A study of McClelland´s Motivations in Relation to software practitioners

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Abstract

Traditionally, empirical research in software development roles has primarily focused on profiling candidates according to their professional competencies. In contrast, recent studies focus on understanding the relationship between the candidates´ personality traits and their disposition towards the tasks framed within their target professional roles. In that same vein, in this study, the authors aim to identify individual motivations among software practitioners to determine how specific motivational engines may relate to roles, specifically in software development using McClelland's motivational theories. While doing so, this study seeks to complement previous discoveries connecting software roles and Myers-Briggs Type Indicators profiling. McClelland's theories state that every individual has one main driving motivator (achievement, affiliation, or power), which people develop through their lived experiences and culture. Our results highlight a prevailing motivation for "Achievement" among the participants, and the distinctiveness of those who perform as project leaders, whose second predominant motivation is towards "Power".

Keywords: McClelland´s motivations and software engineers, software engineer's motivation profile, software engineers' motivational study, motivation and software engineers, software engineering empirical study on McClelland´s motivations.

Introduction

Over the past decade, researchers have been interested in understanding certain human factors that influence the successful performance of software project teams. There is a research project conducting empirical studies involving human aspects in software engineering, specifically profiling software engineering roles based on their personality traits using MBTI (Capretz, 2003; Capretz and Faheem, 2010; Varona and others, 2012a; Varona and others, 2012b; Capretz and others, 2015; Capretz and others, 2019; Lizama and others, 2020) since 2003. Among the most relevant results of that research project may be found (Capretz, 2003; Capretz and Faheem, 2010). As can be seen, both of these studies were aligned towards allocating software development roles based not only on the professional requirements of the role, but also on certain personal characteristics of the candidate that complement the candidate´s professional profile and facilitate his/her later success in the role.

In (Varona and others, 2012a) the authors focus on the technical perspective of the allocation process— evaluating a candidate's generic and specific competences in a way that connects the people with the intellectual skills and mastery of the methods and techniques needed, with the project being developed. Generic competencies are closely linked with the human aspects of software engineering. Among the main results obtained in that research on empirical studies of personal traits and inclinations towards certain software tasks, the following can be singled out: (Varona and others, 2012b; Capretz and others, 2015; Capretz and others, 2019; Lizama and others, 2020).

Furthermore, when focusing on covering all possible perspectives and taking the individual as the center of attention, it is noticeable that it is necessary to evaluate individual motivations in candidates for software development roles. To do this, the authors wanted to examine the individual motivations of a group of 100 software practitioners, with the aim of identifying whether there was a connection between individual motivations and the roles they performed in as software engineers.

Among the theories of human motivations are Maslow's (Maslow, 1943) hierarchy of needs, Herzberg's (Herzberg, 1966) 'satisfaction/ dissatisfaction' as two parallel continuums of equal force, McGregor's (McGregor, 1960) development of self-determination, self-control and maturity of motivation, and finally McClelland's (McClelland) three dimensions: Power, Achievement, and Affiliation it should be noted that the motivational theories of McGregor and McClelland can be understood as one of the steps in the hierarchy of needs pyramid designed by Maslow. While Maslow's theory assumes that one can only move up the hierarchy from more basic needs to the more abstract and philosophical, once the more basic needs have been met, the other theories mentioned, as already noted, focus on measuring specific dimensions in which human needs are expressed. Herzberg and McGregor's theories have been used primarily to create motivational programs in certain contexts such as sports, education, and health (Gagne and Deci, 2005) to give a few examples. However, McClelland's theories have been used more in understanding the motivational needs of individuals than in influencing them towards a particular purpose. For this reason, and because there is also an evaluation mechanism designed and approved by the scientific community - known as the McClelland questionnaire (Sudarsky and Cleves, 1976) -; this theory was chosen to identify motivations in a group of software practitioners.

Method

The goal of this research is to explore studies of software engineering motivations using the motivational theories of McClelland. As such, we surveyed 100 Cuban software practitioners, including Project Leaders, Analysts, Designers, Programmers, and those working in Quality

Assurance and Maintenance related roles. The McClelland motivational questionnaire was used to identify participants' motivation based on McClelland´s three motivational motors: Achievement, Power, and Affiliation. No particular criterion was needed to participate in the McClelland motivational survey, other than a participant´s willingness to do so. However, we did ask the participants to bring a performance evaluation from their managers, based a scale of one to ten points, where one indicates extremely low performance, and ten extremely high performance. The 100 individuals surveyed are a subset taken from a larger group of subjects who achieved a score of eight (8) or above on their performance evaluation. The ratio between genders among the participants was approximately the same, with 49% males to 51% females in the sample, and with a mean of 16 years of experience as a software practitioner.

Results and Discussion

The role distribution among respondents and their experience in that role at the time of the survey can be seen in Table 1. In the same table, one can see how the experience in the roles represents approximately 50% of the total average experience (16 years) as a software developer among the respondents, with the exception of the individuals working in Quality Assurance and Maintenance related roles. This marked imbalance between roles related to Quality Assurance, and Maintenance may find a basis in previous studies (Capretz and others, 2019; Lizama and others, 2020).

As can be seen in Table 7, there are two well-defined trends among the participants. First, a marked motivation of participants (60% and greater), regardless of the role they perform, towards "Achievement"; and second, that "Affiliation" is a less popular motivation among software practitioners, reaching maximum values of less than 15%. Those in the roles of Analysts and Designers had the strongest motivation towards "Achievement".

Roles	**Qty.**	**Exp.[a]**	**McClelland´s Motivations (%)**		
			Power	**Achievement**	**Affiliation**
Project leader	10	7	40	60	
Analyst	20	8		100	
Designer	17	6		100	
Programmer	20	8	25	65	10
Quality assurance roles	22	5	5	81	14
Maintenance	11	2		91	9

Table 1 Software practitioners´ McClelland motivations (n=100)
[a] Experience in the role expressed in years.

It is interesting to see how the values that represent the motivations towards “Achievement” among the roles related to Quality Assurance and Maintenance resemble the values expressed by individuals who perform in the analysis, and design roles. This may be due to the fact that both pairs— Quality and Maintenance, and Analysis and Design roles are the two extreme faces of the same coin. The first pair is dedicated to verifying and maintaining the same objectives, requirements, and functionalities and the second pair are aimed at the development stages.

In contrast, the values exhibited towards an “Achievement” motivation among individuals in the role of Programmer are almost identical to those as Project Leaders. The authors hypothesize that project leaders are very close to the programming process, so this similarity between the motivations of both roles can be expected. However, it is something that needs to be investigated in greater depth.

Another aspect noted by the authors about Project Leaders is that they are not completely motivated by “Power”. Thus, it is their secondary motivation, after their inclinations for the “Achievement” of the project objectives. This is a positive finding from the point of view of the sustainability of the management model that guides the software industry. However, in the same way that a positive balance between “Power” and “Achievement” motivations in Project Leaders is important, so also, “Affiliation” needs to be a key motivation of Project Managers.

The authors believe that certain personality traits among project leaders, in conjunction with a specialized job skills profile, and being motivated by power and the achievement of defined objectives, have an impact on management styles in software projects that should be further investigated. It is an issue that becomes even more important in an environment that is increasingly betting on agile development methodologies and is being challenged by human resources and the conflict-related management issues that come with it.

Another consideration that arises interest is the motivation towards “Power” among Programmers and the Quality Assurance roles, demonstrating that these roles are, to a certain degree, a supply quarry for the position of Project Leader. The authors were aware of some software projects in which role rotation favors the promotion of programmers and quality insurers to project leaders, but no clear reason for this has been identified in the literature supporting such practices.

Lastly, the authors decided to incorporate, the following two elements as a constraint in the mathematical formalization of the model of assigning people to roles in software development:

1. The predominant motivation of candidates to occupy the roles: Project Leader, Analyst, Designer, Programmer, Quality Assurance and Maintenance related roles, should be focused on the trait of “Achievement”.

2. The candidates for the role of Project Leader must also be motivated towards “Power” as their second prevalent motivation.

The authors also would like to highlight the need for a deeper analysis of leadership and the balance of the three motivations from McClelland’s theories, as well as the study of the influence of the motivation of "Affiliation" predominance for the Project Leader role and its impact on the performance of the team.

Conclusions

There is a primary inclination towards “Achievement” among the software practitioners surveyed, regardless of their role. However, the Analyst and Designer roles have a more marked association with that motivation than do other roles.

For instance, in the case of the Project Leader role, the second predominant motivation is inclined towards “Power”.

“Power” is also the second predominant motivation for those in the Programmer role. However, they differ slightly by also having motivations for “Affiliation” whereas Project Leaders do not.

The relationship of Quality Assurance associated roles to McClelland’s three motivational engines is similar to those of the Programmer, in that they exhibit a balance between all three engines. Nevertheless, in contrast to the Programmer role, Quality Insurers relate more to “Affiliation” than to “Power” making it their second predominant motivation.

The preponderance of motivation-role edges identified in this study will be formalized as constraints on the mathematical formalization of a model for task allocation in software development roles.

Beyond descriptive studies such as the present survey, it is recommended that the study of McClelland's motivations in the context of the software industry be deepened, especially in terms of how it can enhance our understanding of the impact of team members' motivations—particularly the project leader— in the overall performance of the development team.

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Appendix I David McClelland Motives Questionnaire and scoring sheets

#Q.	Question Description	Agree	Disagree
1	People like to tell me their problems because they know I will help them		
2	I am quite effective in getting others to agree with me		
3	I often set goals that are very difficult to reach		
4	I feel any job done should be done thoroughly if you do it at all		
5	I feel confident when directing the work of others		
6	Job titles have meaning and significance		
7	I feel uneasy when I have to tell others what to do		
8	I spend a lot of time visiting with friends and family		
9	In an argument, I can usually win others over to my side		
10	Even when I am feeling ill, I will continue working if it is important		
11	I enjoy the opportunity to exercise control over an organization or group		
12	I enjoy challenging work		
13	I choose hobbies that I can share with other people		
14	I continuously look for ways of doing things better and faster		
15	Opportunities to become widely known are important to me		
16	I am uncomfortable in situations that involve conflict with others		
17	I am somewhat of a perfectionist and like to have things done just right		
18	I prefer to eat lunch on a regular basis with a group of people, rather than by myself		
19	When standing in line, I don't let others get in front of me		
20	I am uncomfortable complaining if I receive bad service in a restaurant		
21	It is important to me to seek feedback on how well I am performing		
22	I would work just as hard whether or not I had to earn a living		
23	I seldom try to draw attention to myself		
24	Being well liked by others is very important to me		
25	I often take new employees under my wing and mentor them		
26	I will not be satisfied until I am the best in my field of work		
27	Possessions that are impressive to others are important to me		
28	I don't like to have the responsibility for directing the work of others		
29	I enjoy competing with others		
30	I enjoy opportunities to influence others		

Table 2 David McClelland Motives Questionnaire

Motives	Give yourself one point for every time you checked "Agree" for the following items:	Add up your total points and insert here:
Affiliation	1, 7, 8, 13, 16, 18, 20, 23, 24, 28	
Achievement	3, 4, 10, 12, 14, 17, 21, 22, 26, 29	
Power	2, 5, 6, 9, 11, 15, 19, 25, 27, 30	

Table 3 David McClelland Motives scoring sheet 1

Plot your score for each of the motives on the graph to determine your motive profile. Your highest score reflects what might be considered to be your primary motive.