

The impact of Botball on Team Building

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Abstract—This document deals with the topic "The impact of Botball on Team Building". It shows you how to deal with team members and how the spirit of Botball can improve a collaborative development process.

I. INTRODUCTION

In our first year in Botball we experienced some major impacts on our team, like stressful situations. We participated on an internal school competition and acquired knowledge about team ability, work under high pressure and solve problems together. Our task was based on the Botball game table from last year. We had to build a robot, which had to transport a cube from a position to another. Despite some initial difficulties, our team still managed it to develop an adequate robot.

II. FIRST IMPRESSIONS

At first we had to build a functional robot, which could take the cube easily. But as mentioned before, in the introduction, we had some initial difficulties with our Bot. The gripper on the robot was so big, that the robot could not fit in the starting box.

Hence, the first big issue was to work more precisely. We learned the game rules by hard. This improved our development with big impact. However, we had to stay longer at the robotics laboratory and needed to be very focused to finish our robot for the contest. Although it wasn't an official contest we were constantly under time pressure, because our team members also had to study hard for upcoming tests and we had to do something for this competition after our official school lessons.

Our robotics team was very determined to win the competition, because the prize was to participate in an international Botball tournament. We quickly realized Botball has a big impact on our entire team. That were our first impressions of the impact Botball had on our whole team.

III. SOCIALIZING

In computer engineering it is common, to use robotics, in this case Botball, as a vehicle for teaching teamwork [1].

A. Interaction with team members

Our team, consisting of 5 people, including three programmers and two builders, was created through friendship. As already mentioned, our team members are all friends, but we also had some conflicts, because of disagreements. However,

together we found always a solution to solve the development process.

If someone had an idea, we discussed it as a team and decided together, what would be the best way to translate this concept into action. Even if our tactics should not work, we still work together as a team. In this case, we made a team meeting with all the relevant team members. Most of the time, we find in these reviews even a much better and more efficient solution than before. An examination of high-performance teams indicates, that the most important characteristics of such teams is, that they are goal focused [2].

Now I will explain the current situation, based on the relationships between our team members. At the beginning, we had some difficulties because everyone in our team wanted to put their own idea into action. As you probably could think for yourself, it did not work. So we had to accept, that sometimes it is better to make a decision consensual.

This has given our team the experience, that multiple minds have to be discussed and a generally accepted decision can be made.

Our free time is based on the dates of the deadlines. Therefore, we made regular meetings.

As a result, members of most of the teams, that participate in Botball, competitions do not have many opportunities to spend their free time.

B. Interaction with other teams

In the aforementioned competition, we had to face two opponent teams. The problem was, that all teams had to work in only one room together. Therefore we could not keep our strategy secret as easy as we thought and other teams were able to reconstruct some parts from our robot easily.

Due to the other people in the room, while preparing for the competition, we were usually unable to focus very well on our work, because of the noise level and therefore we were not very productive. So we decided as a team, that we only work in the room, when our opponent teams were not inside. This has increased our productivity for the upcoming internal competition.

Although other teams and schoolwork have put pressure on us, our team decided to work at home as well. Because of this decision, we have been able to achieve much more in a short time than ever before.

Although we had to work under challenging conditions, we managed to finish the code and the building of our robot without the help of other teams.

IV. TEAM-MANAGEMENT

A. Programming

As we have mentioned before, we also had to do school work, because there were upcoming tests, were we had to learn. Especially in a computer science department, we also have a lot of work for the school subject programming.

However, since the programming languages of KIPR controllers differ in the programming language we use on a normal school day, it was a relatively big change for us to learn the new commands and implement them correctly. This means that the programmers in our team had to change their way of thinking. For us it was very challenging to programme a physical object, which must effectively work during competition.

So this can be a big problem for programmers, that have bad grades at school, because they could potentially fail in this school year and they have to practise to program at home in their free time. However, this is hardly impossible for students in Botball, because they must have the potential to fulfill all requirements. Otherwise, they have to concentrate on school business.

This statement confirms, that the members of a team, who compete in Botball, have much less free time, than other students. As mentioned, we needed to change our way of thinking and that motivated us even more to stay in school to work on the code for the robot.

Sometimes we used the concept of pair programming. Pair or collaborative programming is, where two programmers develop software side by side at one compute [3]. It helped us a lot to work faster and more effectively, by simply analyzing the code and the other programmer just wrote the code.

B. Building

On the one hand, programmers are important for a working team that participates in a contest, but on the other hand, in a team, you need members who create the concepts and then build the different robots. These team members are the so-called "builders" who are in charge of a effective robot.

There are two different types of competitions that each have the same task, but you either have a free choice of what the parts are for the robot, or you get a ready-made kit. We are talking about Botball and PRIA Open.

At Botball you get a ready-made kit for the competition. That means you are only allowed to take the parts of this kit to create your robot. Therefore, builders competing for a team in the Botball contest have to plan very carefully how to construct the robot, as the number of parts is limited. That is why the builders need to be minimalistic, in building the robot .

At PRIA Open you are on your own and have to organize the parts for the robot yourself. Because you are on your own, you can do whatever you want. Sometimes we used parts of wood

and metal. However, sometimes it is better to use some lego bricks instead of the aforementioned materials. The advantage of PRIA Open is that builders can perform their own unique creativity as they want.

Overall no matter what competition, builders play an important role in a team, which takes part at the development process. Although Botball and PRIA Open are very similar, the impacts on the team members, which build the robots, are different.

V. PARTICIPATING IN BOTBALL

Participating in Botball is stressful as mentioned in the previous sections, but there are also some advantages in competing in Botball that we would like to introduce here.

A. Pros

- Due to the fact, that teams participate in the international competition Botball, they travel a lot through the world and get to know other cultures and customs
- As mentioned in the last advantage, teams travel through the world a lot, because of the international competition. So they also improve their foreign language skills. However, that is really important for your future life and it could also be very significant for your future job.
- As soon as you arrive at the location, where the competition takes place, you have the opportunity to meet other people and get to know them better. Especially, because of the same interests, the contest can be of great impressen, even in a competitive environment.
- Every single team member, whether male or female, increases his or her ability communication in a team. And that also has a positive effect on everyday life.
- Programmers improve their mindset as well as their skills of programming. This is a plus for their future job opportunities.
- Builders at PRIA Open are able to give their creativity free rein. Thus, their creativity is greatly encouraged and it is easier for them to use their creative spirit effectively in future areas.
- The members of a botball team learn to work under high pressure. Like most of the bullet points mentioned earlier, this one also has some positive implications for the future life and possibly also for the job. Because it is always very important to perform consistently under very high pressure.
- Furthermore, as a member of a team participating in Botball, you will learn how to properly divide your time in your private life to keep the deadlines.

B. Cons

- A disadvantage of participating in Botball are the travelling costs and participation fees.
- Botball team members, also have much less free time as before.
- The stressful situation that comes with participating in international robotics tournaments, in this case Botball,

means that the team does not understand each other as well as when the individual members play video games together, for example.

- The previously mentioned stress situation arises mainly through the fixed delivery dates.
- When you are there, where the competition takes place, you miss a lot of lessons at school.

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