather than attempt to form generalizations about the social acceptance of all technologies.

Author Keywords

Wearable; WEAR Scale; social acceptability; technology acceptance; user research; culture.

Copyright is held by the author/owner(s).

CHI'18 Workshop on (Un)Acceptable?!—Re-thinking the Social Acceptability of Emerging Technologies, April 21, 2018, Montreal, QC, Canada.

Defining the Terms

For the purposes of the WEAR Scale, a **wearable** was defined as a computer or electronic device that is personal, personally-owned, and worn on the body (on skin or clothing) but excluding wearables that are not visible (e.g., inside or under clothing).

To define **social acceptability**, we first need to understand that it is connected to human actions. Putting something on one's body, including a technological device, is an action that falls somewhere on a continuum of social acceptability. A person will use existing knowledge and gather information about current surroundings to make decisions about the social acceptability of their actions. Observers' reactions then serve as feedback (positive or negative) on the social acceptability of a person's actions, such as wearing a certain device [11].

ACM Classification Keywords

H.1.2. Human/machine Systems: human factors; J.4. Social and behavioral sciences: Sociology; K.8.m Personal Computing: Miscellaneous.

The Big, Wide World of Technology

For researchers, keeping up with the evolution of technology is a challenge, and the crucial topic of social acceptability is no exception. Some of the more well-known models that have been in use for decades, like the Technology Acceptance Model [2,3] or Unified Theory of Acceptance and Use of Technology [19], were conceived for information technology in an MIS (management information system) context. But now that computers and information technology saturate our lives in a wide variety of forms and functionalities, how can researchers competently address the topic of social acceptability?

One path forward for researchers is to hone in on particular areas of interest for close examination. This is what I did for my dissertation work, in which I chose to pursue the main research question: what are the factors affecting the social acceptability of *wearable* technologies? After some initial exploration, I decided the best way to address this question was through scale development, using the methods outlined in DeVellis's *Scale Development* [6].

An important first step in scale development is to define the construct that is being measured (see sidebar). In this case, I decided that for the construct and measure to make sense, the scale's definition of "wearables" needed to be restricted to devices that are worn in public and viewed by others. While this excludes some devices that are typically called "wearables," this was

necessary for the measure to work. HCI researchers exploring the realm of social acceptability should similarly set parameters on their topic as it makes sense. Many advances in science are a result of specialization. Human computer interaction is a broad field, and as researchers we sometimes try to cut too broad a swath.

Further below I examine some of the factors and research that make wearables a unique case of technology acceptance. But first, some background on the development of the WEAR (Wearable Acceptability Range) Scale is presented.

Building the WEAR Scale

Developing a scale to measure a latent construct—like social acceptability of a wearable—requires going through a process [6]. The first step was to determine exactly what was being measured by reviewing the literature and also conducting an interview study. Next, 97 possible scale items were written based on the literature and interview data. For example, an interview finding was that a socially acceptable device is useful and easy to use, which then became a scale item.

For the scale format I decided upon a 6-point Likert scale that ranged from Strongly Agree to Strongly Disagree. Next, three experts reviewed the scale items and provided feedback, which resulted in a revised scale of 50 items. A sample of people then responded to these items, as well as to related items for conducting validity testing. Participants responded to the items *about* a particular device in three different studies; one study used a Bluetooth headset as the stimulus, and another study used Apple Watch and

WEAR Scale Items [13]

1. I like what this device communicates about its wearer
 2. I could imagine aspiring to be like the wearer of such a device
 3. This device is consistent with my self-image
 4. This device would enhance the wearer's image
 5. The wearer of this device would get a positive reaction from others
 6. I like how this device shows membership to a certain social group
 7. This device seems to be useful and easy to use
 8. This device could help people
 9. This device could allow its wearer to take advantage of people*
 10. Use of this device raises privacy issues*
 11. The wearer of this device could be considered rude*
 12. Wearing this device could be considered inappropriate*
 13. People would not be offended by the wearing of this device
 14. This device would be distracting when driving*
- * Reverse-scored

Google Glass. This allowed me to look for commonalities among three quite different wearables in forming the final scale.

The last step was to evaluate the items using exploratory factor analysis, adjust the scale as needed, and test its validity and reliability. The common solution shared by all three datasets showed good validity and reliability and became the final 14-item WEAR Scale (see sidebar). It can be used not only to evaluate but also design for a socially acceptable wearable.

In conducting factor analysis to arrive at the final items for the WEAR Scale, it was also determined that these 14 items loaded onto two factors. I identified Factor 1 as pertaining to the fulfillment of aspirational desires (nos. 1-8 in sidebar). I identified Factor 2 as largely relating to the avoidance of social fears (nos. 9-14 in sidebar).

The Special Case of Worn Technology

More than any other computing devices or technology, wearables are about the body and the self. This was a foundational finding in developing the WEAR Scale. What does it mean to place an object on one's body, how does it change one's self—these were fundamental questions that drove the results. A wearable is an accessory, or adornment, and is therefore a form of dress—that is, a purposeful manipulation of the body, in the same category as clothing, cosmetics, and hair styling [12]. One's dress largely defines one's appearance, and it is a major factor in how people relate to one another [4,12].

Today we have a form of dress—wearables—that can be even more impactful in the social realm than typical

clothing. A wearable can interrupt or modify interpersonal communication. In the case of Google Glass, the user could surreptitiously video record. No wonder Glass experienced severe backlash and quickly fell from grace; it was "creepy" and "not cool" [15,18].

Indeed, fear of the new is how much novel technology is greeted. Corrective lenses for eyesight were one of the earliest wearable technologies and they too had a slow and uneven path to social acceptance. In the 20th century, as eyeglasses grew in popularity, critics continued to voice their concerns. The previous style (the pince-nez) was applauded as being invisible, while modern tortoiseshell eyeglasses were derided as heavy and obtrusive, like two aggressive automobile lamps [17].

All forms of technology must travel a path to acceptance. But wearables are a unique case in that *social* acceptance plays a large role; also, once *everyone* is wearing something, it's no longer desirable. This need for individuality is well-documented in fashion research [20]. We want to be unique, because what one wears is as "a kind of visual metaphor for identity" [1, p. 139].

Identity, the Social Space & Wearables

We establish our personal identity in part by our appearance and dress, which also then serves as a form of communication with others [12]. For example, anthropologist Mary Douglas observed how shaggy hair is a sign of rebellion [7]. It's a symbol of people who have a high degree of freedom to critique society, like academics and artists. On the other hand, smooth hair signals conformity to society's rules and regulations, and as such is favored by bankers and lawyers.

We all belong to certain social groups—work, school, family, etc.—and within those groups, a certain range of clothing styles are considered acceptable. More broadly, we inhabit a culture, and a person who dresses inappropriately is “subversive of the most basic social codes and risk[s] exclusion, scorn or ridicule” [8, p. 7]. Dress is crucial to defining personal identity and is closely connected to one’s sense of self [8,10].

In fact, clothing helps us identify group members and also reinforces group unity. Classic psychology research showed that if a person wants to belong to a group, that person will be motivated to conform to group norms, including norms of dress [5,9]. These findings can provide insights about wearable acceptance. For example, if a wearable is generally worn by members of a group, individuals who wish to belong to that group will desire to adopt the wearable. On the other hand, a person who is specifically *not* attracted to that group will be less likely to accept and adopt the wearable, and may even actively reject it.

Attraction to those who are similar to us extends beyond group dynamics and applies to individual encounters as well. For example, Nash [16] studied the social interaction of runners who passed each other. He found that those who were dressed differently tended to engage in a short nonverbal greeting. But runners that were dressed alike tended to engage in a longer conversation. Extended to wearables, it is likely that the social acceptability rating of a wearable is influenced by the wearer’s similarity to the viewer [12]. If I perceive you as similar to me, I will be more likely to find your wearable device socially acceptable (than if I perceive you to be dissimilar to me). These are all factors that influence the social

acceptability of wearables and are represented in the WEAR Scale.

Measuring the Social Acceptability of *Other* Technologies

In this paper I examined a particular case of technology social acceptability—that pertaining to wearable devices. The factors affecting the acceptance of other types of technology in many ways deviate from the case of wearables. For example, the social acceptance of autonomous vehicles has little to do with aspirational desires, social fears, personal identity and sense of self, and much to do with personal safety, security, and risks [14].

The social acceptance of technology is a wide and deep topic, thus challenging researchers. Using the example of wearables technology, this paper described how the form a technology takes will greatly impact the fields of study that informs its social acceptability. Because a wearable is placed on the body for public view, it is greatly intertwined with personal identity and aspirations, and avoiding social scorn. Social acceptance of various other types of technology involves very different factors. A “divide and conquer” approach rather than generalizations about the social acceptance of all technologies should form the foundation of the research agenda for the social acceptability of technology.

References

1. Fred Davis. 1992. *Fashion, culture, and identity*. University of Chicago Press.
2. Fred D. Davis. 1986. *A technology acceptance model for empirically testing new end-user information systems: Theory and results*. Doctoral

- dissertation, Massachusetts Institute of Technology.
3. Fred D. Davis. 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*: 319-340.
 4. Leslie L. Davis. 1984. Clothing and human behavior: A review. *Home Econ. Res. Journal*, 12, 3: 325-339.
 5. Morton Deutsch and Harold B. Gerard. 1955. A study of normative and informational social influences upon individual judgment. *Journal of Abnormal and Social Psychology*, 51, 629-636.
 6. Robert F. DeVellis. 2012. *Scale Development*. Sage Publications.
 7. Mary Douglas. 2004 . *Natural symbols: Explorations in cosmology*. Routledge.
 8. Joanne Entwistle. 2000. *The fashioned body: Fashion, dress, and modern social theory*. Polity Press.
 9. Leon Festinger. 1954. A theory of social comparison processes. *Human Relations*, 7, 117-140.
 10. Leopoldini Fortunati, James E. Katz, and Raimonda Riccini (Eds.). 2003. *Mediating the human body: Technology, communication, and fashion*. Lawrence Erlbaum Associates.
 11. Irving Goffman. 2002. *The Presentation of the Self in Everyday Life*. Doubleday.
 12. Kim K.P. Johnson, Jeong-Ju Yoo, Minjeong Kim, and Sharron J. Lennon. 2008. Dress and human behavior: A review and critique. *Clothing and Textiles Research Journal*, 26(1), 3-22.
 13. Norene Kelly. 2016. *The WEAR Scale: The Development of a Measure of the Social Acceptability of a Wearable Device*. Ph.D Dissertation. Iowa State University, Ames, IA.
 14. Markus Maurer, J.C. Gerdes, Barbara Lenz, and Hermann Winner (Eds.). 2016. *Autonomous driving: technical, legal and social aspects*. Springer.
 15. Gabriele Mentges. 2000. Cold, coldness, coolness: Remarks on the relationship of dress, body and technology. *Fashion Theory: The Journal of Dress, Body & Culture*, 4(1), 27-47.
 16. Jeffrey Nash. 1977. Decoding the runner's wardrobe. In J. P. Spradley & D. W. McCurdy (Eds.), *Conformity and conflict: Readings in cultural anthropology* (3rd ed., pp. 172-185). Little, Brown.
 17. Kerry Segrave. 2011. *Vision aids in America: A social history of eyewear and sight correction since 1900*. McFarland.
 18. Omer Tene and Jules Polonetsky. 2013. A theory of creepy: Technology, privacy and shifting social norms. *Yale Journal of Law & Technology*, 16: 59-102.
 19. Viswanath Venkatesh, Michael G. Morris, Gordon B. Davis, and Fred D. Davis. 2003. User acceptance of information technology: Toward a unified view. *MIS Quarterly* 425-478.
 20. Bill Wasik. Jan. 2014. Try it on. *Wired*, 90-99.