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Mark F. Thouin and William E. Hefley

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Teaching Tip
Teaching Scrum Product Owner Competencies Using an Experiential Learning Simulation

Mark F. Thouin
William E. Hefley
Naveen Jindal School of Management
University of Texas at Dallas
Richardson, TX 75080, USA
mark.thouin@utdallas.edu, bill.hefley@utdallas.edu

ABSTRACT

The product owner role is one of three key roles in the Scrum software development process. Industry demand for product owners is growing exponentially, and educators need effective techniques for teaching students the knowledge, skills, and competencies required to be effective product owners. To address this need, this Teaching Tip describes how SimAgile, an experiential learning simulation, may be used as one part of a series of Scrum-based assignments to help students better understand the product owner role and the competencies required to be an effective product owner. Results from a graduate class on agile project management indicate that when SimAgile is combined with complementary Scrum workflow assignments students report high levels of active learning, relevance, and utility and closely mirrors real world product-owner experiences. Furthermore, students are able to successfully identify product-owner competency requirements upon completion of assignments. With minor modifications, the simulation and Scrum workflow assignments may also be used for undergraduate students. Using the simulation in combination with supplemental Scrum workflow assignments appears to be an approach well suited for teaching students about the product owner role in a classroom setting and will help educators meet the growing demand for product owners in industry.

Keywords: Product owner, Agile, Scrum, Experiential learning & education, Competency, SimAgile

1. INTRODUCTION

The product owner (PO) is one of three primary roles in projects employing the Scrum process (Schwaber & Beedle, 2002). Eighty-seven percent of organizations using agile practices are using Scrum (Digital.AI, 2022). Given the ubiquity of Scrum in organizational software development processes, demand for POs is soaring (Digital.AI, 2021). With an annual growth rate of 24%, industry demands for POs are expected to double every 3 years (LinkedIn, 2020). To meet these growing industry demands there exists significant need for educational programs focused on the PO role.

POs require a broad range of skills and competencies from domains including data analytics, user experience design, business analysis, and technology development (Gnanasambandam et al., 2018). The PO role requires the acquisition, integration, application, and synthesis of knowledge from these diverse domains making traditional pedagogical approaches challenging.

Experiential learning is a proven approach for creating educational experiences that replicate practice-based settings (Clem et al., 2014; Danko, 2019; Thouin & Hefley, 2020). Prior studies exploring experiential learning have shown that computer simulations provide high levels of engagement and are effective for simulating Scrum processes in individual and group activities (Hefley & Thouin, 2016, 2017). This Teaching Tip explores the use of a collection of Scrum workflow assignments in combination with a PO role playing computer simulation in a graduate class on agile project management and reports on the level of student engagement and students' understanding of PO job competencies. Student engagement has been shown to be associated with effective learning environments and understanding PO competency requirements is an essential component for learning the PO role.

The two specific learning objectives of the simulation and Scrum workflow assignments are for students to understand the role of the PO in the context of a Scrum project and for students to understand the competencies required to be an effective PO working on a Scrum project. The first learning objective is assessed with the Experiential Learning Survey (ELS) (Clem et al., 2014). The second is assessed by identification and evaluation of PO competency requirements from the MSIS 2016 Global Competency Model for Graduate Degree Programs in Information Systems (Topi et al., 2016). The results in this paper support the value of the pedagogical approach for helping students understand the role of the PO in the Scrum process and the competencies required to be an effective PO in Scrum.

The remainder of the paper proceeds as follows. First, a review of the literature on experiential learning, computer simulations, and Teaching Tips in the context of PO skills and competencies is provided. Next, an overview of the simulation

is discussed along with a description of complementary Scrum workflow assignments. Finally, benefits of the pedagogical approach taken, evidence supporting the use of the simulation and Scrum workflow assignments, and a conclusion are provided.

2. LITERATURE REVIEW

The PO in Scrum is the central point of product leadership and is responsible for identifying and prioritizing stakeholder and end-user requirements throughout the development process (Rubin, 2013). The PO creates the vision for the product and is said to be the "cornerstone of successfully applying agile product management in Scrum" (Bass et al., 2018; Pichler, 2010, p. 20). The PO has primary responsibility for the creation, modification, and prioritization of user stories in the product backlog and is required to work with a wide variety of constituents in an ongoing basis (Sverrisdottir et al., 2014). The knowledge, skills, and competencies required to be an effective product owner have been given little focus in academic research (Duncan, 2012; Kristinsdottir et al., 2016), however, this is changing.

Oomen et al. (2017) explored the relationship between PO competences, team performance, and stakeholder satisfaction and found that relationship management, user support, and backlog management were predictors of team effectiveness. Rubin (2013) identified domain skills, people skills, decision making and accountability as important characteristics of POs while Pichler (2010) explicitly cited communication, commitment, and teamwork as being vital. Matturro et al. (2018) also identified communication and teamwork as essential PO skills and, in addition, identified customer orientation as an essential soft skill. A recent multi-method study exploring the PO role identified communication, acceptance testing, customer relationship management, and writing user stories as the activities most often performed by a PO and concluded that a primary function of a PO is that of a communicator (Unger-Windeler et al., 2021). Given that the overarching goal of POs is to maximize the value delivered by the Scrum team (Fowler et al., 2019), the knowledge, skills, and competency requirements of a PO are diverse, extensive, and oftentimes tacit. Hence, traditional teaching methods may not be effective and different pedagogical approaches for teaching Scrum in the classroom are needed.

Experiential Learning Theory (ELT) provides a "holistic model of the learning process…consistent with what we know about how people learn, grow and develop" (Kolb, 2001, p. 227). It posits that experiences play an essential role in the learning process. Accordingly, instructors should seek to provide students with experiences that closely mirror the phenomena being taught. Villavicencio et al. (2017) developed an educational framework for providing students with direct Scrum project experiences and found the process to be beneficial for student learning. Baham (2020) explored incorporating a business product owner role into Scrum-based student software projects and found that business product owner engagement was improved with a bottom-up selection process emphasizing co-creation activities. Furthermore, providing students with hands-on Scrum experiences has been shown to be an effective pedagogical tool for teaching Scrum (Baham, 2019; Baird & Riggins, 2012; Sharp et al., 2020). The importance of experiencing Scrum activities firsthand appears to be a useful pedagogical technique for helping students understanding the PO role and the Scrum software development process.

Since instructors may not always be able to find suitable hands-on PO activities for students to perform in classroom settings, it is important to understand the suitability of other approaches that attempt to mirror firsthand experiences. Computer based simulations are one such approach as they are designed to provide classroom experiences that mirror the subject domain of interest.

Computer simulations have been developed and used in the classroom to support the teaching of a wide variety of IS subjects including project management, business process integration, Scrum, and the PO role. Developed in the late 1990s, the Information Systems Project Manager (ISPM) simulation provided participants with the opportunity to take on the role of a project manager developing an information system and it was found to be useful in helping students understand the importance of strategic decision making (Martin, 2000). BPIsim has participants working in teams of five in a variety of roles in a typical supply chain and it was found to be a "highly-effective experiential learning activity" (Whitelock, 2020, p. 14). SCRUMIA and SCRUM-X are two computer-based simulations that teach participants about the Scrum software development process and the difference between Scrum roles (Lee, 2016; Von Wangenheim et al. 2013). SimAgile has an emphasis on the PO role; students participating in SimAgile take on the role of a PO to try and successfully deliver a software product (Thouin & Hefley, 2020). SimAgile was developed by Simulation Powered Learning, a commercial provider of agile and planned project management educational simulations (SPL, 2022). SimAgile is an interactive, turn-based simulation designed to replicate the experiences of a PO working as part of a Scrum team and prior research has shown it to be a valuable experiential learning platform (Hefley & Thouin, 2016, 2017).

One difficulty associated with implementing Scrum is making sure all participants clearly understand the roles, responsibilities, and competency requirements of each member on the team (Cho, 2010). Role clarity is an essential component of Scrum team effectiveness. The purpose of this Teaching Tip is to outline and describe a series of assignments to be used along with SimAgile, an experiential learning simulation. After completing the simulation and Scrum workflow assignments, students should have a clear understanding of the PO role and the skills and competencies required to be an effective PO.

3. SIMULATION OVERVIEW

SimAgile is a computer-based simulation providing participants with an opportunity to take on the role of a PO in a software development project. The SimAgile PO leads a virtual team of non-player characters through the planning and development of a human-resource self-service software application for a fictitious company called Uniworld. Simulation game play is turn based and is designed to mirror as closely as possible circumstances and events routinely taking place in Scrum-based projects. SimAgile POs plan the project, make decisions in response to non-player character actions, and receive feedback from the simulation based on decisions made. Success is determined by whether the Scrum team is able to

complete the minimum viable product (MVP) by the end of the fourth two-week sprint.

SimAgile requires a license fee of $30 to access and, once purchased, is accessible from any internet-connected web browser. Students work in teams of three, four, or five and complete the SimAgile and Scrum workflow assignments as a group. Only one person in each group is required to purchase a license and significant class time is provided for student teams to work on the simulation. When working on SimAgile, one student in the group logs in and shares his or her screen with the other members of the group so that the group may collectively discuss how best to respond to the performance of the SimAgile team and feedback from non-player characters.

3.1 Background Materials

SimAgile provides background materials to help students immerse themselves in the PO role. The background materials include a project overview document and an initial product backlog containing 41 user stories. The project overview document provides a detailed description of the project, information about project objectives, project requirements, and project success criteria. The project overview document also provides details on the structure of the organization and includes an organization chart with the names of the Chief Executive Officer (CEO), the Chief Operating Officer (COO), the project sponsor, and organizational vice presidents. The names and profiles of the initial Scrum team are provided along with their educational backgrounds, strengths, and weaknesses.

As previously noted, the initial product backlog in SimAgile contains 41 user stories. User stories in Scrum capture product requirements. Each user story in SimAgile specifies a user type, a goal/task statement, and an expected benefit as a result of completing the goal/task. In addition to these three components, each user story in SimAgile also includes a short title, a yes/no flag indicating whether the story is required for an MVP, a size estimate in story points, a size estimate in hours, an estimate of business value, and a list of acceptance criteria. The goal of the simulation is for the PO player to deliver all MVP functionality by the end of the fourth two-week sprint.

3.2 Game Play

After logging in to SimAgile, game play begins with a product backlog refinement session whereby the PO player prioritizes the user stories in the backlog. The PO player is free to prioritize user stories in any order he or she sees fit. Refining the product backlog is an ongoing activity and the priority of user stories may be adjusted at the end of each two-week sprint. In addition, game play requires the PO player to plan activities for each day of the two-week sprint. Activities for each sprint include sprint planning, daily standups, sprint review, and a sprint retrospective. Once the PO player is satisfied with the refined backlog and activities planned for a sprint, the PO player runs the simulation for the planned sprint, the simulation processes the choices made, and provides feedback over the course of each two-week sprint. Specifically, the simulation runs each sprint sequentially one day at a time starting with the first day of the first sprint. SimAgile provides two general types of feedback from the beginning of each day until the end of each day. Feedback may be additional information about the project or feedback may be a decision prompt requiring the PO player to make a decision based on emerging events. An example of an additional information prompt is "Started daily standup" while an example of a decision prompt is a Scrum team member asking to skip the daily standup because he or she prefers to work alone. Decision prompts typically have three predefined responses for the PO player to choose from. The PO player selects the option he or she thinks is best and the choice made affects what happens later in the day impacting project and team performance.

At the end of each week, a report on the team's performance is provided. The report includes a Kanban board, a burndown chart, a velocity trend report, and a log with a history of all information received and decisions made. The Kanban board shows user stories that will be worked on soon, user stories that are in progress, and user stories that have been completed. The burndown chart lists the user stories completed in a sprint relative to the number of stories planned for the sprint. The velocity trend report displays the velocity of each sprint along and the average velocity of all sprints completed so far. The log has a history of everything that transpired each day of the two-week sprint, including the informational prompts, decision prompts, and PO player decisions made. The PO player reviews all information provided and adjusts his or her plan accordingly. Game play continues for a series of four two-week sprints. If the PO player and Scrum team deliver all MVP user stories by the end of the fourth sprint, the project is considered a success.

4. ASSIGNMENTS AND CURRICULUM

SimAgile provides a realistic, immersive experience on what it is like to be a PO on a Scrum team. To enhance the SimAgile learning experience, several additional assignments have been created by the instructors and are assigned to students. Specifically, students completing the simulation are required to create a project charter, create a product roadmap and release plan, refine the initial product backlog, and, at the conclusion of the simulation, write a reflection paper discussing their thoughts about the simulation and the Scrum process. Finally, after completing all assignments related to the project, students are asked to complete an ELS (Clem et al., 2014) and identify PO competency requirements based on the competencies identified in the MSIS 2016 curriculum (Topi et al., 2016). ELS and MSIS 2016 are used to help assess the primary learning objectives of students understanding the role of the PO in the context of a Scrum project and the competencies required to be an effective PO working on a Scrum project.

Figure 1 illustrates the workflow of the Scrum process with instructor-created and simulation assignments. Activities with a yellow star represent assignments that take place outside SimAgile and were created by the instructors to add realism, assess student immersion, and assess student learning. Activities with a yellow cylinder occur in SimAgile and are depicted inside the four dashed two-week timeboxes. SimAgile Scrum activities include sprint planning, sprint execution, daily standups, sprint done, sprint review, and a sprint retrospective. The story-writing workshop has a light background as all user stories are provided up front by SimAgile and students do not need to complete a workshop to write user stories. The provided user stories are used as input to the product roadmap and release-plan assignment. Student assessment activities occur after all Scrum project activities are completed and are depicted inside the dotted rectangle.

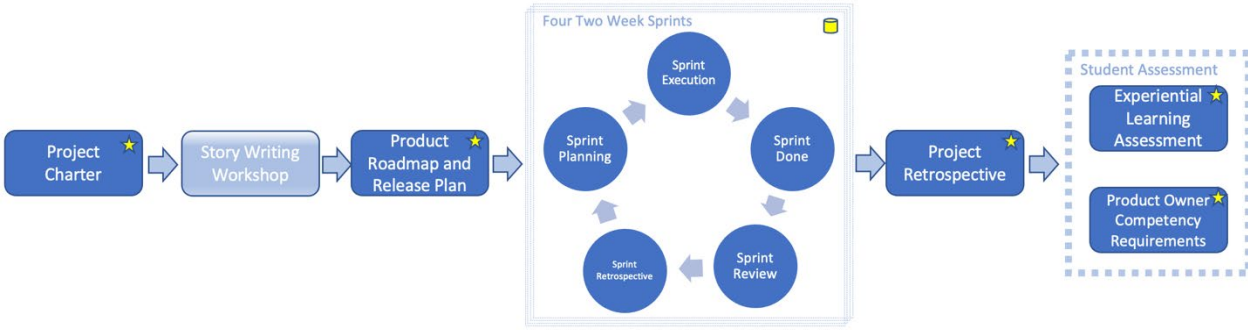

Figure 1. Simulation and Scrum Workflow Assignments

Samples of the project charter, release plan, project retrospective, and PO competency-requirement assignments have been provided in Appendices A, B, and C. If teaching graduate students, it is recommended to include all assignments in the appendices. If SimAgile and Scrum workflow assignments are to be used in an undergraduate class, it is recommended to use only the assignments in Appendices A and B and make the assignment in Appendix C optional or taught as part of an instructor-led class discussion.

The two assessment activities at the end of the Scrum flow were created by the instructors to assess the level of student immersion in the simulation and the level of student understanding of PO competency requirements. The first assessment activity that students complete is the ELS (Clem et al., 2014) which is a 28-item survey used to measure student immersion and engagement and provides scores of students' perceptions of the simulation's authenticity, level of active learning, relevance, and utility. Students respond to each of the ELS questions, found in Table 1, based on their experiences with SimAgile providing responses along a 7-point Likert scale (1 = Strongly Disagree to 7 = Strongly Agree). Clem et al. (2014) demonstrated that the ELS subscales can be scored by summing the responses from these items and that high scores indicate a high level of perceived value of the experience-based learning activity.

The second assessment activity is the PO competency requirement assessment, which leverages MSIS 2016 and is also administered at the end of the simulation activities and retrospective. MSIS 2016 defines 9 information systems (IS) competency areas, and 88 individual IS competency categories that collectively define the universe of IS competencies associated with the teaching and practice of IS (Topi et al., 2016). The 9 competency areas include: IS Strategy and Governance; Innovation Organizational Change, and Entrepreneurship; Enterprise Architecture; IS Management and Operations; Systems Development and Deployment; IT Infrastructure; Data, Information, and Content Management; Business Continuity and Information Assurance; and Ethics, Impacts, and Sustainability (Topi et al., 2016). Each of the 9 competency areas contains between 4 and 10 competency categories. Competency categories refer to a group of related competencies and are hereafter referred to simply as competencies. The PO competency requirement assignment requires students to evaluate competencies within each of the 9 competency areas of MSIS 2016 to identify what competencies they think are needed most to be a successful PO. The PO competency assignment requires students to synthesize knowledge gained from SimAgile and Scrum workflow assignments and identify the two most important competencies in each of the 9 competency areas. The PO competency assignment may be found in Appendix C and a discussion of the results is provided in Section 5 as supporting evidence for the effectiveness of the overall pedagogical approach.

Scrum is a complex process, and the role of the PO is often difficult to understand given the broad base of knowledge required to be a PO. The simulation and complementary Scrum workflow assignments described above provides students with an opportunity to experience the PO role in a realistic, immersive fashion so that students have a better understanding of the PO role and the competencies required to be an effective PO.

5. EVIDENCE

To provide evidence for the support of the benefit of using the simulation and Scrum workflow assignments in Figure 1, details regarding a recent classroom implementation are provided. The simulation and Scrum workflow assignments were assigned to a graduate class on agile project management at a large research-intensive university. The class included MS and MBA students from a variety of backgrounds. Twelve students working in teams of three completed the simulation and Scrum workflow assignments in Figure 1 with each team assuming the role of the PO player in SimAgile. Groups were used instead of having students work individually as groups have been shown to provide higher levels of experiential learning than when completing the simulation alone (Hefley & Thouin, 2017). After completing the simulation and Scrum workflow assignments, students were given two assessment activities. One of the two assessment activities was ELS and was used to assess the level of experiential learning. The second assessment activity required students to review all competencies and competency areas in the MSIS 2016 and identify the most important competencies for being an effective PO. Details of both post-simulation assessments follow.

5.1 Experiential Learning Survey Assignment

In the ELS, students evaluate the degree to which they agree or disagree with 28 different questions using a 7-point Likert scale of Strongly Disagree (1), Disagree (2), Somewhat Disagree (3), Neither Agree nor Disagree (4), Somewhat Agree (5), Agree (6), and Strongly Agree (7). ELS questions pertain to the

ELS Questions (7-point Likert Scale)	**Mean Response** (n = 12)
Authenticity (Questions 1 - 5)	
1. The setting where I learn helps me understand the material better.	6.53
2. I expect real-world problems to come up during this learning experience.	6.47
3. The simulation does not enhance the learning experience.[1]	5.47
4. The learning experience requires me to interact with people other than students and teachers.	4.06
5. I expect to return to an environment similar to the one where this learning experience occurs.	4.76
Mean Authenticity	**5.46**
Active Learning (Questions 6 – 12)	
6. I am stimulated by what I am learning.	6.29
7. The learning experience requires me to do more than just listen.	6.76
8. The learning experience is presented to me in a challenging way.	5.41
9. I find this learning experience boring.[1]	6.12
10. I feel like I am an active part of the learning experience.	6.18
11. The learning experience requires me to really think about the information.	6.12
12. I am emotionally invested in this experience.	5.88
Mean Active Learning	**6.11**
Relevance (Questions 13 – 21)	
13. I care about the information I am being taught.	6.53
14. The learning experience makes sense to me.	5.94
15. This learning experience has nothing to do with me.[1]	6.06
16. This learning experience is enjoyable to me.	5.88
17. I can identify with the learning experience.	5.59
18. This learning experience is applicable to me and my interests.	5.88
19. My educator encourages me to share my ideas and past experiences.	6.59
20. This learning experience falls in line with my interests.	5.94
21. I can think of tangible ways to put this learning experience into future practice.	6.12
Mean Relevance	**6.06**
Utility (Questions 22 – 28)	
22. This learning experience will help me do my job better.	5.59
23. This learning experience will not be useful to me in the future.[1]	5.18
24. I will continue to use what I am being taught after this learning experience has ended.	6.12
25. I can see value in this learning experience.	6.47
26. I believe this learning experience has prepared me for other experiences.	6.06
27. I doubt I will ever use this learning experience again.[1]	5.88
28. I can see myself using this learning experience in the future.	5.94
Mean Utility	**5.89**

Table 1. Experiential Learning Survey (ELS) Results

following four areas – authenticity, active learning, relevance, and utility. Higher scores are associated with higher levels of experiential learning. Table 1 summarizes the results.

As shown in Table 1, all four subscales scored at the high end of their possible range of values with active learning scoring the highest of all four dimensions with a mean of 6.11 on a 7-point scale. The relevance and utility subscales were in the range of "Agree" with scores of 6.06 and 5.89 respectively. The authenticity subscale was the lowest of the four with a mean of 5.46 falling approximately halfway between "Somewhat Agree" and "Agree"; however, one of the questions in the authenticity subscale asks about the level of interaction with people other than students and teachers. Given the context of the assignments and the fact that this was a classroom exercise, this item scored lowest of all questions and negatively impacted the authenticity subscale. Furthermore, PO players may also be perceiving non-player characters they are interacting with throughout the simulation as objects rather than as social persons with whom they have empathy and a relationship (Harth, 2017). If the one item pertaining to interaction with people other than students and teachers were removed from the scale, the mean authenticity score increases to 5.81, falling in the range of "Agree" resulting in all four subscales of experiential learning being rated "Agree." In sum, ELS results indicate students engaged in the simulation and Scrum workflow assignments depicted in Figure 1 agreed that they experienced high levels of authenticity, active learning, relevance, and utility.

Competencies
Conducting IS strategic analysis
Manage plan based, hybrid and agile development approaches
Managing IS projects and programs
Identifying opportunities for and designing process improvement
Monitoring emerging technologies to understand their potential to support the domain
Fostering an ethical culture
Maintaining compliance with legislation, regulations, and standards
Capturing and structuring data and information requirements using appropriate conceptual modeling techniques
Communicating and deploying an enterprise architecture
Explaining enterprise architecture principles to justify the value enterprise architecture provides to organizations within various types of domains.

Table 2. Top MSIS 2016 Competencies Required to Be an Effective Product Owner

5.2 PO Competency Requirements

The PO competency assignment required students to read MSIS 2016 and identify the most important competencies needed to be a successful PO. Specifically, the assignment asked students to identify the two most important competencies in each of the nine competency areas of MSIS 2016. MSIS 2016 contains a total of 88 competencies and competencies appearing in a fifty percent or more of student responses were identified as important PO competencies. Table 2 summarizes the findings.

A review of the competencies listed in Table 2 indicates a high level of face validity with respect to students' abilities to identify the skills and competencies needed to be an effective PO. Students identified 10 out of a total of 88 competencies from MSIS 2016. As expected, required competencies come from seven different competency areas indicating the PO has to have broad knowledge in multiple areas. Furthermore, students indicated that PO competencies include conducting IS strategic analysis; managing IS projects and programs; managing plan based, hybrid and agile development approaches; identifying opportunities for and designing process improvement; and fostering an ethical culture. These competencies are consistent with the skill and competency requirements noted earlier. The results of the PO competency requirement assignment indicates that students understand the PO role after completing the SimAgile simulation and corresponding assignments.

5.3 Student Feedback

In addition to the ELS and PO competency requirement assignments, students were able to provide comments and feedback on their experience with SimAgile and Scrum workflow assignments during an end of semester course evaluation. A total of 12 students (a 100% response rate) provided written feedback. Comments that directly related to the SimAgile, and Scrum workflow assignments were reviewed and analyzed. Three students commenting on their experience with SimAgile stated that "The in-class SIM was my favorite," "I liked the simulation," and "The best and most helpful part was the Agile simulation." Furthermore, students from non-software backgrounds with limited exposure to Scrum and the PO role found SimAgile and Scrum workflow assignments helpful and useful. One student commented "I believe the Agile Simulation is a great way to practice Agile methodologies. I am still learning more about Agile to incorporate in manufacturing, but this technique for practicing best practices and methods is very useful." Another student stated, "I didn't enjoy at first, because I use traditional project management methods, but later found that the methods and techniques are widely used in the software industry." Finally, the collaborative nature of the simulation had a positive impact on the student learning environment with one student commenting "We did a lot of collaborative work with the simulation in his class. That was very helpful and fun." None of the comments provided included anything negative about student experience with SimAgile and related Scrum workflow assignments and the overall qualitative feedback was extremely positive.

6. DISCUSSION

Having an effective PO is an important component for high-performing Scrum teams and delivery of high-value software. POs require a broad range of knowledge, skills, and competencies and learning outcomes are optimized when students have an opportunity to experience the PO role firsthand from beginning to end over the life of a project. The simulation and Scrum workflow assignments illustrated in Figure 1 outline an approach for providing students with an experience that mirrors real world Scrum projects. Students begin by creating a project charter to define the purpose and objectives of the project. Next, students create a vision for the product to highlight business value and demonstrate business alignment. This is followed by product backlog refinement and the creation of a product roadmap and release plan. The refinement process requires students to develop decision rules for prioritizing user stories in the product backlog from most important to least important based on user story characteristics and business objectives. The refined product backlog is used to define major product releases and release dates with each product specifying a collection of user stories from the product backlog. All of the activities described are typical of a PO working on a Scrum project. Once the charter and release plan have been created, students have the opportunity to execute the project in an interactive computer-based agile simulation over the course of a series of four two-week sprints. The end result provides students with a holistic, inclusive experience of the PO role in the context of a Scrum-based project.

Assessment of student immersion, students' ability to identify essential product owner competencies, and student feedback highlights the effectiveness of the approach. ELS results indicate that students perceive that the simulation and Scrum workflow assignments provide a high level of authenticity, active learning, relevance, and utility. Active

learning has been shown to be a contributor to effective learning environments.

Students were also able to successfully identify MSIS 2016 competencies required for being an effective PO as evidenced by the list of competencies in Table 2. The PO role requires a broad range of skills with the competencies identified coming from 7 different competency areas of MSIS 2016. Furthermore, competencies such as managing plan-based, hybrid and agile development approaches; managing IS projects and programs; and identifying opportunities for and designing process improvement are closely aligned with the PO role.

Student feedback regarding the experience with SimAgile was overwhelmingly positive. Two students stated that the simulation was their favorite part of the class. In addition, two different students with no prior background in Scrum or the PO role found the simulation to be very helpful providing support for using the simulation and Scrum workflow assignments to teach those new to Scrum. Finally, working on the simulation and Scrum workflow assignments as part of a group was stated to be beneficial.

7. CONCLUSION

This Teaching Tip provided detailed guidance on an effective approach for teaching the PO role in a classroom setting. The use of SimAgile when combined with supplemental and complementary Scrum-based assignments provided a rich, immersive experience that replicates the PO role in a Scrum project. Students completing the simulation and Scrum workflow assignments agreed that the experience provided high levels of authenticity, active learning, relevance, and utility. Furthermore, students were able to identify appropriate competencies of effective POs. Identified competencies included strategic analysis, managing projects, managing agile development, identifying opportunities for process improvement, and monitoring emerging technologies. Finally, student comments on the value of the simulation and Scrum workflow assignments were extremely positive.

This study is not without limitations. First, one of the key activities of a PO concerns the creation and modification of user stories. Initial user stories are typically written in a story writing workshop facilitated by the PO and involve subject matter experts. The Scrum workflow assignments did not include a story writing workshop as SimAgile provides all user stories ahead of time and these pre-defined user stories are required for the simulation to function. A second limitation concerns the competency requirements of a PO. While the list of 10 competencies identified appear to have a high degree of face validity and a review of all 88 MSIS 2016 competencies indicates nothing major was omitted, the appropriateness of the competencies identified have not been validated. Future studies will explore the creation of PO competency profiles based on input and feedback from industry experts.

Demand for POs is growing exponentially and the need for effective techniques to teach the PO role in a classroom setting is growing just as rapidly. This Teaching Tip provides instructors with a valuable approach for providing a classroom environment that closely mirrors the PO experience over the life of a Scrum based project. The use of an experiential learning computer simulation, combined with complementary Scrum workflow assignments provides students with an authentic, relevant, useful, active learning experience. Furthermore, students completing the simulation and Scrum workflow assignments are able to identify competencies required to be an effective PO increasing their understanding of the PO role. The complex nature of the PO role makes it challenging to teach in a traditional classroom room setting and the pedagogical approach discussed in this Teaching Tip was shown to be highly effective for helping students understand and learn the PO role in Scrum.

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AUTHOR BIOGRAPHIES

Mark F. Thouin is clinical professor at the University of Texas at Dallas where he teaches graduate and undergraduate courses in information systems. His research interests include the study of the project management, experiential learning, and postsecondary leadership and administration.

William E. Hefley is clinical professor at the University of Texas at Dallas where he teaches graduate and undergraduate courses in information systems and project management. His research interests include the study of business value of IT, IS and cybersecurity workforce management and development, outsourcing relationships, and experiential learning.

APPENDICES

Appendix A. Sample Project Charter and Release Plan Assignment

Benefits and Administration Agile Team (BAAT) Project Charter and Release Plan Assignment
Read the Project Overview document found in SimAgile and review the initial product backlog of 41 user stories. Use this information to answer the questions listed below. The Overview document may be found in SimAgile by selecting "Overview" in the top right corner after login and the initial product backlog may be found by selecting "Product Backlog" after login.

Part 1 - Project Charter (20 points)
Create a project charter based on information in the SimAgile Overview document. Your project charter should include the following sections.

- Project Name
- Project Description
- Project Purpose
- Measurable Objectives and Success Criteria
- Summary Milestone Schedule
- Project Budget
- Name of the Product Owner
- Name of the Project Sponsor
- Name of the Scrum Master

Part 2 - Product Vision (20 points)
Use the BAAT Project Overview document and initial product backlog to develop a vision statement. The vision statement should be clear concise description of the product clearly describing the value of the product. Please refer to the class notes for advice and tips on creating a good vision statement.

Part 3 - Release Plan (20 points)
Analyze all 41 user stories in the initial product backlog and create a product roadmap/release plan. The product roadmap should clearly identify the release date for the minimally viable product and the release date(s) of any subsequent versions. When developing your release plan, assume an average velocity of 30 story points per sprint and a total of four two-week sprints. How many releases total do you have planned?

List the date of each release and provide a short, descriptive name for each release.

Part 4 - Grooming the Product Backlog (20 points)
Groom your entire product backlog and describe the approach you used to groom the product backlog. Specifically list and describe the rules you used to prioritize your product backlog.

Paste a copy of your groomed, prioritized product backlog below indicating which sprint each user story will be worked on.

Part 5 - JIRA Software (20 points)
Create a free account on JIRA Software using the following link https://www.atlassian.com/software/jira/pricing. Use the information provided in parts 1, 2, 3 and 4 to create a new BAAT project on the JIRA Software platform. Use the JIRA Scrum template and import all user stories into the JIRA platform. Populate as much other content as possible for your project in JIRA. Paste a screenshot of each page of JIRA below.

Appendix B. Sample Project Retrospective Assignment

Project Retrospective

The next three questions pertain to your thoughts about the performance of the BAAT project team across all four sprints after the project has completed.

1. How many total story points did your BAAT project team deliver in your best execution of the simulation? What was the average velocity, minimum velocity, and maximum velocity (in story points) for the project across all four sprints?

2. Describe three things that positively impacted the performance of the BAAT project team.

3. Describe three things that negatively impacted the performance of the BAAT project team.

4. As a result of executing the SimAgile, discuss three lessons you learned related to how you will manage projects and people in the future.

Appendix C. Sample Product Owner Competency Requirements Assignment

The MSIS 2016 Global Competency Model for Graduate Programs in Information systems (MSIS 2016) defines 9 information systems (IS) competency areas, and 88 individual IS competency categories that collectively define the universe of IS competencies associated with the teaching and practice of IS.

The 9 competency areas include IS Strategy and Governance; Innovation Organizational Change, and Entrepreneurship; Enterprise Architecture; IS Management and Operations; Systems Development and Deployment; IT Infrastructure; Data, Information, and Content Management; Business Continuity and Information Assurance; and Ethics, Impacts, and Sustainability. Each of the 9 competency areas contains between 4 and 10 competency categories. Competency categories refer to a group of related competencies and are hereinafter referred to simply as competencies.

For each of the 9 Competency Areas listed in Appendix A of MSIS 2016 Global Competency Model for Graduate Degree Programs in Information Systems, identify what you think are the two most important competencies in each area needed to be a successful Product Owner. Justify your response. The following template has been provided to assist you with your response.

Two Most Important Competencies in the Area of Business Continuity and Information Assurance (BCIA)
Competency:
Competency:
Why are the above two BCIA competencies the most important needed to be a successful Product Owner?

Two Most Important Competencies in the Area of Data, Information, and Content Management (DATA)
Competency:
Competency:
Why are the above two DATA competencies the most important needed to be a successful Product Owner?

Two Most Important Competencies in the Area of Enterprise Architecture (EARC)
Competency:
Competency:
Why are the above two EARC competencies the most important needed to be a successful Product Owner?

Two Most Important Competencies in the Area of Ethics, Impacts, and Sustainability (ETIS)
Competency:
Competency:
Why are the above two ETIS competencies the most important needed to be a successful Product Owner?

Two Most Important Competencies in the Area of Innovation, Organizational Change, and Entrepreneurship (IOCE)
Competency:
Competency:
Why are the above two IOCE competencies the most important needed to be a successful Product Owner?

Two Most Important Competencies in the Area of IS Management and Operations (ISMO)
Competency:
Competency:
Why are the above two ISMO competencies the most important needed to be a successful Product Owner?

Two Most Important Competencies in the Area of IS Strategy and Governance (ISSG)
Competency:
Competency:
Why are the above two ISSG competencies the most important needed to be a successful Product Owner?

Two Most Important Competencies in the Area of IT Infrastructure (INFR)
Competency:
Competency:
Why are the above two INFR competencies the most important needed to be a successful Product Owner?

Two Most Important Competencies in the Area of Systems Development and Deployment (SDAD)
Competency:
Competency:
Why are the above two SDAD competencies the most important needed to be a successful Product Owner?

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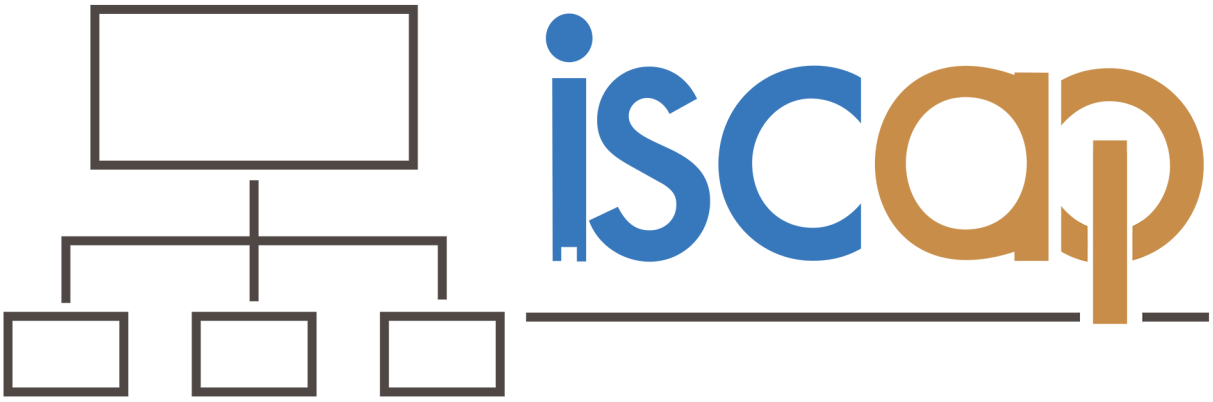

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