Enabling Great User Experiences with User-Centered Design

User-centered design supports great user experiences by focusing on who an application’s end customers are, how and where they use the software, and their goals with it. Software innovation around platform capabilities of the target device can play an integral role by making interactions more intuitive, individualized, and convenient.

An inherent gap exists in the perception of a software application between the organization that builds it and the end user that buys it. Software creators must overcome that gap to deliver an optimal user experience, by gaining and responding to an intimate knowledge of how users are actually experiencing their applications. User-centered design (UCD) provides the methodology needed to achieve that requirement, by making end users’ abilities, wants, and needs the foundation of software architectures, features, and user interfaces (UIs).

As a structured approach to software development, UCD has many variations, but all of them are based on better understanding the relationship between the software and its users. The overall goal is to tailor software to the end user and their environment, rather than the other way around. To that end, software companies are considering the use of existing or potential Intel® platform features and capabilities to create new, richer ways for their applications to interact both with users and with environmental factors, including the following:

- **Enhanced user interactions with software** improve outcomes of the UCD-driven approach with UI-input options such as touch, gesture control, facial recognition, human proximity, or manipulating the device’s position in space, as well as expanded display options using Intel® Wireless Display (Intel® WiDi).

- **Expanded software interactions with the environment** can support innovation that better meets UCD requirements by changing the behavior of the application based on data gathered from the target device’s sensors, such as GPS position, compass bearing, and ambient light levels.

Intel has established an ongoing program of research by social scientists, ethnographers, and anthropologists that studies people’s everyday routines to identify opportunities for enabling richer user experiences. The outcomes of that research directly drive the roadmaps for Intel platform features.

In addition to providing the means to meet user-based requirements, these platform features also support new experiences that differentiate products in their market segments. A user’s positive emotional reaction to having his or her needs anticipated and met by a piece of software can help establish a strong bond of brand loyalty. That relationship can be a powerful catalyst to ongoing success for a software provider.
A Simplified View of User-Centered Design

Software companies and other development organizations have created a wealth of variations on the UCD methodology. This section describes a simple UCD model, illustrated in Figure 1, which provides context and introduces how Intel’s research and technology complement the UCD lifecycle.

![Figure 1. A simple representation of the user-centered design approach.](image)

Notably, the UCD cycle is iterative; each stage builds on those that precede it, in a repeating series of steps that continually refine the ability of the software to meet user needs and expectations.

**Research Users, Tasks, and Context**

This stage begins by identifying who will actually be using the software and recruiting a representative group of customers to help establish how they will interact with it. Researchers should work with those users to identify the tasks they want the product to accomplish for them, as well as how the users complete those tasks at present and the strengths and shortcomings of existing solutions. The other key factor is the context in which the solution will be used, including the physical environment and the solution’s relationship to factors such as location, people, and resources.

**Define Solution Requirements and Design Approach**

The project team distills the information gathered in the preceding stage into a structured list of functional requirements that the solution must accomplish. In this stage, the team also creates a high-level design overview that establishes how the solution will meet the needs of the users to handle the specified tasks and context. Here is where usage-model innovation begins to take place, creating unique and compelling user experiences through the use of Intel platform features.

**Develop Application to Meet User-Driven Requirements**

In this stage, the development team begins translating the design approach into the functioning code that will meet the real-world user-driven requirements established previously. Intel® Developer Zone (Intel® DZ) provides a comprehensive body of resources such as technical documentation, tools, and best practices to help make this effort efficient and successful. Solution innovators should also know that Intel DZ offers Intel® Software Partner Opportunities to software makers that are putting Intel platform features to use in amazing ways.

**Evaluate Product Based on User Feedback**

After a working version of the software has been created, the user population that helped establish the solution requirements evaluates the application. This part of the process is critical to verifying that the developers have taken a suitable approach to meeting the requirements. Both successes and outstanding challenges should be noted during this stage, for further research among the end-user sample population when the iterative process returns to the research stage.
Enabling User-Centered Design with Intel® Platform Capabilities

Opportunities for innovation that are revealed through the UCD process can often be met by enabling applications with Intel platform features and capabilities. The resulting superior user experience in turn drives competitive advantage, as illustrated in Figure 2. This section gives a few example scenarios to illustrate the types of opportunity that are possible now or in the not-so-distant future.

![Figure 2. Using Intel® platform features to enable user-centered design fuels competitive advantage through a superior user experience.](image)

**Friendly Advice, Served in a Timely Fashion**

As Alan arrives at the new Greek restaurant he has been wanting to try, a social networking app on his phone vibrates to life. The phone senses the motion of Alan taking it from his pocket, and as he looks at the screen, facial recognition technology identifies him and unlocks the display. Based on GPS location, the app has recognized the restaurant and determined that Alan’s friend Tory recently posted a review that includes a recommendation for the taramosalata appetizer. It turns out to be an outstanding choice.

**Little Help with a New Language**

Luca has some spare time at the cafe as he waits for his girlfriend Sophia to arrive, and he decides to practice his German, with which he has started making some real progress with. He calls out, “Aufwachen!” His Ultrabook™ device
dutifully wakes up, launches the German tutorial, and engages Luca in a spoken conversation. When Luca uses the wrong tense of a verb or mispronounces something, the app notices and gently asks him to correct it. This way of learning languages has taken the pain out of the process, and even made it fun.

**Streamlining the Departure**

As Isaac arrives at the airport, he is almost but not quite late for his flight, and as the cab pulls to the curb, he is on the sidewalk almost before the car stops. It has been a productive trip, but Isaac is ready to be home, and he doesn’t intend to leave anything to chance, especially in an unfamiliar airport. Making long strides into the terminal, Isaac spies a check-in kiosk, and as he draws closer, it senses his approach, replacing the large-lettered sign identifying it as a check-in kiosk to smaller-text instructions. Two strides later, Isaac smiles at the confirmation that the kiosk and his phone have already handled his check-in using near-field communication—the very picture of silent efficiency.

**Conclusion**

UCD provides a formal structure to the effort to design applications around users and their needs, creating superior user experiences that can ultimately translate into a competitive advantage. Intel platform features breathe additional life into those user experiences, dramatically extending what’s possible, by meeting the user requirements in UCD with a wide variety of interactions that are more intuitive, flexible, and convenient. By targeting the capabilities users want, with platform capabilities that heighten creativity, software providers can amaze their customers. And that’s a great way to keep them coming back.

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