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White Paper

Incorporating Usability Experts with Your Software Development Lifecycle: Benefits and ROI

Learnability, *efficiency*, *safety*, *effectiveness*, *memorability* and software's overall *utility* are key factors in its long-term success and profitability. All of these aspects can be improved by incorporating usability experts throughout the software development lifecycle.

Most software design processes share similar phases, but differ on speed and the degree of repetition (cycling) through the phases. The nature of development varies by model: some models encourage a broad exploration of designs, while others encourage depth in design. Each software development process has its associated advantages and disadvantages affecting the end product, and involving usability experts can help compensate for the weaknesses associated with a particular design process.

Process / Model	*Pros*	*Cons*
Waterfall Model	Encourages high-detail in each phase to pass to next phase of design; definitive deadlines and completion point; predictive nature (deliver what was originally planned); up-front design can fix problems early; less continuous customer interaction needed	Cannot return / revise once handed off to next phase; method is heavyweight, regimented and micromanaged; less adaptive; can be expensive; unable to solve *wicked problems* (where requirements / limitations revealed during development)
Rapid-Iterative / Incremental Models	Frequent inspection; can adjust quickly and improve designs in each iteration; higher flexibility and team communication; ability to work with smaller budgets; higher speed; ability to review / receive earlier feedback on prototypes	Often end up down a rabbit hole: chasing an idea and not exploring breadth of design options; no definitive end point (iterations) makes planning difficult; less up-front design can burden projects with later redesigns
Agile Development	Similar to iterative model, with high visibility and collaboration among development team; fast delivery to client; less micromanaged through self-organized teams; results-driven and adaptive	Less predictive (final product can vary from original plan); features can be rushed; high communication with client needed (client might not know users' best interests); urgent, programmer-centric culture that values short-term goals

An array of software development processes exist, with some of the most common listed above.

Common to all development processes are some sort of *requirements gathering*, *design*, *implementation*, and *testing*. Regardless of the lifecycle you use at your organization, usability experts can improve the product at various phases to improve overall satisfaction and productivity of users with the end product. For example, usability experts might inform early designs with questionnaires, workshops, and card-sorting activities to uncover users' needs. Later in the design process, conducting usability research on interactions with prototypes will provide designers valuable feedback on the effectiveness of the new design.

Planning & Design. During the design phase, competitive designs can be brought to users to examine which features are most productive, least productive, and to determine potential bottlenecks within the software that can affect user productivity. Incorporating these findings can yield solutions that combine the best features of competitive designs into a redesign with higher usability and a better user experience.

Testing & Evaluation. Simple usability flaws can mean the difference between market success and failure. For example, under-utilized features could clutter the screen and slow user cognition by providing too many options, while over-utilized functionality might be streamlined for better access. Creating a better taxonomy and organization for a larger set of users can boost their productivity and efficiency during software use. Beyond simple quality assurance testing and bug fixes, usability testing can highlight larger design problems or unintended ways in which a software product is used.

A difficult to use product can have many consequences. A study by Karat & Lund[1] describes one company's customer service savings with a user-friendly redesign, noting how "an improved experience by *Schneider Automation* resulted in $2 million saved in call-center support costs over the first 10 months after the change" (p. 300).

Usability experts can employ a combination of quantitative and qualitative approaches to inform design at several points during a project. For example, a quick survey can provide some statistical data early in design, revealing the most significant problems in need of attention during design activities. Later in the

[1] Karat, C. & Lund, A. (2005). The Return on Investment in Usability of Web Applications. In R. Bias & D. Mayhew (Eds.), *Cost Justifying Usability (2nd edition)*. San Francisco: Morgan Kaufmann.

project, a study that observes user interaction with prototypes can help designers understand the context of activity by painting a picture of how software is used in natural settings. Both of these examples can yield a high return on investment (ROI) for software developers.

Situated Research has developed a unique method of natural observation that can find patterns in user behaviors, aimed at uncovering deep design issues (both good and bad) underlying software use. In particular, analysis focuses on both social interactions as well as action potentials created by the software interface that can create or hinder meaningful action. Benefits of this research can include increased sales, more customer loyalty, higher user productivity and lower maintenance costs. In the following quotes, consider the value proposition of incorporating usability expertise:

- "The rule of thumb in many usability-aware organizations is that the cost-benefit ratio for usability is $1:$10-$100. Once a system is in development, correcting a problem costs 10 times as much as fixing the same problem in design. If the system has been released, it costs 100 times as much relative to fixing in design."[2]

- "The average user interface has some 40 flaws. Correcting the easiest 20 of these yields an average improvement in usability of 50%. The big win, however, occurs when usability is factored in from the beginning. This can yield efficiency improvements of over 700%."[3]

Integrating usability experts throughout the software design process ensures that the final product aligns with business objectives: including increased revenue, market share, and brand perception.

[2] Gilb, T. (1988). *Principles of Software Engineering Management.* Reading, MA: Addison-Wesley.
[3] Landauer, T. (1995). *The trouble with computers: Usefulness, usability, and productivity.* Cambridge, MA: The MIT Press.

About Situated Research

Situated Research, located in Naperville, Illinois, offers services including software usability research and testing, video game research, and web usability. High usability standards are incorporated to ensure a final product that is easy to use, functional yet simple, efficient, and more intelligently designed than the offerings of competitors.

For more information about Situated Research, visit www.situatedresearch.com.

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