



THE FUTURE OF THE INTERFACE

Why Traditional UX Just Won't Cut It Anymore

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INTRODUCTION

Over the past two decades – and even more so over the past two years, we have seen a massive and rapid shift in the impact technology has on our day-to-day lives. Which begs the question, how will technology continue to evolve in the coming decades?

As UX professionals, whether you are a designer, developer, or researcher, we must all ask ourselves, how must we adapt to ensure our work remains relevant, effective and produces profitable outcomes as the technology customers are using and the way they interact with it are quickly changing?

Founded in 1991, Phase 5 quickly became a pioneer in online market research as we saw an opportunity to leverage this new thing (at the time) called the Internet. It became core to our work, both as a tool to undertake research, and also as a subject of research itself.

In 2000, Phase 5 started one of the earliest dedicated UX practices in North America. From



the very beginning, we have always kept our eyes open for new trends and continue to do so today.

Based on our now 30+ years of experience, and seeing first-hand how our work has evolved over the past three decades, this paper addresses how we see the future of the interface unfolding, and discusses the implications for UX professionals and the changes that will be needed to the way we conduct our work.

These changes will ensure we are properly equipped to handle the new opportunities and challenges that come with these inevitable changes.

THE EVOLUTION OF THE INTERFACE

Early UX

Before we jump ahead and look forward, we must first reflect on the past and consider how UX started and where it has led us today. Although the term “user experience” was first coined by Don Norman in 1993, the field itself is much older than the term.

In 1945, Bell Labs hired psychologist John E. Karlin to lead a group of social scientists and



systems, in particular, focusing on the design of the touchtone keypad: What shape should the buttons be? How should the buttons be arranged?

Bell Labs was one of the first companies that explicitly considered how humans interacted with their systems. According to Ed Isrealski, one of the engineers on the project, “[Karlin] was the one who introduced the notion that behavioral sciences could answer some questions about telephone design.”

As a result of their research, the keypad design introduced by Karlin has become the international standard on a variety of objects today, ATMs, gas pumps, door locks, medical equipment etc.

Early UX

Focus On

- Single user
- Single application

Key Metrics

- Task completion rates
- Task completion time
- Number of errors

Key Goal: *Efficiency*

Modern UX

Focus On

- Sophisticated user
- Multi-faceted application

Key Metrics

- Ability to remember task completion schemes
- Ability to discover new tasks

Key Goals: *Efficiency, Memorability, Discoverability*

Modern UX

Today, UX professionals are tasked with designing and testing much more complicated and multi-faceted systems, embedded within a wider customer experience ecosystem.

Take, for example, retail banking. Over the past two decades, financial institutions have focused their efforts on creating experiences that allow their customers to easily complete a range of banking tasks (e.g., making payments, tracking their spending habits, signing up for new products) through a variety of digital, direct and other channels, including mobile apps, responsive websites, voice-based virtual assistants, wearables, ATMs, telephone and in-person banking.

In this day and age, customers expect the convenience of interacting with their bank however and whenever they want. It is imperative to create an intuitive, seamless experience across all channels. A breakdown at any touchpoint can be detrimental to the broader customer experience.

As the interface has continued to evolve, the value and responsibility of UX professionals, and the results of the work that we do, have dramatically increased.

As we reflect on these two examples, the telephone keypad and the retail banking ecosystem, we can start to see that the history of UX is very much tied to the evolution of the interface.

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In the early days of UX, the machine used to be the center of attention, whether it be looking at task completion rates or number of errors when attempting to complete a certain task.

Today, the user has become the primary focus of our work. Our concern has shifted to whether users can learn and remember how to complete tasks and if they are able to easily discover new ones.

Transitioning our attention from machine-focused to user-focused has had a major impact on how UX professionals approach their work. But the focus remains on the individual's interactions with a particular product, service or channel, and their ability to adapt to the machine's needs. In other words, the human is reduced to a "user."

But will continuing to maintain this perspective, and upholding our current UX standards and metrics, suffice as technology continues to evolve and change?



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THE INTERFACE OF THE FUTURE IS INVISIBLE AND UBIQUITOUS

We are in the middle of a shift in technology.

The interface is transitioning into something that is no longer a physical display with which a user interacts. The user's world is now more connected than it has ever been before, transforming the interface into something invisible and ubiquitous.

Here are a few examples of this transition that are already part of our technology landscape:

Voice User Interfaces

Virtual assistants such as Alexa and Siri are commonplace within households across North America. These devices remove the need to interact with a graphical or physical interface, instead relying on spoken commands to complete a diverse set of tasks.

Whether it be checking the weather, playing songs from a specific artist, turning the lights on and off, or adjusting the temperature in their house, humans can interact with technology through the power of their voice alone.



As a result of this innovation, some theorize that the keyboard might become extinct in the near future, as the technology continues to grow and improve.

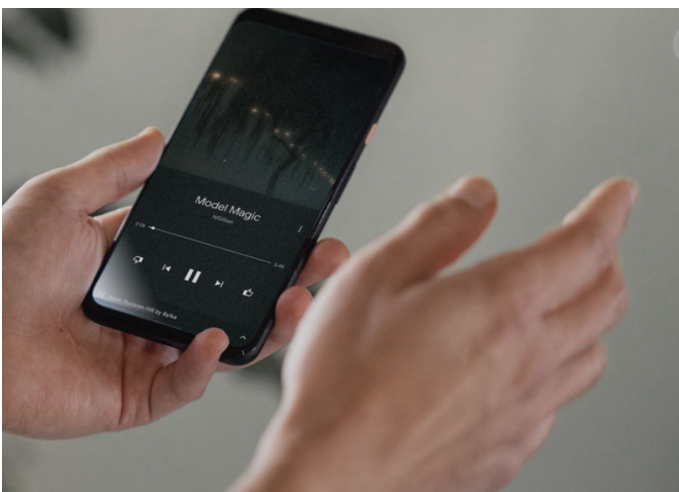


Gestural Interfaces and Ambient Sensors

The use of sensors to track and interpret a user's hand gestures, position, and even gaze has begun to open new means of interacting with technology in a largely invisible manner.

Google has begun to include gestural interactions in their latest mobile devices, allowing users to wave their hand to silence alarms, decline calls and navigate through music playlists. Similarly, BMW offers gestural control allowing drivers to accept or decline phone calls, control media, and adjust rear camera angles.

Amazon scales this concept up to enable its checkout-less brick-and-mortar shopping experience. Amazon Go locations use a combination of overhead cameras and sensors on store shelves to track customers' movement through the store and determine which items they take, automatically charging their account when they leave the store.



Augmented Reality

Augmented reality (AR) overlays virtual content, including interfaces, onto the real world, and is enabled by a variety of devices including (smart) eyeglasses, smartphones, and tablets.

A popular example that demonstrates a good use of AR is Ikea's Place app. This tool allows users to select items from Ikea's catalogue and preview how they will look in their home. The app overlays a 3D model of the furniture, at full scale, onto a live view of the user's room using their smartphone's camera and display.

Militaries pioneered AR with the use of heads-up displays (HUDs) to improve situational awareness, and assist in distinguishing between enemy and friendly forces by overlaying information in a pilot or soldier's field of vision. This technology has now moved into consumer use in the automotive sector, with HUDs available in many new vehicles and as after-market add-ons communicating speed, navigation and proximity warnings.

Virtual Reality and the Metaverse

Whereas AR enhances our surroundings, virtual reality (VR) replaces it with fully digital sensory environments – visual, auditory, and even tactile, with the increasing prevalence of haptic feedback technologies.

VR has long been the domain of entertainment, with most consumer VR focused in the gaming space, but its value in commercial applications continues to grow and evolve, with core use cases in simulation, visualization and training.

Oxford Medical Simulations uses VR to provide immersive medical training scenarios, training clinicians in the assessment and management of fully interactive virtual patients that respond accurately to treatment decisions.



The term “metaverse” has recently been applied to a more unified, social vision for VR – virtual environments intended for immersive interpersonal, experiential and brand interactions.



Facebook’s Horizon platform has recently entered the consumer market with components for users to create virtual homes to host friends, venues attend “live” events, and workspaces for business collaboration.

Businesses are already using the metaverse for internal meetings and job interviews, and the next logical step is to employ virtual, immersive spaces to deliver human-mediated services that once required bricks-and-mortar locations. The last point holds tremendous promise for service delivery and experience design but is in its nascent stages.

To be fully embedded in business processes involving service delivery, a number of issues need to be resolved: these relate, but are not limited to, issues of legal validity and compliance; physical comfort of the participants; the use of avatars versus actual likeness, and attendant issues of verification; as well as jurisdictional implications (e.g., on contracts and covenants). However, these are anticipated issues, and will be solved quickly enough for us to keep an eye on the broader implications on interface design and experience development¹.

¹ Phase 5 will be releasing our paper on Research in the Metaverse in April 2022



Internet of Things

The Internet of Things (IoT) is the term used to refer to physical devices that can connect and communicate with one another through the internet. Common examples that most would be familiar with are smart thermostats, speaker systems, and security systems.

Another example is the smart refrigerator. Smart fridges can not only enable customers to view the inside of their fridge on their smartphone while at the grocery store to confirm if they need to buy milk, but also provide an embedded interface in a common area of the home to facilitate family scheduling on a shared calendar, creating to-do lists, play their favourite tunes on Spotify, and providing a hub for controlling other smart technology in the home (e.g. smart thermostats or lighting).

Internet of Bodies

The Internet of Bodies (IoB) is the IoT concept extended to technology connecting the human

body to a network, allowing health data to be exchanged, and devices to be controlled and monitored remotely.

IoB devices can be categorized as:

- External or wearable, e.g. smartwatches such as Fitbits and Apple watches
- Internal, e.g. pacemakers, a device placed in the chest to help patients with heart conditions control abnormal heart rhythms with electrical impulses
- Embedded, e.g. prosthetics that are controlled by nerve signals through a sensor implant, or Elon Musk's Neuralink, which promises to connect human brains directly to computers

In 2018, researchers from South Korea designed a glucose tracking device enabled by smart contact lenses. This innovative product will allow those living with diabetes to get a read on their glucose in a literal blink of an eye, rather than a prick of the finger.

In Sweden, thousands of individuals have made the decision to have microchips, the size of a grain of rice, inserted into their hands. These chips are designed to help make their daily routines more convenient, by allowing them to access their homes, office and gyms through a simple swipe of their hands. The chips are also used to store information, such as emergency contact details, social media profiles, tickets for events etc.

WHAT DO THESE CHANGES MEAN FOR UX PROFESSIONALS?

We need to flip our way of thinking about the user experience.

As interfaces become more invisible and ubiquitous, we need to create solutions that can anticipate the user's needs and can react when the user is experiencing challenges. Our focus should no longer be on the user's ability to adapt to the machine's needs. It should be about creating an experience that allows the machine to adapt to the users' needs and react when they have difficulty.

We need to change the way in which we view and measure the success of a product's efficiency, discoverability, memorability and accessibility.

In the future, solutions will need to be able to identify the individual providing the command, accurately anticipate the user's needs, interpret, and learn from the user's behaviour to effectively provide anticipatory prompts and be able to accommodate users with long-term or situational impediments by minimizing formal input and output requirements. If we continue to focus on the user's ability to adapt to the use of a product



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Early UX

Focus on single users, single applications to achieve efficiency

Modern UX

Focus on sophisticated users with sophisticated, multi-faceted applications

Future UX

Focus On

- Multiple applications delivering an aggregate experience through a non-dedicated and possibly invisible interface

Key Metrics

- Overall satisfaction, scenario fulfilment (as opposed to task completion)

The Future of UX Metrics

It is no longer about designing an interface, rather it is about designing an experience.





As UX professionals, we need to take into consideration the full scope of cognitive and experiential possibilities, expanding the user to full human scope by considering their:

- Life context
- Technological context
- Financial context
- Physical or situational context
- Emotional context
- Geographical context
- Cultural context

Taking a human-centric approach will lead us to designing experiences instead of interfaces and will ensure customers receive a consistent feel and experience across all of their interactions with a brand and its products.

“When you make computers invisible you actually flip the [interaction]. It is no longer the human that is adjusting to the computer’s need, but the other way around. In order to remain invisible, the app is taking the decisions on behalf of users, making their experience seamless”.

*-Alok Kumar,
Business Insider India*

Metrics	UX of Today	UX of Future Interfaces
 <p>Efficiency</p>	<p>The user's ability to conduct tasks quickly and easily using an interface.</p>	<p>The application's ability to accurately anticipate the customer's needs and conduct the task with minimal or no prompting from the user.</p>
 <p>Discoverability</p>	<p>The user's willingness to explore and ability to discover the scope and idiom of the application.</p>	<p>The application's ability to identify the customer (e.g. within a household) and their context to proactively surface the most relevant content or functionality.</p>
 <p>Memorability</p>	<p>The user's ability to remember the scope and idiom of the application.</p>	<p>The application's ability to learn from the customer and present them with anticipatory suggestions and prompts.</p>
 <p>Accessibility</p>	<p>The user's ability to interact with the application through an interface or assistive technology allowing the maximum number of users to access the application unimpeded.</p>	<p>The application's ability to accommodate users with long-term or situational impediments by minimizing formal input and output requirements (e.g. voice-based commands gained traction in the accessibility context prior to mainstream applications).</p>

QUESTIONS WE MUST ASK AS THE FUTURE OF THE INTERFACE UNFOLDS

A paradigm shift is required to meet the evolving needs of our customers.

Historically, UX has been reactive, solving the problems we already know exist. As the interface of the future continues to evolve, we need to be more proactive in finding solutions to potential problems before they occur.

While we may not have all the best practices figured out to accommodate the future of the interface, we as UX professionals must start changing the way we approach and look at the products we are developing.

Practitioners should keep in mind these important questions to help adjust our way of thinking:

1. What is the big picture of what our product or service is trying to accomplish for our customers?
2. How can the experience our product or service offers deepen the customer relationship with the brand?
3. Where, when and how is the best way to present information? We need to think beyond pixels and screens.
4. Who are we expecting will be required to react and adjust when using our product or service, our customer or the machine?
5. What are the challenges we anticipate our users will face when using our product or service? How can we seamlessly navigate these on behalf of the customer?
6. Which metrics are most appropriate to track? *E.g., is it about the user's ability to complete the task? Or is it about the computer's ability to accurately anticipate a user's needs?*
7. What are the legal, privacy and ethical issues we need to consider as technology becomes more integrated into our customers lives and collects more personal data (e.g. medical information)?



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