TEAMWORK IN ENGINEERING EDUCATION

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Abstract: *This article shows two different approaches of teamwork in a long term project and it demonstrates that you may achieve your goal without following any principles or laws. This paperwork also brings out two approaches of working in a group that will be useful if you know when to apply them.*

Keywords: *PBL, teamwork, team, project, experience.*

Introduction
Being a student at school, at university or an employee in a company you do not have to underestimate the importance of the teamwork. It has been demonstrated to be a crucial factor when you have to deal with others day by day. Being widely used as one of the key soft-skills, teamwork, gives you a lot of benefits. It helps you to grow as a personality and it also helps you to take the right decision while working on a project. Studying at the Technical University of Moldova and having the opportunity of being every semester involved in different projects with different teammates we decided to share with you two different teamwork approaches that finally had the same result. My colleague Timotin Mihai and I, Ilcenco Eugeniu, were in two different teams having to work on different projects and we had our individual way of working in order to get to have a successful output. According to "The 17 indisputable laws of teamwork " written by John Maxwell, when working in a team, people have to respect some laws, which, generally speaking, teach us that everybody needs a special attitude in order to do his best. Speaking in terms of teamwork, it is necessary to mention that every member should know the team goal and what they have to do in order to reach it. Evey member should know each other very well, his strengths and weaknesses. A successful teamwork is also obtained when the tasks are structured and they have a deadline and at the moment you have a well done and clear example you start following it, by accomplishing every single requirement, step by step. Having such an example will allow your team to start from the beginning on the right way of making a project.

Stages of a team
As every team, they had some periods of developing (Figure 1.), and they were just at forming stage when they found out that their mentor will not help them. Just after that came the hardest period called storming. It defines the period when they didn't meet and had no idea what they have to do. Some time later it passed and after the first meeting they made a short plan and step by step developed it. The performing stage came when they separated tasks and everybody knew what he is going to do. Finally, they did their tasks almost without meetings and teamwork itself. They met in the last day, when everybody came with his job and had to put all it together. However, their working method didn't influence the final result because the idea was clear and as soon as everybody did only one task they did it perfectly.
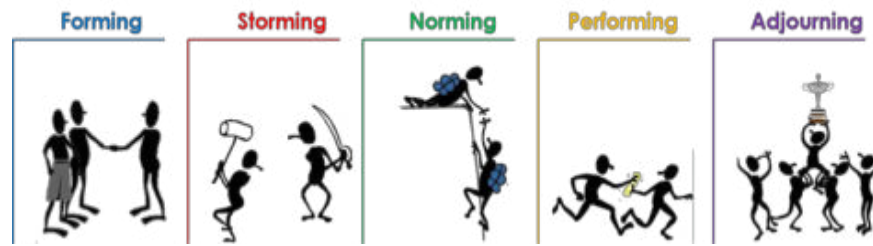
Figure 1. Teamwork stages

Roles in a team

Dr Meredith Belbin defines a team role as: "A tendency to behave, contribute and interrelate with others in a particular way."

There are nine main roles, two of which are possible leaders, and a ninth specialist role. All the roles are significant, though some have a higher profile than others; exactly which ones matter most depends a lot on the circumstances - size of the team, nature of the task, stage of team development and so on. Teams can work even with missing roles, but to work at their best they need:

- some kind of leader, a coordinator to balance tasks and people, or Shaper to drive projects through to completion.
- people who communicate and support others: Team Worker, Resource Investigator
- various kinds of 'doers': Implementer, Completer-Finisher, Monitor-Evaluator
- an 'ideas person': Plant-Innovator • and perhaps an Expert-Specialist to give depth of expertise

Figure 2. Team Roles

Two Teams, Two Approaches

Both teams had to develop a project. It is very important to mention that every team was assigned a mentor, the person to guide the team along the project development. At the beginning of the semester they gave some advice regarding taking the right the direction.

In the first team every person had his own task and deadline to respect. In other words, they decided to divide tasks, assigning every student to develop a small chunk. As a result, every person has brought his contribution, more or less, to the project development. Approaching this way of working, team members agreed that there was no need for face-to-face meeting, as each of them had to do his part. The most difficult was time when the group had to decide on the next milestone, as every member was working alone and was insisting on his opinion. As a result, the team members concluded they were far from the most productive team, on the contrary, they identified themselves as not being an organized team ever.

Talking about the second team it is important to say that everybody was concentrated on the same task until it is not resolved taking in consideration every person with his vision and solution. Also they had regular meetings where were discussed the future stages of the project. Their team was organized as soon as there were a leader who gave tasks, encouraged the team and had the responsibility to bring them together. It influenced their total worked time, they needed more meetings and time spent together but every member knew every small detail they worked on. Working in such a collective gives you only positive and precious experience. Speaking about the book mentioned before, the second team seemed to follow the very first rule called 'The law of Significance' where people should have a team in order to achieve great things, right as it happened to them.

Why the same result?

Although both teams made mistakes and their way of working was completely different, they managed to do their job well. This was possible because the project was not so complex and the topic was well defined from the very beginning. If the first team risked with their result relying on each member to do his task, then second team risked not being able to do all the tasks in time because it was meticulously polished and it took much more execution time. Understanding well what you have to do greatly facilitates the work process and reduces the chance of making mistakes. It also matters a lot the way you present your product because first team presented the it well and it contributed to neglect some small errors that existed while the second team didn't manage to cover all the possible questions due to their perfectionism.

The attention to details shows that the whole team worked professionally and the involvement on the project was at the highest level, due to this the first team managed to convince the jury even if some aspects were not described in the project.

For both teams, time was a decisive factor and the online tools and services provided by Outlook were very helpful because they allow us to work remotely and easily synchronize the work done by each one. If we did not have time for meetings, working online was an accessible solution for everybody and very good to solve the tasks.

The organization of the working mode is an important factor without taking in consideration it's approach. If each member is given the task by the whole team and does not get involved when it is another teammate's work area, this will definitely lead to success and each member of the team will be sure you contributed something to the project with.

Because in both teams each member participated to the presentation it was a factor that indirectly obliges the team members to work on the project and to understand the whole progress so that they can relate to the juries the idea and the main operations of the application, this criterion imposed a little responsibility on the shoulders of each team member.

The appreciation mode was very good because each member of the team had to give a mark from 1 to 4 for his colleagues and himself according to certain criteria like the researches made during the collaborating time that demonstrates your interest and involving in the whole process. Also there were taken in consideration skills like listening that was a significant factor in our teamwork. It was a very important decision because this way of giving marks allowed the free riders to be established. We were lucky in both teams not to have free riders even if at the beginning it seemed to happen.

Conclusion

Concluding we can affirm that teamwork does not have standards that you have to follow in order to succeed it has just small steps to go through. Any working approach done on time will definitely bring results. PBL is a good place to experiment and learn different ways of working in a team, in the end you can make a conclusion that if you are a flexible person then you will surely benefit from any type of teamwork approach. There are problems in every new team and they have to be overcome and each member must be ready and able easily to go through the stages of teamwork (Figure 1.).

Speaking about PBL projects we were involved in, at the final we had the same conclusions about, we lived the same emotions and we met the same difficulties. It was a new experience for each of us developing a lot of skills but teamwork the most. While being in a new team for a whole semester we needed some time to get familiar with everybody. Even if it was hard at the beginning the result made both team proud. Speaking about the things we learned we have to mention that now we are ready for a faster adaptation in any new environments, we know how to structure our work and save our time but the most important is that we know how to work in a team.

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