Simulation For Everyone: Techniques to Help Democratize Simulation

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KEYWORDS

Democratization, Usability, User-Centered Design, User Experience

ABSTRACT

Advantages of simulation are many, but the biggest benefit is money savings. Designing, building, testing, redesigning, rebuilding, retesting and so on, can be an expensive effort. Applying simulations tools reduces the effort both in cost and time. While simulation provides huge advantages, it has its limitations. One major limitation is the complexity of the tools which are used to run simulations. We at ANSYS have a vision to empower every engineer with simulation tools that are easy to use and are adoptable at all levels to increase productivity.

To achieve this vision, we need accurate understanding of our users, their goals and business objectives. With such deep understanding, we can create software that will provide easy and intuitive means to allow all engineers at every level to achieve greater productivity and efficiency. Such level of understanding can be achieved by employing user-centered (Usability) design process. It is a process deeply embedded in diverse set of sciences.

At ANSYS have deployed a user-centered design process which has helped us to build next generation of simulation software that is easy to use for all engineers. It's not a prescription but a tool kit where you pick and choose the right tool for the right job. We have divide this process into four stages, Discover, Design, Validate and Deliver.

Discover is the initial stage where we conduct research activities such as ethnographic studies, stakeholder interviews, focus groups, usability research studies and surveys. This is similar to collecting requirements for product design in simulation process. After obtaining a good understanding of users/potential users and their needs and business objectives, we move on to the Design stage. This is where we apply tools such as the design studio approach and information architecture. During this phase we collaborate with appropriate stakeholders to come up with an initial design. We use this initial

design as basis for creating and testing the prototypes. Which leads us to the next stage of our process, Validate. During this stage we test our design ideas, and revise the design utilizing tools such as usability testing. It is just like engineers test, modify and retest employing the simulation techniques. Like in simulation process we revise, test until we achieve our desired goals ensuring an intuitive and well balanced design. Finally, in the Delivery stage, we create the specifications and detailed visual design. This is very similar to the simulation results where results are used to create the actual products. Our detailed designs and artefacts are used to create actual simulation software. Again just like simulation ~~world~~ process when you build actual physical product you want to test and ensure it meets all requirements, similarly we test our product utilizing usability studies to ensure they meet expectations.

It's relatively a new process at ANSYS and we are still collecting data to access the progress we have made by employing this approach. The data collected so far has shown great success. For example we are using system usability scale (SUS) to measure our progress. Our data has given us very encouraging early signs where we have seen significant improvements in our product usability. We have seen improvements in SUS by as much as 60%.

Simulation is complicated, and traditionally a process used by specialist engineers. Our vision is to democratize simulation and help usher in a new era in simulation and engineering world. In order for us to achieve this vision, we need to employee all the tools available to us especially usability (user experience) process.