Soft Skills in Scrum Teams

A survey of the most valued to have by Product Owners and Scrum Masters

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Abstract—**Software development requires professionals with knowledge and experience on many different methodologies, tools, and techniques. However, the so-called soft skills, such as interpersonal skills, teamwork, problem solving and customer orientation to name just a few, are as important as, or even more important than, traditional qualifications and technical skills. Members of scrum teams, particularly the ones performing the roles of Product Owner and Scrum Master, are not exempt of having these kind of skills because of the distinctive duties and responsibilities of these roles in a Scrum team. In this paper we report a field study in which we interviewed 25 experienced Scrum practitioners from software companies in Uruguay to know their points of view about what are the soft skills they consider the most valued to have by the Product Owner and the Scrum Master of a Scrum team. As a result, Communication skills, Customer orientation, and Teamwork appear as the most valued soft skills Product Owner should have, while Commitment, Communication skills, Interpersonal skills, Planning skills, and Teamwork are considered the most valued ones for the Scrum Master.**

Keywords- soft skills; scrum; product owner; scrum master

I. INTRODUCTION

Software development is a highly technical activity that requires people performing diverse roles in software projects, and with knowledge and experience on many different methodologies, tools, and techniques.

However, as people in software projects have to work together in order to achieve project goals, other kind of skills and abilities are also needed, related to the execution of project tasks such as interacting and communicating with teammates and stakeholders, managing time, negotiating with customers, writing reports, presenting project advances, problem solving, and decision making, among others alike.

These skills are examples of a broad compendium of several components like attitude, abilities, habits and practices that are combined adeptly to maximize one's work effectiveness [1], and they are considered as important as, or even more important than, traditional qualifications and technical skills for personal and professional success [2].

This kind of skills are known in literature as "soft skills", "non-technical skills", "people skills", "social skills", "generic competencies", or "human factors".

According to Capretz, the human factor is a make-or-break issue that affects most software projects and thus, an understanding of these factors is important in the context of the practice of software engineering [3].

In a previous study [4], one of the authors identified 17 soft skills that are usually demanded by software companies in Uruguay when hiring new professionals to work in software projects.

During recent years, several software companies in Uruguay have been adopting agile methodologies, particularly Scrum, for managing their software development projects.

Agile software development is carried out through the collaboration between self-organizing, cross-functional teams. Thus, agile teams depend greatly on efficient communication, taking responsibility, initiative, time management, and leadership [5], examples of the above mentioned soft skills.

As explained in [6], Scrum development efforts consist of one or more Scrum teams, each made up of three roles: Product Owner, ScrumMaster, and the Development Team. Of these roles, in this paper we will concentrate on the two of them that are unique and distinctive: Product Owner and Scrum Master.

The data used in the previous study reported in [4] was collected from job ads published in a major national newspaper of Uruguay, and from the database maintained by the Graduate Office of Universidad ORT Uruguay, that receives jobs ads directly from software companies looking for new staff.

In this paper, our purpose is to deepen that previous study to have the "insider" voices of Scrum practitioners about what are the soft skills they consider most valued to have by Scrum team members. Specifically, we wanted to have the separate perspectives of product owners, scrum masters, and team members of Scrum teams about what are the soft skills they consider of most value to have by their teammates, being either the Product Owner or the Scrum Master.

The remainder of this article is organized as follows. In Section II we give an overview of the three Scrum roles. In Section III, and since software engineering research in Uruguay is scarce, we will give a brief overview of Uruguay and its software industry. In Section IV we present the research questions posed for this study, while in Section V we describe the data collection process followed. In Section VI we present the analysis of the collected data and we answer the research

questions. In Section VII we compare the points of view of product owners, scrum masters and team members of Scrum teams regarding the most valued soft skills to perform the distinctive roles of Product Owner and Scrum Master. Finally, in Section VIII we present our conclusions and further work.

II. SCRUM ROLES

Mainly based on [6], what follows is a brief description of the three roles defined in the Scrum framework:

A. Product owner

The product owner is the empowered central point of product leadership. He/she is the single authority responsible for deciding which features and functionality to build and the order in which to build them.

The product owner holds the product vision, and must understand the needs and priorities of the organizational stakeholders, the customers, and the users well enough to act as their voice. In this respect the product owner acts as a product manager, facilitating communication between the team and the stakeholders to ensure that the right solution is developed.

B. ScrumMaster

The ScrumMaster helps everyone involved understand and embrace the Scrum values, principles, and practices. He/she acts as a coach, providing process leadership and helping the Scrum team and the rest of the organization develop their own high performance, organization-specific Scrum approach.

As a facilitator, the ScrumMaster helps the team resolve issues and makes improvements to its use of Scrum, and is also responsible for protecting the team from outside interference and takes a leadership role in removing impediments that inhibit team productivity. He/she also facilitates regular team meetings to ensure that the team progress to its path to "done".

C. Development Team

Traditional software development approaches discuss various job types, such as architect, programmer, tester, database administrator, UI designer, and so on. Scrum defines the role of a development team, which is simply a diverse, cross-functional collection of these types of people who are responsible for designing, building, and testing the desired product.

III. URUGUAY AND ITS SOFTWARE INDUSTRY

With a population of 3.2 million people, Uruguay has positioned itself in recent years as a leading exporter of software in Latin America. In 2013, exports of software and related services reached 300 million dollars, and CEOs of leading companies expect to reach 1 billion dollars by 2020. The main foreign markets are the United States, Argentina, Brazil, Spain, and Canada. At present, there are about 250 companies that produce software, that employs about 4500 professional, and the unemployment rate in this industrial sector is almost zero.

IV. RESEARCH QUESTIONS

We posed two groups of research questions for this study, as depicted below:

- RQ. A: What are the most valued soft skills a *Product Owner* must have, from the point of view of:

    o A1: a Product Owner, A2: a Scrum Master, A3: a development team member

- RQ: B: What are the most valued soft skills a *Scrum Master* must have, from the point of view of:

    o B1: a Product Owner, B2: a Scrum Master, B3: a development team member

Table I shows the cross relationship between these six research questions about Product Owner and Scrum Master.

TABLE I.   RELATIONSHIP OF RESEARCH QUESTIONS

	About...	
	Product Owner	*Scrum Master*
Point of view of... Product Owner	A1	B1
Scrum Master	A2	B2
Team Member	A3	B3

V. DATA COLLECTION

To collect data for this study, we interviewed 25 software engineering practitioners with working experience in Scrum, from 8 software development companies in Uruguay. These 8 companies were selected from the set of companies that posted the job ads used in the previous study mentioned above. Of these companies, 6 declared to use Scrum as an agile methodology and the other two a hybrid of iterative and agile methodologies. Regarding the years in the Uruguayan market, the youngest company is 4 years old, while the older is 23 years old, with an average of 10 years. With respect to the quantity of employees directly involved in software engineering tasks, the smallest company has 5 people, and the biggest one has 390, with an average of 40 people.

As mentioned above, the software engineering professionals interviewed for this work have working experience in Scrum. Four of them have experience as a Product Owner, seven as a Scrum Master, and the other fourteen have experience only as a member of a Scrum team.

In Table II we show the interviewees' minimum, maximum, and average years of experience in performing their respective roles as part of Scrum teams.

TABLE II.   INTERVIEWEES EXPERIENCE WITH SCRUM (YEARS)

Role	Min.	Max.	Avg.
Product Owner	1	2	1.5
Scrum Master	0.75	4.5	3.1
Team Member	0.5	4.5	2.9

During the interviews, we gave the interviewees the list of the soft skills identified in [4] along with a conceptual definition of each skill.

To answer the six research questions, we requested the interviewees to select from that list the soft skills that he/she considers the most valued to have by a Product Owner (A's questions) and by a Scrum Master (B's questions).

VI. DATA ANALYSIS

With the data obtained from the 25 interviewees, the answers to the research questions posed for this study are as follow:

A. *The most valued soft skills a Product Owner must have.*

To answer the research questions A1, A2, and A3, we asked separately to product owners, scrum masters and team members to select the soft skills considered most valued to perform the role of Product Owner.

From the perspective of the four product owners interviewed, the top five soft skills considered most valued to have by a Product Owner (RQ. A1) are shown in Table III.

TABLE III.   TOP FIVE SOFT SKILLS FOR PO (PO'S POINTS OF VIEW)

Soft skills	Times selected	%
Communication skills	4	100
Customer orientation	4	100
Interpersonal skills	3	75
Teamwork	3	75
Analytic, problem-solving	2	50

From the perspective of the seven Scrum masters interviewed, the top five soft skills considered most valued to have by a Product Owner (RQ. A2) are shown in Table VI.

TABLE IV.   TOP FIVE SOFT SKILLS FOR PO (SM'S POINT OF VIEW)

Soft skills	Times selected	%
Communication skills	7	100
Customer orientation	7	100
Planning skills	7	100
Teamwork	7	100
Commitment, responsibility	6	85.7

Finally, from the point of view of the 14 team members interviewed, the top five soft skills considered most valued to have by a Product Owner (RQ. A3) are shown in Table V.

TABLE V.   TOP FIVE SOFT SKILLS FOR PO (TM'S POINTS OF VIEW)

Soft skills	Times selected	%
Communication skills	14	100.0
Commitment, responsibility	10	71.4
Teamwork	9	64.3
Customer orientation	8	57.1
Motivation	8	57.1

B. *The most valued soft skills a ScrumMaster must have*

To answer the research questions B1, B2, and B3, we asked separately to product owners, scrum masters and team members to select the soft skills considered most valued to perform the role of Scrum Master.

From the point of view of the four product owners interviewed, the top five soft skills considered most valued to have by a Scrum Master (RQ. B1) are shown in Table VI.

TABLE VI.   TOP FIVE SOFT SKILLS FOR PO (SM'S POINTS OF VIEW)

Soft skills	Times selected	%
Communication skills	4	100
Interpersonal skills	4	100
Commitment, responsibility	3	75
Organizational skills	3	75
Planning skills	3	75

From the perspective of the seven Scrum masters interviewed, the top six soft skills considered most valued to have by a Scrum Master (RQ. B2) are shown in Table VII.

TABLE VII.   TOP FIVE SOFT SKILLS FOR SM (PO'S POINTS OF VIEWS)

Soft skills	Times selected	%
Communication skills	7	100
Interpersonal skills	7	100
Motivation	7	100
Teamwork	7	100
Commitment, responsibility, Planning skills	6 (each one)	85.7

Finally, from the point of view of the 14 team members interviewed, the top five soft skills considered most valued to have by a Scrum Master (RQ. B3) are shown in Table VIII.

TABLE VIII.   TOP FIVE SOFT SKILLS FOR SM (TM'S POINTS OF VIEWS)

Soft skills	Times selected	%
Communication skills	13	92.9
Interpersonal skills	12	85.7
Leadership	12	85.7
Commitment, resposibility	10	71.4
Planning skills	10	71.4

VII. COMPARING THE POINTS OF VIEW OF PO, SM AND TM

Based on the data shown in Table III to VIII, we found interesting to compare the points of view of product owners, scrum masters and team members with regard of the most valued soft skills for a Product Owner and for a Scrum Master.

In the next two sub-sections we show the results of these comparisons.

A. Comparing the points of view of product owners, scrum masters and team members about the most valued soft skills a Product Owner must have.

For this comparison, we put together the data shown in Table III (point of view of product owners, PO), Table IV (point of view of scrum masters, SM) and Table V (point of view of team members, TM).

TABLE IX.   PRODUCT OWNER: POINTS OF VIEWS OF PO, SM AND TM

Soft skills	PO	SM	TM
Analytic, problem-solving	X		
Commitment, responsibility		X	X
Communication skills	X	X	X
Customer orientation	X	X	X
Interpersonal skills	X		
Motivation			X
Planning skills		X	
Teamwork	X	X	X

Table XI shows the eight soft skills that appears in those tables and, grayed, the ones that are in common from the three perspectives.

From this comparison results that Communication skills, Customer orientation, and Teamwork are the three soft skills that appear as the most valued for a Product Owner, from the perspectives of product owners, scrum masters and team members.

B. Comparing the points of view of product owners, scrum masters and team members about the most valued soft skills a ScrumMaster must have.

For this comparison, we put together the data shown in Table VI (point of view of product owners, PO), Table VII (point of view of scrum masters, SM) and Table VIII (point of view of team members, TM).

Table X shows the eight soft skills that appears in those tables and, grayed, the ones that are in common from the three perspectives.

TABLE X.   SCRUMMASTER: POINTS OF VIEWS OF PO, SM AND TM

Soft skills	PO	SM	TM
Commitment, responsibility	X	X	X
Communication skills	X	X	X
Interpersonal skills	X	X	X
Leadership			X
Motivation		X	
Organizational skills	X		
Planning skills	X	X	X
Teamwork	X	X	X

From this comparison results that Commitment, responsibility, Communication skills, Interpersonal skills, Planning skills, and Teamwork are the five soft skills that appear as the most valued for a Scrum Master, from the perspectives of product owners, scrum masters and team members.

VIII. CONCLUSIONS AND FURTHER WORK

In this paper we reported a field study in which we interviewed 25 software engineering practitioners experienced in Scrum from 8 software companies in Uruguay to know their opinions about what are the soft skills they consider the most valued to have by the people performing the role of Product Owner or of Scrum Master in a Scrum development team.

Based on the data collected on those interviews, to perform the specific role of Product Owner of a Scrum development team, the point of view of product owners, scrum masters and team members are coincident in that Communication skills, Customer orientation, and Teamwork are the most valued soft skills for performing that role.

To perform the role of Scrum Master, the perspectives of the product owners, scrum masters and team members interviewed are coincident in that Commitment, responsibility, Communication skills, Interpersonal skills, Planning skills, and Teamwork are the most valued soft skills to perform this role.

Findings suggest that there are much more coincidences than discrepancies between the perspectives of product owners, scrum masters and team members regarding what are the most valued soft skills software engineering professionals should have to better perform those two specific and distinctive roles defined in the Scrum framework.

As a further work, we are now working with the companies involved in this study to investigate, among other things: a) what impact have these soft skills of product owners and scrum masters in their software projects outcomes, b) what soft skills are found less developed in their product owners and scrum masters, and what actions are the best to take in order to develop those skills to enhance software projects outcomes, c) whether there are other soft skills, beyond the ones used in this study, that are important to perform those roles.

REFERENCES

[1] G. Ramesh and M. Ramesh, *THE ACE of soft skills. Attitude, communication and etiquette for success*. New Dehli: Dorling Kindersley, 2010.

[2] E. Kumar and P. Sreehari, *Comunication skills and soft skills. An integrated approach*. New Dehli: Dorling Kindersly, 2011.

[3] L. F. Capretz, "Bringing the Human Factor to Software Engineering," *IEEE Softw.*, vol. 31, no. 2, pp. 102–104, 2014.

[4] G. Matturro, "Soft skills in software engineering: A study of its demand by software companies in Uruguay," in *6th International Workshop on Cooperative and Human Aspects of Software Engineering (CHASE)*, 2013, pp. 133–136.

[5] L. Bender, G. Walia, F. Fagerholm, M. Pagels, K. Nygard, and J. Münch, "Measurement of the Non-Technical Skills of Software Professionals: An Empirical Investigation," in *26th International Conference on Software Engineering & Knowledge Engineering (SEKE 2014)*, 2014, pp. 478–483.

[6] K. S. Rubin, *Essential Scrum: a practical guide to the most popular agile process*. Upper Saddle River, New Jersey: Pearson, 2013.