

CLEARINGHOUSE FOR MILITARY FAMILY READINESS

Just-Enough Programming

Clearinghouse Technical Assistance Team

As of May 28, 2019

This material is the result of partnership funded by the Department of Defense between the Office of the Deputy Assistant Secretary of Defense for Military Community and Family Policy and the USDA's National Institute of Food and Agriculture through a grant/cooperative agreement with Penn State University



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Background

In 2000, William S. Junk, a faculty member of the University of Idaho Computer Science Department, wrote about the importance of balancing the schedule, product features, quality, and resources in software development projects. He argued that the goal of software development projects should be to produce a “minimally-viable product,” a product that meets quality expectations and produces value for the customer with minimal features, in order to balance the project schedule and resources (Junk, 2000).

Around the same time, a subset of experienced software developers started the “agile software development” movement, a movement that is still occurring today, which is predicated on removing as much of the “heaviness commonly associated with the traditional software-development methodologies. . . to promote quick response to changing environments, changes in user requirements, accelerated project deadlines and the like” (Erickson, Lyytinen, & Siau, 2005, pg. 89). As more developers began to adopt the agile software development approach, different versions of agile development began to appear.

Defining features of the various agile development methods include quick, incremental, and iterative delivery of the product. In his 2011 book *The Lean Startup*, entrepreneur Eric Ries describes this as the “Build-Measure-Learn” cycle in which the developer finds out basic information about what the customer wants, builds a prototype with basic features, measures how the customers respond to the prototype, and then learns whether to continue development of the prototype in the same direction or adjust course based on the customer’s response. This cycle is repeated until the customer is satisfied with the quality of the product (Ries, 2011).

The method outlined in *The Lean Startup*, sometimes referred to as the lean method, has permeated throughout various industries and has been adopted by large, successful corporations. GE, a leader in the manufacturing industry, adopted the lean method by using a new technique that they labeled “FastWorks” that focuses on rapid learning cycles with customers in order to reduce the risk of building something that cannot be sold. FastWorks was piloted with a small team tasked with creating a refrigerator for less money and on a tighter timeline than traditionally required. Using the FastWorks method, the team created a product that was developed for half the cost, in twice the speed, and that sold over two times the normal sales rate (Power, 2014).

Characteristics of Just-Enough Programming

The success of agile software development, the lean method, FastWorks, and related methods has resulted in similar approaches being adopted in other industries, including behavioral health. In behavioral health, and particularly mobile health (mHealth), the concept is often referred to as “just-enough programming.” In just-

enough programming the goal is to create the minimum amount of a product to reach the desired outcome or accomplish the primary goal. Common characteristics of just-enough programming in mHealth include:

1. Multi-disciplinary product development teams (Mann, Quintiliani, Reddy, Kitos, & Weng, 2014; Whittaker et al., 2008)
 - Include a representative from each department (e.g., research, development, legal, web, marketing) that will be part of the creative process on the product development team.
2. Creation of technology-driven products (Buller et al., 2013; Mann et al., 2014; Whittaker et al., 2008)
 - Create technology-based alternatives (e.g., mobile applications) to existing products.
3. Reliance on evidence-based behavior change frameworks as a product foundation (Mann et al., 2014)
 - Incorporate principles from research on human behavior change into the development and design of the product.
4. Production of a prototype with basic features based on evidence-based core features (Buller et al., 2013; Mann et al., 2014)
 - Build an initial model that includes the minimum amount of evidence-based product features required to change user behavior.
5. A user-centered development process (Buller et al., 2013; Mann et al., 2014; Whittaker et al., 2008)
 - Meet with potential users frequently to gather feedback.
6. Iterative design processes (Buller et al., 2013; Mann et al., 2014; Whittaker et al., 2008)
 - Be willing to modify the product based on user feedback.

Just-Enough Programming Examples

Just-enough programming is being utilized in various industries to shorten product development time and reduce budget while still meeting user needs to maximize potential revenue. For example, just-enough programming has been utilized in behavioral health to develop mHealth applications for sun protection (Buller et al., 2013), smoking cessation (Whittaker et al., 2008), and to stop hypertension (Mann et al., 2014).

In 2014, Mann et al. described the development process behind a mobile application based on the evidence-based Dietary Approaches to Stop Hypertension (DASH) intervention that had been around for decades. Their development team consisted of professionals with expertise in various areas including primary care, behavior change, nutrition, computer science, design, human-computer interactions, usability, videography, and informatics. The team compared evidence-based practices with applicability to the mHealth format and identified three core features for the prototype: automated tracking and feedback, multimedia training and educational

clips, and communication with a coach trained in motivational interviewing techniques. Users tested the prototype and changes were made based on their feedback.

There is evidence of just-enough programming being utilized outside of the field of behavioral health as well. In 2014, Rogers and Duening utilized just-enough programming as part of a non-degree curriculum design and development process. In 2016, Yeager et al., used the just-enough programming principles and process to create an intervention to improve student resilience.

Recommendations

In order to maximize potential benefit, mHealth developers should consider adopting agile/lean-inspired development processes (Mann et al., 2014). However, the just-enough products that often result from agile/lean-inspired development processes must be grounded in evidence-based behavioral health theory. In addition, there is a need to identify new dynamic behavioral health models grounded in mHealth research (Riley et al., 2011).

MHealth developers also need to consider all evaluation criteria when creating products, not just customer input. As the mHealth industry continues to grow, regulators are beginning to take a closer look at the quality of the products being produced (Stoyanov et al., 2015). For example, the FDA is building a new regulatory model to assess the safety and effectiveness of mHealth technologies (Kagen & Garland, 2019). Ongoing synthesis of best evidence-based practice into mHealth initiatives should be a priority as new research findings around mHealth applications and models continue to become available.

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