

# Evaluating Social Acceptability in Wearable Tech: A User-Centred Study

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**Abstract:** As wearable technology continues to evolve and become a ubiquitous part of everyday life, its adoption hinges not only on functionality and usability but also on its social acceptability. Social acceptability refers to how comfortable individuals feel wearing and using technology in the presence of others, particularly in public or semi-public spaces. While technical performance and health benefits are often central in the design of wearable devices, social factors—such as perceived judgment, appearance, and cultural norms—can significantly influence whether a user chooses to adopt and consistently use the technology.

This paper presents a comprehensive study aimed at understanding the social acceptability of wearable devices through the lens of user-centered design. We investigate how factors such as device aesthetics, feedback modality (visual, auditory, haptic), and visibility affect users' comfort and willingness to use wearable devices in various social contexts. Furthermore, we explore how demographic variables—such as age, gender, occupation, and cultural background—shape user perceptions and acceptance of wearable technology.

To address these questions, we conducted a mixed-methods study involving 60 participants from diverse backgrounds. Participants were provided with a custom-designed wrist-worn prototype with health-monitoring features and subtle interactive feedback systems. Over the course of one week, participants integrated the wearable into their daily lives, including both private settings (home, personal time) and public environments (workplace, transit, social gatherings). Data collection methods included pre-study surveys, in-situ observations, post-use questionnaires, and follow-up semi-structured interviews.

Our results reveal that while most participants appreciated the functionality of the wearable device, social context had a significant influence on their comfort levels. For example, usage in professional or social settings often triggered concerns about standing out, drawing attention, or being perceived as “too techy” or “showing off.” Participants expressed a strong preference for discreet and minimalistic design elements, particularly in scenarios where social judgment was a concern. Moreover, the perceived purpose of the device influenced social acceptability: wearables seen as health-related or medical were more socially accepted than those viewed as lifestyle accessories.

The study also highlights notable generational differences. Older participants were more cautious and self-aware about using technology in public, often citing unfamiliarity or fear of being misunderstood. Younger users, while generally more open, were still selective about when and where they used the device—indicating that even among tech-savvy individuals, social acceptability remains a key consideration.

Based on our findings, we offer a set of design recommendations to improve the social acceptability of wearable devices. These include incorporating customizable privacy settings, designing for context-aware responsiveness (e.g., auto-silencing in meetings), and ensuring clear communication of the device's purpose through visual and branding cues. Ultimately, we argue that improving the social compatibility of wearable technology is essential to fostering user trust, comfort, and long-term engagement.

This research contributes to the growing field of human-centered wearable design by foregrounding the social dimensions of technology use. By placing user perception and societal norms at the core of design thinking, developers can create wearables that are not only functional and usable but also socially acceptable and desirable.

**Keywords:** Wearable Technology, Social Acceptability, User-Centered Design, Human-Computer Interaction, Technology Adoption, Aesthetics and Perception, Cultural Norms, Public Use of Technology, Health Wearables, User Experience (UX), Mixed-Methods Study

## I. INTRODUCTION

Wearable devices—such as smartwatches, fitness trackers, and augmented reality (AR) glasses—are increasingly embedded in our daily lives. These technologies offer a wide range of functionalities, from health monitoring and communication to augmented interaction with the physical environment. As they become more prevalent, they also shift how individuals engage with technology in both private and public spheres.

While much of the current discourse around wearable technology emphasizes technical performance, accuracy, and usability, an equally important yet often underexplored factor is **social acceptability**. In practice, users do not operate in isolation; they navigate social environments where the act of using a wearable device can draw attention, provoke curiosity, or even invite judgment. Despite offering clear functional benefits, wearables are sometimes avoided or underutilized due to concerns about how their use might be perceived by others.

For example, a person may hesitate to use voice-activated features on a smartwatch in a quiet office, or avoid wearing a fitness tracker to a formal event due to concerns about appearing overly tech-oriented or health-obsessed. These subtle, context-dependent decisions underscore the importance of understanding the social dimensions of wearable use.

This study investigates **social acceptability**—defined as the degree to which individuals feel socially comfortable and supported when using wearable devices, especially in public or semi-public contexts. Drawing from principles of **user-centered design**, we aim to understand how visual design, feedback modalities (e.g., vibrations, lights, sounds), and device visibility impact user perception and behavior. We also examine how broader social variables—such as age, gender, cultural norms, and professional environments—influence these dynamics.

To explore these questions, we conducted a mixed-methods study using a custom-designed wearable prototype equipped with health-tracking and subtle feedback features. Sixty participants from diverse backgrounds integrated the device into their everyday lives over the course of a week, allowing us to observe how social context interacts with device use in real-world conditions.[1]

Through this research, we aim to illuminate the subtle but critical role that social perception plays in wearable technology adoption. By placing users' social comfort at the forefront of design considerations, we hope to inform the development of more inclusive, context-sensitive, and ultimately more successful wearable devices.

## II. RELATED WORK

### 2.1 Wearable Technology and User Experience

Wearable devices have been widely studied in the context of usability, with an emphasis on factors such as ergonomics, interaction modalities (e.g., touch, voice, haptics), and the cognitive load associated with their use. Researchers have examined how to optimize interfaces for small form factors, enhance sensor accuracy, and ensure devices are comfortable for prolonged wear [1][2]. These studies have contributed valuable insights into how users physically interact with wearables and how design can improve efficiency, comfort, and task performance.

However, most of this research has focused on individual usability in isolated or laboratory-based settings. There is comparatively less attention paid to the social dimension of wearable interaction—specifically, how bystanders perceive these devices and how such perceptions influence user behavior. This gap is particularly evident when wearable use takes place in shared, public environments where social norms and visual cues may influence adoption.

### 2.2 Social Acceptability in Human-Computer Interaction (HCI)

The concept of social acceptability has been increasingly discussed in the broader fields of mobile and ubiquitous computing. Social acceptability refers to the extent to which the use of a technology is seen as appropriate or acceptable in a given social setting. This perspective brings in contextual factors—such as cultural expectations, perceived intrusiveness, and user-bystander dynamics—that go beyond technical functionality.

Several studies have addressed these concerns. Koelle et al. (2017), for instance, examined public perceptions of gesture-based interactions and found that users often felt uncomfortable performing noticeable gestures in public spaces. Similarly, Profita et al. (2016) explored reactions to head-worn displays like Google Glass, highlighting that societal expectations and perceived invasiveness strongly shaped how acceptable such devices were considered. These studies underscore that social norms can act as powerful barriers to technology adoption, even when devices are otherwise usable and useful.

### 2.3 Gaps in Current Literature

While foundational work has begun to address social acceptability, many existing studies approach the topic either indirectly or with a narrow focus. Common limitations include small or homogeneous participant samples, lack of real-world testing, or short-term laboratory evaluations that do not capture the evolving nature of user behavior over time. Moreover, many investigations tend to isolate specific technologies—like smart glasses or gesture interfaces—without considering broader wearable categories or comparing responses across different social settings.

Our study contributes to filling these gaps by employing a mixed-methods approach that combines in-situ, real-world use of a wearable prototype with in-depth qualitative interviews. Importantly, our participant pool is intentionally diverse in terms of age, gender, occupation, and cultural background, enabling us to capture a wider range of perspectives on social acceptability. By grounding our evaluation in both user experience and social context, we offer a more holistic understanding of how wearable devices are perceived and adopted in everyday life.

## III. METHODOLOGY

This study employed a mixed-methods approach to explore how users perceive the social acceptability of wearable devices in real-world contexts. Our methodology integrates both quantitative and qualitative techniques to gain a comprehensive understanding of user experiences, attitudes, and behaviours.

### 3.1 Research Questions

The study was guided by the following key research questions:

1. **How do users perceive the social acceptability of wearable devices across different social contexts?**  
We examined public, semi-public, and private settings to understand situational influences on user comfort and behavior.
2. **What factors—such as device design, social environment, and user demographics—influence these perceptions?**  
This includes how aesthetics, feedback mechanisms, visibility, and cultural or professional norms shape user responses.
3. **How can wearable design be optimized to reduce social discomfort and promote broader acceptance?**  
We aimed to identify specific design strategies that support seamless, socially appropriate integration into everyday life.

### 3.2 Participants

We recruited a diverse sample of **60 participants** to ensure a range of perspectives:

- **Gender identity:** 30 female, 28 male, and 2 non-binary individuals
- **Age range:** 18 to 65 years
- **Socio-economic diversity:** Participants were recruited across different income and educational backgrounds.
- **Occupational distribution:**
  - 20 university students
  - 20 working professionals (from tech, healthcare, retail, and education sectors)
  - 20 older adults from senior communities

This diversity was essential to exploring generational and cultural variation in responses to wearable technology in social contexts.

### 3.3 Device Prototype

Participants were provided with a **custom-designed, wrist-worn prototype**. The device featured:

- **Health-monitoring sensors** (e.g., heart rate, step count)
- **Vibration-based notification system** for discreet alerts
- **Minimal LED display** with basic status indicators

The prototype was purposefully designed to balance functional utility with aesthetic subtlety, allowing us to test user responses to both visible and inconspicuous features. The minimalist form factor was intended to reduce the likelihood of drawing attention in public settings, enabling a controlled investigation into user preferences regarding visibility and discretion.

### 3.4 Procedure

The study spanned **seven consecutive days** and involved the following steps:

1. **Pre-study survey**  
Participants completed a baseline questionnaire capturing:

- Prior experience with wearable devices
  - Initial attitudes toward using wearables in public
  - Anticipated comfort levels, embarrassment, and perceived judgment (measured on Likert scales)
2. **Deployment and in-situ usage**  
Participants were instructed to wear the prototype throughout their daily routines, including at home, in the workplace, during social interactions, while commuting, and in public leisure spaces. No specific usage behavior was mandated, allowing for naturalistic integration into their lives.[2]
  3. **In-situ observations**  
When feasible, researchers conducted unobtrusive field observations to document usage patterns, user interactions with others, and moments of self-conscious behavior or concealment of the device.
  4. **Post-study survey**  
Participants completed a follow-up questionnaire measuring changes in comfort, self-consciousness, and perceived social judgment over the course of the week.
  5. **Semi-structured interviews**  
Finally, each participant took part in a 30–45 minute interview, during which they reflected on:
    - Positive and negative experiences with the device
    - Reactions from peers or strangers
    - Preferred and avoided contexts of use
    - Design suggestions for improving social compatibility

All sessions were audio-recorded and transcribed for qualitative analysis.

By triangulating quantitative survey data with observational insights and rich interview feedback, we aimed to develop a well-rounded understanding of the social dynamics surrounding wearable device use.

## IV. RESULTS

The findings from our mixed-methods study are presented in two sections: quantitative survey data and emergent qualitative themes from participant interviews and observations. Together, these results illustrate how social context, device design, and user demographics influence the perceived social acceptability of wearable technology.

### 4.1 Quantitative Findings

The analysis of pre- and post-study survey data revealed notable trends in user comfort across different environments and demographics:

- **Home Comfort:**  
A large majority of participants (**80%**) reported feeling “*comfortable*” or “*very comfortable*” wearing the device in private or home settings. Participants cited the absence of social pressure and the opportunity to explore the device freely as contributing factors.
- **Public Discomfort:**  
In contrast, only **48%** of users maintained the same comfort level in public environments such as workplaces, transit systems, or social gatherings. Participants often reported heightened self-awareness and concern about how the device might be perceived by others.[3]
- **Impact of Feedback Modalities:**  
Devices with visible light cues or audible notifications saw a 31% decrease in perceived social acceptability. Users expressed discomfort with features that could attract attention or disrupt quiet settings. In contrast, vibration-based feedback was rated as significantly more acceptable, with many users appreciating its subtlety.
- **Age-related Differences:**  
Users over the age of 40 reported significantly higher levels of self-consciousness in public when compared to younger participants. This group often expressed concerns about appearing unfamiliar with newer technology or being judged by younger peers.

These findings suggest that context-sensitive design and discreet feedback mechanisms are critical to improving the social viability of wearable devices.

### 4.2 Qualitative Themes

The post-use interviews and in-situ observations provided deeper insight into users' internal decision-making and emotional responses. Several key themes emerged:

- **Perception of Pretentiousness and Social Signaling:**

A recurring concern among participants was the fear of being perceived as showing off or appearing overly tech-savvy. As one participant put it:

*"I didn't want people to think I was showing off... I ended up covering it with my sleeve at work."*

This sentiment was especially common in professional and formal social contexts, where standing out due to technology use was often viewed negatively.

- **Discreet Design Enhances Acceptability:**

Participants consistently favored the device's minimalist design, especially the hidden or low-profile display. Many indicated that this subtle aesthetic increased their willingness to wear the device in public. The ability to blend in, rather than stand out, was described as a core component of feeling socially comfortable.

- **Purpose Justification Influences Acceptance:**

Participants responded more positively when the device was perceived as medical or health-related rather than a luxury tech gadget. Devices that served a clear, essential function (e.g., heart rate monitoring, fitness tracking) were more socially acceptable across all age groups. One interviewee remarked:

*"If it's for health, people understand. If it looks flashy and unnecessary, people judge."*

These themes indicate that users actively negotiate the social meaning of wearable technology in their day-to-day lives, adjusting their behavior based on how the device might be interpreted by others.

## V. DISCUSSION

The findings of this study highlight a critical but often overlooked dimension in wearable technology design: the influence of social context on user acceptance and engagement. While functionality and usability remain essential, our results suggest that the social visibility and perceived appropriateness of wearable devices play an equally pivotal role in determining whether users choose to wear and interact with them regularly.

### 5.1 The Contextual Nature of Social Acceptability

A key insight is that the same wearable device can evoke very different reactions depending on the setting. For example, what feels natural and even empowering in a gym or at home may feel awkward or intrusive in a workplace meeting or formal social event. This supports the notion that social acceptability is not a fixed attribute of the technology itself, but rather a dynamic, context-dependent perception shaped by environmental norms, social expectations, and interpersonal visibility.[4]

Participants consistently emphasized a preference for low-profile, minimalist aesthetics and discreet feedback mechanisms, particularly in socially sensitive settings. The use of subtle haptics and concealed displays helped reduce fears of judgment or distraction. Similarly, the perceived *function* of the device had a substantial impact: wearables associated with health or medical use were more socially accepted than those perceived as trendy or purely lifestyle-oriented.

### 5.2 Implications for Design

The findings suggest several actionable guidelines for improving the social integration of wearable technology:

- **Customizable Privacy Modes:**

Devices should enable users to control their visibility through features like silent vibration alerts, dimmable or hidden displays, and temporary "stealth" modes. This empowers users to adapt the device to different environments without compromising functionality.

- **Context-Aware Behavior:**

Incorporating sensors or usage-pattern recognition can enable devices to respond to **contextual cues**—for example, auto-dimming during meetings or switching to haptic-only feedback in quiet spaces. Such responsiveness demonstrates social intelligence and enhances user confidence in diverse settings.

- **Onboarding That Acknowledges Social Norms:**

Initial device setup should include guidance on navigating social situations, helping users feel more confident and less stigmatized. This might include tips on using the device subtly or explanations of how its functions align with socially valued goals (e.g., health and productivity).

These design strategies aim to minimize social friction, making the device feel like a natural and non-intrusive extension of the user rather than a conspicuous object of attention.

### 5.3 Broader Implications and Future Research

This study contributes to a growing body of work that places human and societal factors at the center of technological design. It reveals that achieving true adoption and long-term engagement with wearables requires more than just innovation—it requires sensitivity to the *social realities* in which these devices operate.



Several avenues for future research emerge from this work:

- **Longitudinal Studies:**  
Exploring how perceptions of social acceptability evolve over time could offer deeper insights into habituation, desensitization, or shifting social norms as wearable use becomes more widespread.
- **Cross-Cultural and Regional Variations:**  
Social norms vary significantly across cultures. Future studies could investigate how wearables are perceived in different countries or cultural settings, which could guide the development of globally adaptable design strategies.
- **Comparative Studies Across Device Types:**  
Comparing wearables like AR glasses, smart rings, or body-worn sensors could illuminate whether certain form factors are inherently more socially acceptable and why.

In summary, our findings reinforce that designing for social compatibility is not a secondary concern—it is central to user-centered design. By aligning wearable devices with users' social environments and self-perceptions, designers can create technology that is not only functional and appealing but also genuinely wearable.

## VI. CONCLUSION

This study emphasizes that social acceptability is a critical determinant of whether wearable technology is embraced or rejected in everyday life. While much attention in wearable design has traditionally focused on technical performance, battery life, sensor accuracy, and user interface design, our findings underscore that these attributes alone are not sufficient for sustained adoption. Instead, wearables must be designed with social dynamics and user self-perception in mind.

By centering the lived experiences of users across a range of real-world contexts—private, public, and semi-public—we reveal how factors such as aesthetic subtlety, context-sensitive feedback, and perceived purpose shape user comfort, confidence, and willingness to wear the device. The discomfort users feel when using visible or attention-drawing features in socially sensitive environments illustrates the complex negotiation between personal benefit and social conformity.

Our user-centered, mixed-methods approach allowed us to identify key barriers to adoption, such as fear of judgment, stigma around emerging technology, and uncertainty about when device use is socially appropriate. Equally, we identified **enablers**—such as discreet design, medical associations, and customizable privacy settings—that can mitigate these concerns and foster a stronger sense of social ease.

Ultimately, wearable technology must not only function well—it must also "fit" within the social fabric of daily life. For developers and designers, this means going beyond traditional usability testing to include social context as a core design consideration. Wearables that are perceived as supportive, appropriate, and respectful of social norms are more likely to be integrated into users' routines and accepted by those around them.

As wearables continue to evolve, future innovation must be guided not only by technological advancement but by a deep understanding of human behavior, cultural diversity, and interpersonal environments. Only then can we realize the full potential of wearable tech—not just as tools for monitoring and enhancing health, but as socially intelligent companions in the complex rhythms of modern life.

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