TEACHING SOFTWARE PROJECT MANAGEMENT: THE COLLABORATIVE VERSUS INDEPENDENT APPROACH

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ABSTRACT

The purpose of this scientific article is to outline the human's desire and capability of working independently or as part of a team. Each way of working has its advantages and disadvantages. The question is: which one makes us happier? Depending on everyone's character, the professional objective can be obtained through working independently or collaborating with other people.

KEYWORDS: *Independent Work, Collaborative Work, Team Worker, Software Project Management, Teaching Strategies*

INTRODUCTION

There are moments in our life when we have to integrate ourselves in a team or when we need to work independently in order to achieve our goals and get satisfied with the efforts we made.

Being an independent person means becoming self-aware, self-monitoring and self-correcting. You have to know what you need to do and how to take the initiative rather than waiting to be assigned any tasks. Doing what is needed to the best of your ability, without the need for external prodding, and working until the job is completely done can be a difficult activity. It is necessary to learn to work at a pace that you can sustain, to accept your mistakes without looking for excuses and to refuse to let self-doubt or negative emotions due to negative past experiences change your path.

"Coming together is a beginning. Keeping together is progress. Working together is success." — *Henry Ford*

As Henry Ford states, a more difficult process can appear while founding a team due to the members' personality and capability of working with other people. While working in a collaborative environment, a collective commitment to a common mission and a shared effort to get the desired results is required.

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One of the most important moments when we have to join a team is after university graduation when everybody needs to get a job. Ensuring that students are ready to start working in a professional environment is the main objective of any university. However, most of the projects that a student is required to work on demand individual effort, whereas more and more companies assemble groups of employees with great synergy and put a strong focus on terms like "teamwork", "team building" and are usually looking for people that are comfortable working in a team.

So what then should universities be teaching us? Apart from the obvious technical skills that any graduate is expected to have, students should be given the chance to exercise and improve their social skills and learn how to be an effective group member.

T. Panitz states: [1] "Collaboration is a philosophy of interaction and personal lifestyle where individuals are responsible for their actions, including learning and respect the abilities and contributions of their peers;"

An idea that can be drawn from the above statement is the fact that one's responsibility to the team also increases his motivation, which can play a key role towards a better understanding of the concepts required for that specific project and the subject itself. Getting accustomed to the various ways of thinking of each individual in the team also improves the thought process and social skills.

Johnson and Johnson (1986) [2] stated that students working teams tend to achieve at truly higher levels of thought and also retain information for more time than those who work individually. The shared learning gives students an opportunity to engage in discussion, take responsibility for their own learning, and yet become critical thinkers. (Totten, Sills, Digby and Russ, 1991) [3]

PREVIOUS WORK

A research study was conducted by EJ Bryson that would answer the following question: "Will allowing students to work in groups improve their understanding, or will working individually lead to greater understanding?" [4].

At the start of each lesson, the class of 28 7th grade math students would be divided as follows: "Half of the class was instructed that they would complete their work for this unit by working in groups; the other half of the class would complete their work by themselves. The students were randomly assigned to work either individually or in groups using Random Sequence Generator."

Students also received a pre-test before the lessons started, and a post-test at the end of the unit aiming to determine whether they had progressed or not. The pre-test contained two questions, and the post-test three, two of which were the same as in the pre-test.

The study delivered no conclusive information on whether it would be better for students to work individually or in groups mainly because the average grades on the pre-test were higher than anticipated and no improvement could be observed.

An observation regarding the methodology could be made. Randomly choosing teams and disbanding them after such short periods of time might not be the best idea, as each team

has its' own dynamic based on the members it's made of. Team members may require a short period of time to figure out how they can work best together and to adjust to each other. Rapidly changing the composition of the teams might not lead to any kind of progress.

Another study, made by A. Gokhale [5], aimed to evaluate the effectiveness of individual learning versus collaborative learning in evolving critical thinking talents. One of the main research questions examined in this study was: "Will there be a significant difference in achievement on a test comprised of "critical thinking" items between students learning individually and students learning collaboratively?"

A total of 48 students participated in this study, which consisted of two parts: lecture and worksheet. For the worksheet part, the students were divided into two sections: one in which everybody worked individually and one in which students worked in groups of four. After both parts had finished, students were tested over the studied material. The posttest consisted of 15 "critical-thinking" items.

After evaluating the posttests, it was clear that students who worked collaboratively performed better than those who worked individually, with a significant difference. The mean of the posttest grades for the students in the collaborative section was 12.21, higher than the mean of their counterparts (8.63).

Vygotsky's beliefs [6] were that students can achieve a higher understanding through collaborative work, by learning from one another. Different sets of skills and ways of thinking improve the learning process of everyone involved.

PROPOSED APPROACH

Moving on from the student days when everyone adopted his way of learning, we get a job where we are confronting the problem of working independently or being part of a team. Most of the people want to work independently, having their own business being the main purpose. However, the first job is preponderant in a team, the collaborative working approach being the one desired in the most of the companies.

Considering the fact that a student is used to work independently, but companies are looking for employees with the ability of a team worker, we want to emphasize the students' openness towards teamwork and the employees' opinion about what this environment means and what level of satisfaction is reached.

Therefore, we created a survey which can help us to see the differences between what a student is expecting for and what he gets as an employee. Both students and employees in the field of IT, especially programmers, responded to this questionnaire.

The 15 questions mainly focused on the background of the participants, what kind of projects they worked on so far as students or employees, and their preferences regarding the amount of social interaction they wish to have in a work environment.

STUDY RESULTS

This chapter is presenting the results of our study regarding the people's belief of working independently or in a team. Approximately 100 persons responded to our survey, a third of them being represented by employees, and the remaining by students.
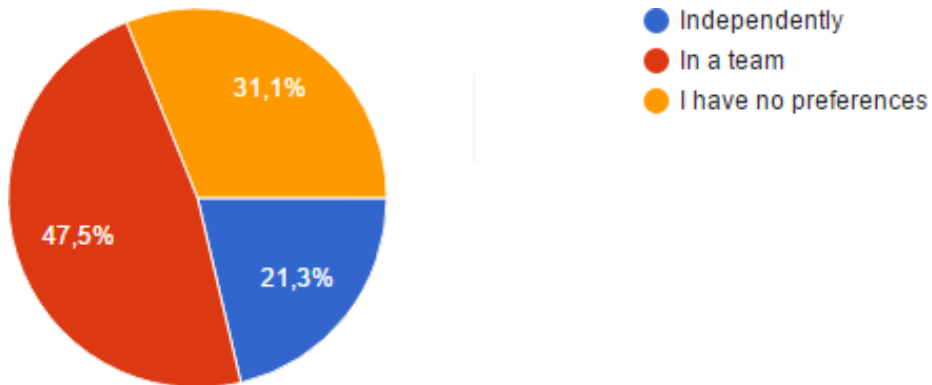

Figure 1.1. Students' answers to the question: "Do you prefer to work independently or in a team?"
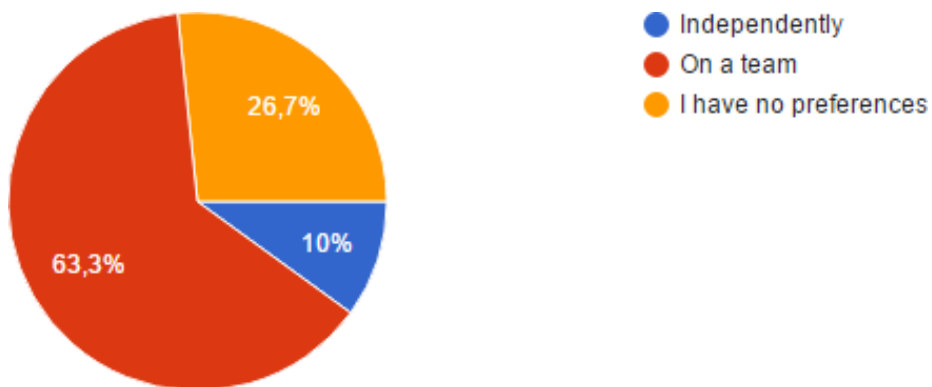

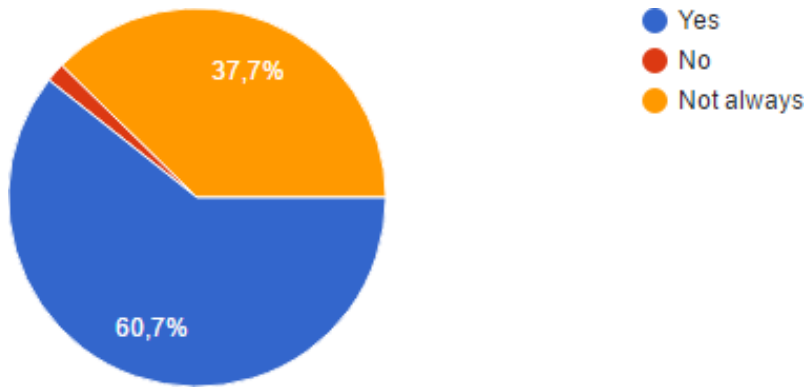Figure 1.2. Employees' answer to the question: "Do you prefer to work independently or in a team?"

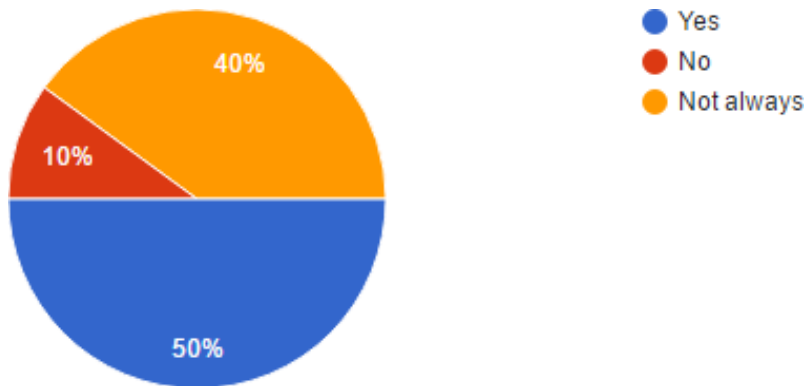Figure 2.1. Students' answers to the question: "Are you a self-motivated person?"

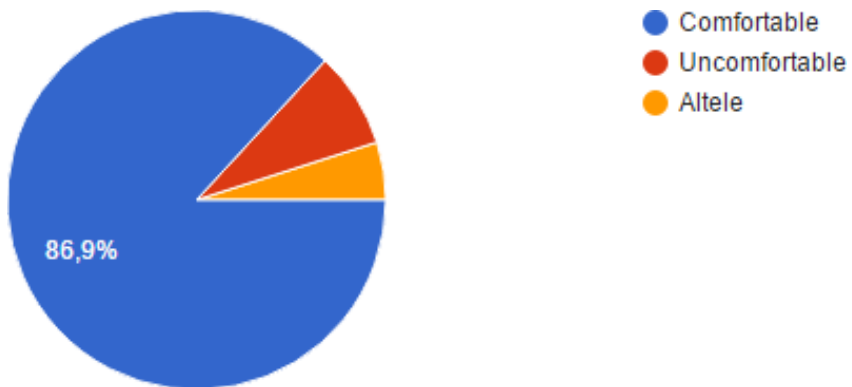Figure 2.1. Employees' answers to the question: "Are you a self-motivated person?"

Figure 3.1. Students' answers to the question: "How do you feel about listening to and respecting other people's ideas?"
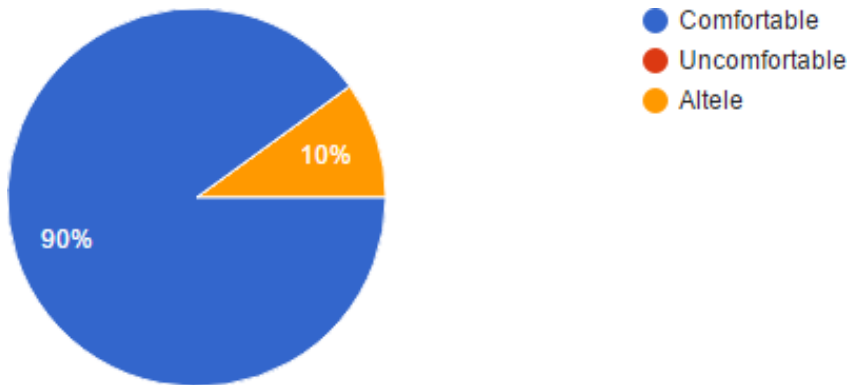
Figure 3.2. Employees' answers to the question: "How do you feel about listening to and respecting other people's ideas?"
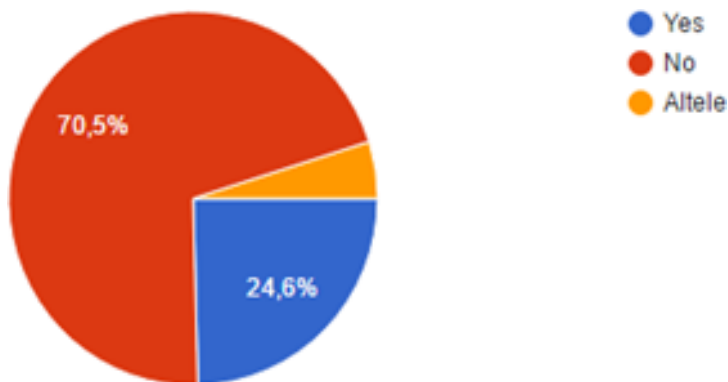

Figure 4.1. Students' answers to the question: "Would you be willing to take the risk of being stuck on an issue rather than working with other people that might be able to solve it?"
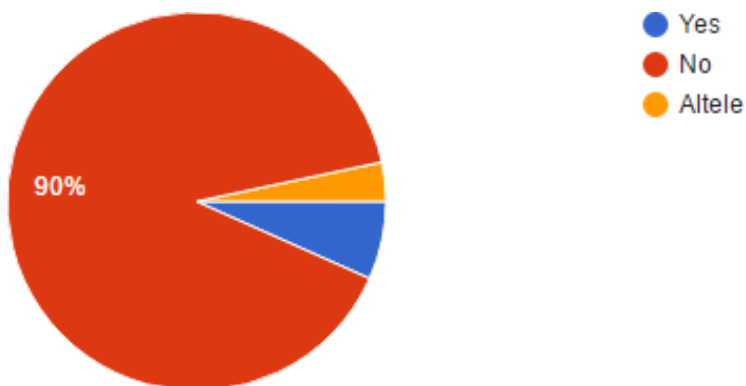

Figure 4.2. Employees' answers to the question: "Would you be willing to take the risk of being stuck on an issue rather than working with other people that might be able to solve it?"
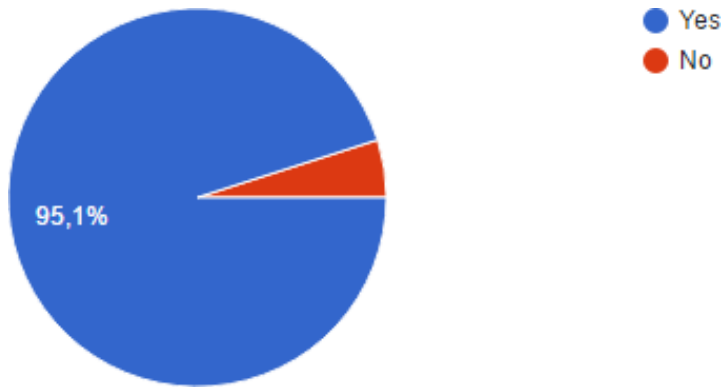
Figure 5.1. Students' answers to the question: "Do you think that you can get a better hold on a problem through sharing knowledge and abilities that you can individually?"
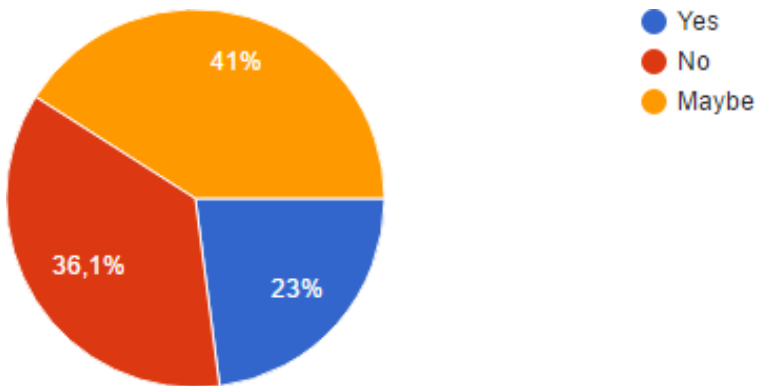

Figure 6.1. Students' answers to the question: "Would you feel stressed about not having someone to cover for you when you take time off?"
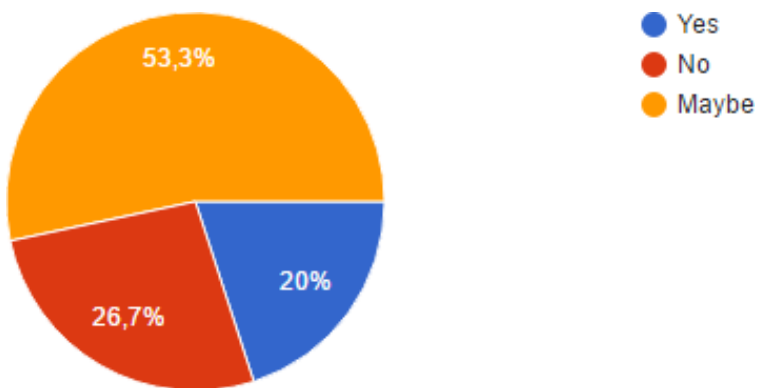

Figure 6.2. Employees' answers to the question: "Would you feel stressed about not having someone to cover for you when you take time off?"

The outcomes have been presented as a comparison between students and employees opinion.

As we can see in *Figure1.1* and *Figure 1.2*, the tendency of students to work independently is bigger than the one of the employees. 21.3% students comparing to 10% employees want to work independently and only 47.5% students comparing to 63.3% employees want to be part of a team. These results can outline the way students were accustomed to work before getting a job.

According to the percentages from *Figure 2.1* and *Figure 2.2*, we can conclude that students seem to be more self-motivated persons. This is the result of working on their own small projects. As an employee, your work is just a part of an entire project, which can reduce your motivation and even your satisfaction if you are expecting for visible results.

In *Figure 3.1* and *Figure 3.2* it is pointed out the feeling that a person can have while listening and respecting others' ideas. As a student, you are used to implement your own ideas, but in a team, another person's ideas can be better and more appropriate for the current project. Listening and respecting others' ideas is learned while working in a team as we can see in the above diagrams.

Figure 4.1 and *Figure 4.2* reveal the fact that students are more willing to take chances. Due to the fact that as a student you are working only on small projects, you are inclined to say that every problem has a solution. This happens because you can think about the problems that can interfere. In a bigger project, you cannot definitely predict the project complexity, thus the employees would prefer to work with many people who can come up with an idea when they are stuck.

Even though a lot of students are not used to listen and respect other ideas, they admit that a problem can be more easily solved if many people are sharing their knowledge. (*Figure 5.1*)

As we can see in *Figure 6.1 and Figure 6.2*, both employees and students take into consideration the fact that an independent work can produce more stress than working in a team.

CONCLUSIONS

According to our research, the biggest problem that students face is the inconsistency between the college approach which is focused on independent work and learning and the market demand which requires collaborative working.

Both independent and collaborative working have their advantages and disadvantages.

The independent work offers autonomy and develops an entrepreneurial spirit, promotes creativity and sometimes gives you the opportunity to have a deeper knowledge of a specific subject. The downsides are represented by the lack of support, this approach putting you in the position of being on your own, the possibility of becoming overwhelmed with the amount of work and even the isolation.

The collaborative approach gives the possibility of interacting with other people, sharing ideas, splitting task, thus the efforts are decreasing. On the other hand, you may not be

able to handle your favorite parts of the process and your initiative may not be acknowledged.

Depending on everyone's personality, one or another can be more appropriate. Until you deal with both working approaches, you cannot say which one gives you more satisfaction and makes you happier.

FUTURE WORK

Our study methodology could be subjected to several improvements in future iterations. First of all, it might be beneficial if the survey would be conducted over a longer period of time, aiming to gather as many submissions as possible. The form should also include questions that would grant the participants the ability to motivate why they answered in a certain way on some questions (e.g. Do you prefer to work independently or to be a part of a team? Why? How do you feel about listening to and respecting others' ideas? Why?).

One interesting path this study could follow is finding out the impact that the cultural environment has on individuals in regard to the process of learning and what teaching approach might best suit them, by reaching out to students and employees in different countries.

Another future direction will be to enhance the software project management teaching approach using voting-based methods like the ones described in [15][16][17][18], blending the collaborative and independent approaches to achieve the best possible impact.

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