How Different Personalities Affect Which Software Tasks People Choose

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Abstract

According to the findings of psychology study, it is a commonly held belief that individuals might not have the required qualities or aptitudes to achieve success in any particular line of work. Therefore, the likelihood of attaining success in a software development project is increased when workers who exhibit specific personality traits are assigned to jobs that are linked with the interests that they themselves have. The manner in which software experts carry out their jobs has a significant impact on the overall process of developing software. For the purpose of this empirical study, a sample size of one hundred software developers from Cuba will be surveyed. These software developers will consist of both teaching staff and students linked with the University of Informatics Sciences in Havana. The goal of this undertaking is to determine whether or if there is a possible association between a person's role preferences and the personality variables that are present throughout the software development life cycle. According to the findings, the most common occupations held by the participants were those of a system analyst, software designer, and programmer. On the other hand, software engineers do not typically take on the tasks of testing and maintenance to the same extent as other software professionals.

Keywords: Human aspects of software development, software life cycle, software psychology, and human considerations in software engineering

Introduction

Software engineering has emerged as a field of study of growing significance over the course of the previous two decades, and this development is expected to continue in the foreseeable future. Software engineering encompasses a wide range of activities, including analysing, designing, developing, testing, and maintaining software. In the modern era, software engineering is merely one of many fields that encompass a vast number of specialised subfields. The human element of software engineering is just as important as the technical expertise that is required, and software engineers need to improve their communication skills in order to improve their ability to connect with users and team members. Software project managers have, for a considerable amount of time, wrestled with the challenge of assigning tasks to teams in a way that maximises the likelihood of a successful completion of the project [1]. There have

been a number of different attempts made to enhance the performance of software by integrating a variety of decision-making processes into the engineering process [3]. The aforementioned ideas are influenced in several ways, including by one's character, their upbringing, and their level of motivation. It is general knowledge that when software engineers are provided with well-defined targets, they are able to considerably enhance their production. A productive interaction between these components can also be the outcome of their mutual dependence on one another. It is a widely held belief that one's performance can be affected by things such as one's internal motivation and the external situation. It is particularly clear in the field of information technology [4, 5] how essential motivation is to the accomplishment of professional objectives. On the other hand, inspiration by itself is not necessarily sufficient to bring about the desired results.

Recognising that external factors are not the only factor in determining employment is another key step in the right direction. Because of this, the productivity of software engineers is determined by a large variety of factors [6]. The majority of research conducted in this area of study has focused on the dynamic relationship that exists between the concepts of motivation and environment. On the other hand, this is the very first study to concentrate entirely on the examination of preferences. It has been suggested by Feldt et al. (7) that environment, by itself, is not adequate to promote performance on a particular task. In this inquiry, we hone in on the role that an individual's personal preferences can have in determining the success or failure of a software development project. In addition to this, it studies the ways in which different personality characteristics may influence a user's preference when it comes to the completion of specific software-related tasks.

Numerous academic studies have been conducted to investigate the connection that exists between the personalities of software engineers and the level of success they achieve in their careers. The fundamental objective of these investigations is to determine whether or not there is a correlation between personality characteristics and various aspects of the software development process. For instance, Choi (2018) and Da Cunha (2019) both take into account a variety of challenges that are associated with programming. The capability-person connection model that Acuna and Juristo [10] developed enables software project managers to delegate responsibilities to members of a team based on the members' preexisting skill sets. According to Acuna et al. (2011), one of the most important aspects of developing high-performing teams is allocating sufficient resources to activities related to team development. They focus on human capacity as the primary focus of their approach, and they provide

management consulting services to small and medium- sized software businesses.

Changing the Big Five strategy in software engineering is something that Ritcher and Dumke (2012) suggest doing through making use of the FMEA tool. When applied to the field of software engineering, the human factor is frequently regarded as a possible risk. The preferences of software engineers were investigated by Capretz and Ahmed [13] in relation to the various stages of the software development life cycle. This analysis entails comparing these phases with the personality characteristics described by the MBTI as well as taking into consideration the soft skills that are stressed in adverts for open positions. According to the findings of these investigations, an individual's personality determines not only their performance and their choice of responsibilities, but also their environment and the amount of motivation that they feel. These elements have the potential to influence the choice of tasks, as well as performance and motivation.

There are a wide variety of psychological examinations that can be utilised for the objectives of behaviour prediction and career guidance. Several different personality frameworks, such as the Keirsey Temperament Sorter and the Five-Factor theory, can be used to gain a better understanding of the influence that an individual's personality has on the tasks involved in software development. The Myers-Briggs Type Indicator (MBTI) is a tool that is frequently utilised in the field of business to make determinations on the personalities of individuals. The Myers-Briggs Type Indicator (MBTI) is a tool that examines a person's preferences along four axes: extraversion/introversion, sensing/intuition, thinking/feeling, and judging/perceiving. Extraversion refers to a person's tendency to be more outgoing while introversion refers to a person's tendency to be more introspective.

The Myers-Briggs Type Indicator (MBTI) classifies individuals into one of two categories determined by their preferences regarding the four pairs of axes: sensing (S) and intuition (N), feelings (F) and logic (T), perception (P) and judgement (J), and extroversion (E) and introversion (I). On the basis of these preferences, we are able to categorise people into one of sixteen distinct groups, each of which is designated by a different four- letter code.

According to the findings of a plethora of research, one of the most important factors influencing a person's level of job satisfaction is whether or not the task they perform is a suitable match for their unique personality.

People that get their energy from social contacts, such as extroverts, have a tendency to be more extroverted and love working in team contexts, whereas introverts are more comfortable working alone and prefer not to interact with others. The manner in which we become aware

of new information constitutes the second aspect of the S-N dimension. People who are more intuitive, for example, are more likely to exhibit a tendency towards researching complicated connections, thinking theoretically, and analysing innovative choices. This is because intuitive people are more likely to be creative thinkers. People who have a preference for the senses, on the other hand, are more likely to be practical, to place a high value on actual experience, and to learn most effectively through the use of sensory data. The third dimension, T-F, focuses on the decision-making processes that are unique to each individual. Intelligent people take great pleasure in undertaking study into phenomena that can be assessed logically and objectively. This type of research can be quite rewarding. The "feeler" mindset can be recognised by a more emotional reaction to different scenarios as well as a leaning towards helping professions as a career choice. In a word, people whose personality types are perceived as perceiving and perceiving tend to gravitate towards activities that require a great lot of adaptability in order to successfully deal with surroundings that are always evolving. On the other side, individuals who have a preference for judging are more likely to be attracted to careers that place an emphasis on order and technique.

The Myers-Briggs Type Indicator, sometimes known as the MBTI, has come under fire for a variety of reasons, including the fact that its statistical design is incorrect and that it has additional constraints. When considering the prospect of being mistreated in a professional or organisational setting, it is vital to act with extreme caution. In spite of this, it is important to point out that the Myers-Briggs Type Indicator (MBTI) is still considered to be the gold standard for conducting personality tests in the field of software engineering [17].

According to Myers (14), the S-N and T-F dimensions of an individual have a significant impact on the likelihood that they will look for work. On the basis of cognitive measurements, the following elements interact to influence the degree to which people are interested in and satisfied with the occupations they have chosen: On the other hand, STs prefer tasks that need the application of past knowledge in order to succeed. They have a keen awareness of their surroundings and pay close attention to the particulars, yet they are unwilling to experiment with different methods. In addition, the purpose of their work is not simply to make use of or improve upon methods that already exist, but rather to generate new information. According to the findings of certain studies, those who think more instinctively (also known as NTs) are more likely to be creative than people whose thought processes are more analytical (also known as STs). This disparity can be explained by the fact that NTs have a greater propensity to recognize patterns and connections and to be open to ideas that extend beyond the data that

is presented to them. Therefore, persons who have neurotically traits have the ability to find innovative principles through the integration of theoretical frameworks and their tendency to generalize. This is possible because of their characteristics. People's points of view are significantly influenced by a variety of factors, including their levels of extroversion and introversion, as well as their levels of judgement and perception.

Research Methodology

This research tries to determine the most suitable career options for software engineers by taking into account the specialized qualities possessed by members of this demographic. It has been demonstrated, through the use of an empirical method, that there is a correlation between the personality type of an individual and the preferences that they have in the field of software engineering. According to the findings of this study, the personalities of engineers have a strong correlation with the hobbies they have a penchant for pursuing. It is absolutely necessary to collect relevant field data in order to have an understanding of the influence that the characteristics of software developers have on output. As a result, a survey was carried out, in which participation was solicited from a representative sample of one hundred software engineers working for the University of Informatics Sciences (UCI) in Havana.

When compared to other colleges, the University of California, Irvine (UCI) does not provide nearly as many opportunities for students and professors to collaborate on software development projects. They have a combined experience in the industry of software development that is equivalent to five years on average. Students and faculty members at the University of California, Irvine (UCI) should be called software practitioners due to the work they have done producing software that is utilised by a large number of people.

The sample for the study consisted of one hundred different Cuban software developers. These developers consisted of both teaching staff and students from upper-level courses offered by the Department of Informatics Sciences Engineering at the University of Informatics Sciences in Havana.

The sample consisted of 93 teachers and 7 students in their final year of high school. Both the instructors and the students had an equal amount of investment in the process, and between them, they had an average of five years of experience working in the field as software engineers. As a result, referring to professors and students at UCI as software developers is a fair description of their work. The primary focus of the company is on the development of software for distribution in markets located in both Europe and Latin America. If a participant

indicated that they were interested in assisting with the research project, they were extended an invitation to take part in the survey.

The gender distribution of the data set had a somewhat higher proportion of females (53%), compared to males (47%). In an effort to eliminate discrimination on the basis of gender, Cuba has issued a decree requiring all colleges to attain and maintain gender parity in their student bodies. The ages of the participants varied from 22 to 23, while the teachers were all between the ages of 23 and 27. The participants were given the MBTI questionnaire, Form M, in Spanish, along with instructions on how to decide which personality type best describes them. Despite the fact that the system was designed to be used for self- assessment, the data analysis was carried out by an onsite assessor who was accredited by the CPP.

Before we started collecting data from the participants, we provided them with role definitions that were unique to the roles that were being researched. At the time that the data was being collected, it was discovered that seven of the sample's members were serving in the capacity of global project managers. At the time that the survey was being conducted, each participant had spent at least five years gaining experience in the software sector. On the other hand, the academics who were a part of the group had, on average, five years of experience in the field of software development. According to the data, there were thirty percent of individuals working on analytical tasks and twenty-eight percent working on programming tasks. Twelve percent were also regarded as subject matter experts due to the fact that they had extensive expertise regarding testing and maintenance. In addition, eleven percent of the persons who participated were given the post of designer, while the remaining participants assumed leadership roles in other initiatives.

After having the participants complete the Myers-Briggs Type Indicator (MBTI), we posed the question of which of the following five jobs they would be best suited for: analyst, designer, programmer, or tester. Instructions on how to indicate whether a person was "neutral," "had no preference," or "favoured a particular perspective" were given to each participant. It was requested of the participants that they put their active software development projects to the side and consider simply about their preferences in a more broad sense.

Results

Table 2 demonstrates that there is only a little presence of dominating poles within each dimension of the MBTI distribution among the sample of one hundred software engineers. This is shown by the fact that the presence of dominant poles is restricted. To be more

specific, the number of people who are extroverts is nearly twice as high as the number of people who are introverts.

The percentage of people who prefer to receive information via their senses is significantly larger than the percentage who prefer to receive information through their intuition. In a similar vein, there are three times as many people who have a preference for logic (75%) as there are those who have a choice for emotion (25%). In addition, there are more people who lean towards having a preference for perceiving (39%) as opposed to sensing (61%), which is the majority.

It is clear that there is an excessive amount of "Ts" and "Ss" in the sample, whilst "Fs" and "Ns" are underrepresented, accounting for just 25% and 28% respectively. This is in relation to the fact that there is an overrepresentation of "Ts" and "Ss" in the sample.

The ESTJ configuration has the largest prevalence among personality types, at 25%, followed by the ESTP configuration, which has a frequency of 15%, and the ISTJ configuration, which has a prevalence of 10%. These three categories of personalities account for a combined total of fifty percent of the total sample. On the other hand, the findings that are presented in Table II suggest that the combinations with the least amount of representation were INFJ and INFP, with only 1% of the participants belonging to each of those types. In a similar vein, the combination of ISFP, ENTP, and ESFJ only accounted for 2% of the total population of the group.

The statistical analysis was performed using a Chi-Square test that did not rely on any parameters. When the distribution of the observed data (Table II) was compared to the distribution of the expected data (Table I), it was found that the former did not demonstrate statistical significance (p = 0.001) in the comparison. Table III contains the findings that pertain to the roles that individuals choose to play. The table provides information regarding the personality type, the number of people who fall into each group, and the number of people who have a preference for each of the roles. There is a lot of competition for jobs in the fields of analysis, design, and programming; however, the position of analyst is the one that gets the most attention. On the other hand, respondents indicated that testers and maintainers were the roles they valued the least. Before asking the participants about their preferences, they were given education on the definitions of each presentation role. This was done before the questioning began.

References

[1] T. DeMarco and T. Lister, Peopleware: Productive Projects and Teams, 2nd ed.., Dorset House, 1999.

[2] B. Curtis, W.E. Hefley and S.A. Miller, Pople Capability Model (P-CMM), technical reportno. CMU/SEI-2001-MM-001, Software Engineering Institute, Carnigie Mellon University, 2001.

[3] R. van Solingen, E. Berghout, R. Kusters and J. Trienekens, "From process improvement to people improvement: enabling learning in software development," Information and Software Technology, vol. 42, pp. 965-971, 2000.

[4] T. Hall, H. Sharp, S. Beechman, N. Badoo and H. Robinson, "What do we know about motivation?" IEEE Software, pp. 92-94, 2008.

[5] M.J. Gallivan, "Examining IT professionals' adaptation to technological change: the influence of gender and personal attributes," SIGMIS Database, vol. 35, no. 3, pp.28-49, 2004.

[6] J.E. Moore, "One road to turnover: an examination of work exhaustion in technology professionals," MIS Q., vol. 24, no. 1, pp. 141-168, 2000.

[7] R. Feldt, L. Angelis, R. Torkar and M. Samuelsson, "Links between the personalities, views and attitudes of software engineers," Information and Software Technology, vol. 52, no. 6, pp.611- 624, 2010.

[8] K.S. Choi, F.P. Deek,, and I. Im, "Exploring the underlying aspects of pair programming: The impact of personality," Information and Software Technology,vol. 50, no. 11, pp.1114-1126, 2008.

[9] A.D. Da Cunha and D. Greathead, "Does personality matter?: an analysis of code-review ability," Communications of ACM, vol. 50, no. 5, pp. 109-112, 2007.

[10] S.T. Acuna and N. Juristo, "Assigning people to roles in software projects," Software: Practice and Experience, vol. 34, pp. 675-696, 2004.

[11] S. T. Acuna N. Juristo, and A.M. Moreno, "Emphasizing human capabilities in software development," IEEE Software, vol. 23, no. 2, pp. 94-101, 2006.

[12] K. Ritcher and R. Dumke, Modeling, Evaluating, and Predicting IT Human Resources Performance, CRC press, 2015

[13] L. F. Capretz and F. Ahmed, "Making sense of software development and personality types," IEEE IT Professional. IEEE Press, vol. 12, no. 1, pp. 6-13, DOI: 10.1109/MITP.2010.33, 2010.

[13] I.B. Myers, M.H. Mccaulley, N.L. Quenk and A.L. Hammer, MBTI Manual. A Guide to the Development and Use of the Myers-Briggs type Indicator. Palo Alto, CA, Consulting Psychologists Press, 1998.

[14] D. Petinger, "Measuring the MBTI...and coming up short," Journal of Career Planning and Employment, vol. 54, no. 1. pp. 48-52, 1993.

[15] G.J. Boyle, "Myers-Briggs Type Indicator (MBTI): some psychometrics limitations," Australian Psychologist, vol. 30, no. 1, pp. 71-74, 1995.

[16] L.F. Capretz, "Bringing the human factor to software engineering," IEEE Software, vol. 31, no. 2, pp. 102-104, DOI: 10.1109/MS.2014.30, March-April 2014.

[17] L.F. Capretz, "Personality types in software engineering," International Journal of Human Computer Studies, vol. 58, no. 2, pp. 207-214, DOI: 10.1016/s1071-5819(02)00137-4, 2003.

[18] N.A. Schaubhut and , R.C. Thompson, MBTI Type Tables for Occupations. CPP, Mountain View, 2008.

[19] S. Cruz, F.Q.B. Silva and L.F. Capretz, "Forty years of research on personality in software engineering: A mapping study," Computers in Human Behavior, vol. 46, no. 1, pp. 94-113, Elsevier, DOI: 10.1016/j.chb.2014.12.008, 2015.

[20] J.G. Clark, D.B. Walz, and J.L. Wynekoop, "Identifying exceptional application software developers: A comparison of students and professionals," Communications of the Association for Information Systems, vol. 11, no. 8, pp. 137- 154, 2003.

[21] G.E. Evans and M.G. Simkin, "What best predicts computer proficiency?" Communications of ACM,. vol. 32, no. 11, pp.1322-1327, 1989.

[22] J. Teague, "Personality type, career preference and implications for computer science recruitment and teaching," in 3rd Australasian Conference on Computer Science Education. New York, NY, ACM, 1998, pp. 155-163.

[23] D. Varona, L.F. Capretz, Y. Pinero and A. Raza, "Evolution of software engineers' personality profile" ACM SIGSOFT Software Engineering Notes, vol.37, no. 1, pp. 1-5, DOI: 10.1145/2088883.2088901, 2012.

[24] L.F. Capretz, and P.A. Lee, "Reusability and life cyycle issues within an object-oriented design methodology," Technology of Object-Oriented Language and Systems, pp. 139-150, Prentice Hall, Englewood Cliffs, 1992.

[25] R. Shatnawi and A. Alzu'bi, "A Verification of the correspondence between design and implementation quality attributes using a hierarchal quality model," IAENG

International Journal of Computer Science, vol. 38, no. 3, pp. 225-233, 2011.

[26] H. Takamatsu, H. Sato, S. Oyama, and M. Kurihara, "Automated test generation for objectoriented programs with multiple targets," IAENG International Journal of Computer Science, vol. 41, no. 3, pp. 198-203, 2014.

[27] F. Ahmed, L.F. Capretz and P. Campbell, "Evaluating the demand for soft skills in software development," IEEE IT Professional, vol. 14, no. 1, pp. 44-49, DOI: 10.1109/MITP.2012.7, 2012.

[28] T. Kanij, T. Merkel and J. Grundy, "An empirical study of the effects of personality on software testing,", 26th IEEE International Conference on Software Engineering Education and Training (CSEE&T), San Francisco, pp. 239-248, May 2013.

[30] J. Miller and Y. Zhichao, "A cognitive-based mechanism for constructing software inspection teams," IEEE Transactions on Software Engineering, vol. 30, no. 11, pp. 811-825, 2004.