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Using Scrum in an Information Systems Capstone Course : A Case Study

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USING SCRUM IN AN INFORMATION SYSTEMS CAPSTONE COURSE: A CASE STUDY

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Abstract:

In this case study, we describe the introduction of agile development using Scrum in a graduate-level information systems capstone course. Scrum concepts and processes were discussed in a couple of class sessions early in the semester. Students then had to work in teams of four or five on systems development projects using scrum. We discuss the steps we took to introduce scrum concepts to our students. We provide details of the course schedule, scrum, and student team projects. There were challenges along the way, including in documentation – our existing documentation requirements were more traditional in nature following the SDLC-Waterfall approach. Those deliverables did not quite match the outputs of scrum. We provide student feedback of the scrum process, and lessons learned. Findings from this case study will be invaluable to instructors who are planning to move to agile methodologies in their systems development theoretical, and project-based courses.

Keywords: Scrum, Information Systems Capstone

I. INTRODUCTION

Courses in information systems analysis and design or systems development have changed in the past two decades. As methodologies and technologies change they make their way into the courses we teach. We have watched systems analysis and design course evolve from structured to object oriented in the past decade. Recently we have seen agile development methodologies take the place of traditional approaches like the systems development lifecycle or waterfall.

The change in methodologies has impacted information systems courses both at the introductory as well as the capstone level. According to Schwering (2015) students, employers, accrediting agencies, and those financing higher education want to see evidence that learning outcomes have been achieved. So, schools have used projects both in regular systems analysis and design and capstone classes to help students integrate what they have learned in other courses. A number of studies have examined projects in capstone courses (Baird & Riggins, 2012; Keller, Parker, & Chan, 2011; Matos & Grasser, 2007; Mills, Hauser, & Pratt, 2008; Schwering, 2015). Research shows that some instructors are transitioning to agile technologies by creating a hybrid methodology that uses characteristics of agile within a traditional waterfall approach (Baird & Riggins, 2012).

II. SCRUM

Scrum is an agile methodology which focusses on the interactive or iterative nature of systems development. It is considered to a lightweight "process framework" for agile development. In this framework, a product is the deliverable. To create this product we need to collect requirements and desired features from a variety of stakeholders including users, executives and team members. Features are written from end-users' perspective and are therefore called user stories. The entire list of user stories is called the product backlog. Based on the product backlog we create separate smaller sets of user stories called sprints. These sprints are reviewed daily with stakeholders. After we end one sprint we move to the next done till all the sprints are complete.

This represents completion of the product. A graphical description of the scrum process is shown in the figure 1 below.
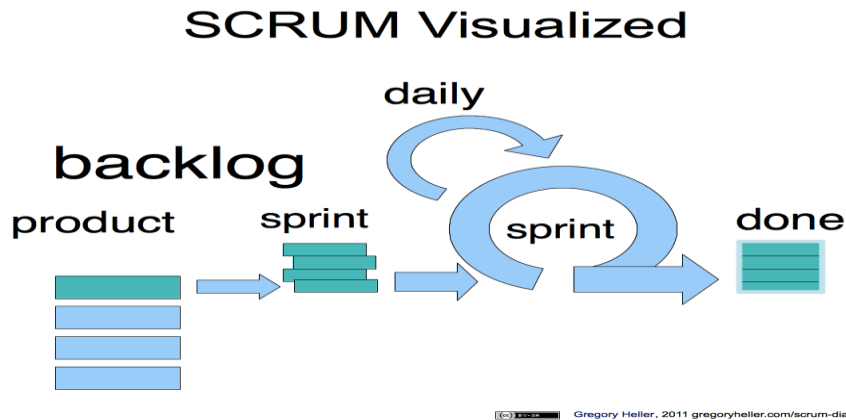

Figure 1: Scrum Visualized (Heller, 2011)

II. CASE STUDY

In this case study, we describe the introduction of agile development using Scrum in a graduate-level information systems capstone course. This course is the final capstone course in the MS program in information systems technology at a large private university in the mid-Atlantic region of the U.S.A. Scrum concepts and processes were discussed in a couple of class sessions early in the semester. Students then had to work in teams of four or five on systems development projects using scrum. In these projects, teams had to solve an existing problem, or take advantage of a new opportunity. They had to analyze requirements and design an information system and create a working prototype by the end of the semester.

We used a traditional Systems Development LifeCycle (SDLC) Waterfall methodology till the Fall 2016 semester. This methodology consists of four phases: project planning, systems analysis, systems design, and implementation. The SDLC approach has its advantages in pedagogy. It is structured with definite deliverables after every phase. Therefore, using this in a capstone course environment also provides the same structure. It is easy to set deliverables after each phase, and teams in the course can move along at the same pace.

In the Spring 2017 semester we moved to a hybrid approach for systems development. We first introduced scrum concepts to our students. We then tried to match our deliverables from previous semesters when SDLC was used to Scrum deliverables. There were challenges along the way, including documentation – our documentation requirements from earlier semesters were more traditional in nature following the SDLC-Waterfall approach. Those deliverables did not quite match the outputs of scrum. Scrum uses a more iterative approach with sprints that are defined completely by project teams, making their deliverables very different. Some teams may achieve more in their early sprints while others may do the same later on in the Scrum process. This forced us to modify some of the structured deliverables. Baird and Riggins (2012) reported on similar issues in their computer information systems capstone course. They created a hybrid structure to address some of the issues.

We report on the student feedback of the scrum process, and lessons learned. Similar to Baird and Riggins (2012) we also used a hybrid structure. We started with the SDLC in the project management phase and then moved into Scrum and sprints in the systems analysis and design

phases. Findings from this case study will be invaluable to instructors who are planning to move to agile methodologies in their systems development and project-based courses.

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ABOUT THE AUTHOR

Dr. Subhasish Dasgupta is Associate Professor of Information Systems in the Information Systems and Technology Management in the School of Business at George Washington University in Washington, DC, USA. He served as Department Chair from 2010-2015, and Program Director of the Master of Science program in Information Systems Technology from 2004-2010. Dr. Dasgupta received his BS (Physics) and MBA (MIS and Operations Research) degrees from the University of Calcutta, India, and PhD (Information Systems) from Baruch College, The City University of New York, U.S.A. Dr. Dasgupta has published his research in journals such as Journal of Strategic Information Systems, European Journal of Information Systems, Journal of Global Information Management and Journal of Information Education and Research (now Journal of Information Systems Education). He has presented many papers at international, national and regional conferences. Dr. Dasgupta is an expert in software development methodologies, and open source software development.