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Rewards and Challenges in Adopting Agility in an Academic Department

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Over the past 50 years, there has been little change in the way that most academic departments in universities across the United States conduct their day-to-day affairs. Based on the research of Hobbs and Anderson [1], which reported the results of surveying thirty-eight departments ranging from R1 universities to small private universities shows that, typically there are number of faculty who either volunteer for a task or are given a task that is associated with different aspects of department operations. These assignments are either based on faculty interest or expertise. Usually, if a task is assigned to a committee, some members of the committee would perform most of the work, and the rest either provide input or review the work product. There are number of issues associated with this model [1].

- Only a handful of faculty will participate in the day-to-day operation of (service for) the department. Sometimes this allows several faculty members to stay under the radar avoiding to be assigned to the department service. On the other hand, some faculty will become the "suckers" and get increasingly more service tasks assigned to them [2].
- Given the fact that some faculty may end up getting away with little or no service contribution, service is typically perceived as less important than teaching and scholarly activity, therefore this exacerbates the problem as more faculty may try to get out of any service responsibility.
- There is very little cross-training for those who participate in service activities. For example, since assignments are based on the individual interest and expertise of the faculty, there is little opportunity for other faculty to learn about these service tasks. In this case, junior faculty get the opportunity to only learn about a service task, based on their initial assignments, but as they move through the ranks, they usually get assigned to the same type of tasks again and again.

The research work of O'Meara, et al [2] points to three possible approaches that can potentially eliminate some of these issues, which are as follow:

- Adding transparency by creating a faculty service activities dashboard, which allows everyone to know who is participating in what type of service activities. This dashboard can potentially provide an opportunity for an inconvenient, but necessary conversations that can result in better equity in service activities.
- Eliminating ambiguity in what is expected of each faculty to contribute to service. Additionally, define each service activity as a low, medium, or high impact (workload), that way faculty have a better understanding of each faculty contribution to the service of the department
- Adopting a Department opt-out policy rather than the opt-in policy for the service. This way, rather than volunteering for a service activity, faculty must have a good excuse for getting out of service activity. Thus, reducing the opportunity for faculty who wish to "stay under the radar" when it comes to the department service.

Unfortunately, few departments have taken any initiative to address this lack of equity between the faculty service activities. Many reasons contribute to the lack of innovation in department service operations, which includes;

- ***Apathy***, many departments think that "if it is working fine, why do we need to change it. In other words, no one is complaining about the situation?" Or even worse, "they don't want to open that can of worms" [2].
- ***Low priority***, since faculty are not being assessed on how the department service is run, faculty focus their efforts on what makes them more competitive (e.g., research

expenditure, publication, producing higher quality graduates, increasing enrolment, etc.)

- ***Change is hard,*** faculty and department heads think that since they are only one department in this big university, even if they change their practices, they cannot change the rest of the university.

Over the last three years, the Department of Electrical Engineering and Computer Science (EECS) at Embry-Riddle Aeronautical University (ERAU) has been involved in a project funded by the NSF IUSE-RED (Revolutionizing Engineering Department) program, with the main objective of changing the individualistic culture of the department. We believe that reducing the individualistic culture of the department could potentially improve the productivity and the quality of the faculty in the areas of service, research, and teaching respectively. To accomplish this goal, we adopted agile techniques from software development, specifically Scrum, to provide a framework to follow for teamwork.

The three pillars of the Scrum framework [3-6] are (a) Transparency (Data and Analysis), (b) Inspection (Reviews and Testing), and (c) Adaptation (Process Improvement). Scrum is a framework to facilitate productivity by prioritizing tasks with the highest value and working in short time increments within a "inspect and adapt" framework (Figure 1). As it is shown, there are three defined roles identified as part of the Scrum framework. The Product Owner, has the responsibility of identifying the product requirements (backlog items), and prioritizing them based on the customer preference. The Scrum Master who is the custodian of the process, and as such is responsible for the process improvement and adopting best practices, while removing the barriers which prevent the team's progress. Finally the Team, which includes the Scrum Master, who is responsible for the product development. There are four types of meeting in the scrum framework, and these are: stand up, review, retrospective and planning meetings. The stand-up meeting, which lasts no longer than 15 minutes, is where the team members provide information about what they have accomplished since the last meeting, what they plan to work next, and finally if they face any impediments that could potentially prevent them from achieving their goal or slow them down. In addition, the remaining three meetings take place at the completion of a sprint, and these are: review (of the product) and retrospectives (review of the process), and planning which takes place before the start of the next sprint. Project requirements can be adjusted during the development process, by incorporating results from regularly occurring reviews by customers and other stakeholders. Initially Scrum was used in the software industry, but in recent years, it has been adopted by a variety of other industries, such as the military, automobile, and business, to name a few.

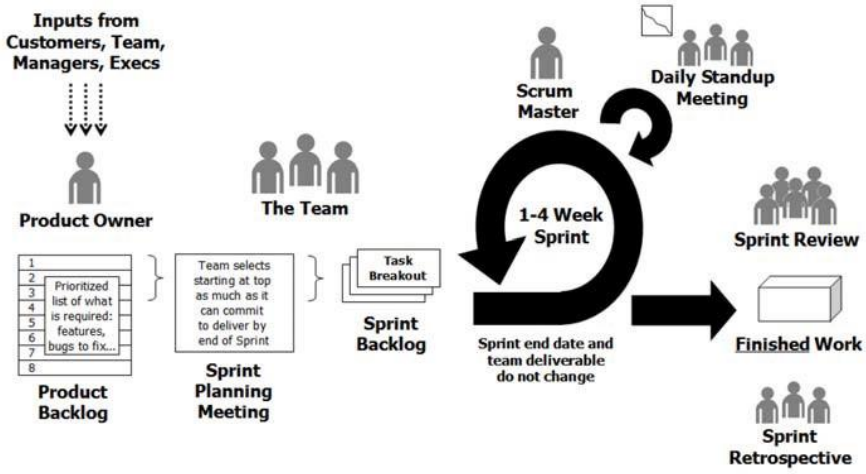

Figure 1. Scrum Process (Sutherland and Schwaber)

Over the past three years, we have adopted the Scrum framework as a change strategy for the operation of the EECS department. During the last couple of years, we have established several pilot projects, where the faculty, staff, and students worked together to deliver products that were useful to the department. The majority of these activities are directly associated with the departmental service activities. The department made the commitment to have every member of the faculty and staff participate in at least one service project using the Scrum framework. Some examples of these projects include, graduate students recruiting, curriculum modification, ABET preparation and the follow-up response, internal university program review, and others. As the project name implies, each team was responsible for delivering a set of products at the completion of their projects.

The project evaluator team includes one faculty outside of the EECS department, and another faculty outside of ERAU. The evaluators, have conducted a number of surveys and interviews in the recent year, in order to identify the advantages and disadvantages of the Scrum adaptation, as perceived by faculty. Some of the techniques that are used by the project evaluator include, one-to-one confidential interview with each member of the faculty, review and analysis of the recording of the Scrum teams Review and Retrospective meetings, short confidential surveys regarding the use of the Scrum framework and its affect in the department organization, and others. The data collected by the evaluator has been assessed and analyzed. Based on these data, number of rewards and challenges have been identified since the inception of the project, these items are discussed below.

Rewards:

- ***Improved community of participants (faculty, staff, and students):*** Given the fact that we have made the commitment to have every member of the faculty and staff participate in at least one project, we reached 100% participation by the faculty and staff in the service area. In addition, as it was suggested by O'Meara, by establishing the transparency (one of the pillars of Scrum), every member of the team was almost forced to actively participate in the development of the product.
- ***Frequent interaction leading to more efficient product delivery:*** Part of the Scrum framework, requires frequent meetings. This allows the team members to share with each other their accomplishments and challenges. Due the nature of academia, we adopted a total of three stand-up meetings (15 minutes each) over a two-week period, and a single end of the sprint (one hour) every other week, which supports the current sprint review and retrospective, and the next sprint planning. Therefore overall, every two weeks the team met for one hour and forty-five minutes. This is fifteen minutes less than a typical department service meeting, which lasts at least one hour every week. However, the frequency of these meetings forced the team members to make progress almost every other day, which eliminated the typical mad dash at the end of the project to finish the project. In addition, the resulting product was of a higher quality due to the iterative nature of work on the product frequently through the duration of the project, instead of just at the end.
- ***Sense of ownership and buy-in for the final product:*** Since every member of the team was responsible for the development of the product; the team demonstrated a higher sense of product ownership and buy-in for the project final product.

Challenges:

- ***Team accomplishments rather than individual accomplishments:*** Even though, there is an increase in the collaborations between the faculty because of Scrum adaptations, some

junior faculty raised the issue that this team accomplishment could potentially hurt them during the Promotion and Tenure process (P&T). Unfortunately, some schools may deem the service component of faculty performance not as important as the scholarly and teaching accomplishment. Additionally, some schools' P&T processes value higher the faculty with individual accomplishments in comparison to faculty with collaborative accomplishments. This is a real concern, however, having the college dean and potentially provost well informed of the project goal and their buy-in could potentially eliminate this concern.

- ***Agile world meets the slow (non-agile) academic environment:*** Changing a culture is a major task, this is even harder when an organization is operating in an eco-system that is used to get things done very slowly. Unfortunately, academic institutions traditionally operate very slowly, for example to make some minor, non-editorial curriculum change, such as introduction of a new course, can take one to two semesters. However, using agile framework, we were able to change the curriculum for a graduate degree in about three sprints (six week) and have all the necessary approvals out of the department. However, these changes were finally approved eight months later (passing only two additional approval stages, which is mainly the review of the proposal).
- ***Potential increased workload for the faculty:*** One of our biggest concerns about making this adaptation was a potential workload increase for team members. Fortunately, based on the survey results, it became obvious that almost all team members agreed that they did not feel any additional workload associated with this process change. On the other hand, some product owners felt that there was some extra workload associated with the process. However, when we asked them if this extra work was more than what they would expect of a workload if they were assigned to be a committee chair for the same project using the old practices, almost all felt the extra work was less than a typical committee chair.

Conclusion

As mentioned previously, academic departments have been stagnant for the last 50 years, this is even more obvious as we look into the equity between the faculty as it relates to the service component of an academic department. Using an agile approach, namely Scrum, has shown that there are valuable rewards in its adoption. We report out that faculty feel an improved sense of community, higher product quality, and a better sense of ownership for products generated. However, there are certain challenges that could impede the adoption of the agile approach. Such challenges include that faculty feel that P&T policies could value team collaborations accomplishments lower than the individual accomplishments. In addition, introducing agility to the department processes may be challenging especially when it still must interface with a non-agile environment. Nonetheless, academic departments have been stagnant for too long and this work aims to incite a change to the culture, bringing new opportunities and seeking to remedy the associated challenges.

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