

Time-Speed-Distance Foot Rally as a Tool for Campus Presentation

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Abstract

Since 2002, the Engineering course of the Escola de Engenharia Mauá greets freshmen during their first week of classes with different activities aiming to present activities related to Engineering course, to promote integration among the freshmen and to present the Campus. One of the activities consisted of a self guided tour, which showed the facilities and departments for the freshmen. It was proposed in 2009 the activity "Trekking de Regularidade", also known as Time-Speed-Distance (TSD) Foot Rally, to replace a guided tour, so that the students could perform an activity that was able to recognize the campus, to promote integration and also introducing them to a sport that promotes teamwork and contact with nature.

Keywords: Time-Speed-Distance Foot Rally, Campus presentation, Freshmen.

1 Introduction

In 2001, it was proposed some different activities to first grade of the Engineering students at Escola de Engenharia Mauá (EEM). This project, called "Projeto Primeira Semana", was composed of speeches, evaluated activities assigned to students and a guided tour of the Campus of São Caetano do Sul. "Projeto Primeira Semana" aims to introduce simple engineering problems to freshmen, stimulate analytical solution of Mathematics and Physics with previously acquired knowledge, present the Campus and promote integration among freshmen (Marim, et al., 2013).

1.1 Previous activities

Between 2002 and 2007, the presentation of Campus to freshmen was guided by a professor. This visit was intended to present dependencies, sectors and services offered to students throughout their academic life. The different visited sectors introduce its main activities, restrictions, hours of operation and so on.

In 2008, the activity "Área Construída do Campus" replaced the guided tour. This activity requested that each team, composed of four students, visited one building of the Campus and estimated its dimensions for subsequent building area's calculation. On returning to the classroom, the professor managed the information obtained by the teams to determine the total area visited. However, it was realized that these students did not have a Campus overview.

In 2009, inspired by the experience gathered throughout two years of participation in competitions of Time-Speed-Distance Foot Rally competition, some professors, Scalco, Gomes, Gomes, & Kawamura (2010) proposed the activity "Trekking de Regularidade", which has for objectives the presentation of the Campus, sectors and their services (retaken after the gap in 2008); integration of new students; deadlines and practice of a physical activity.

2 Time-Speed-Distance Foot Rally

There is a misunderstood between the words "trekking" and "hiking" in Brazil. In fact, it is used the word "trekking" in the meaning of "hiking". According to dictionary:

- hiking (2013) is a walk for a long distance, especially across country;
- trekking (2013) is a long arduous journey, especially one made on foot.

Of course, this activity does not represent an arduous journey, so the correct term should be hiking, instead of trekking. Anyway, here in Brazil the term trekking is widely used to define the sport. Beyond this point of this work, the words hiking and trekking may have the same meaning, and should be interpreted in the context for this paper.

According to Mendonça (2005), the etymology of the word trekking considers the word trekken is originated from long trips and expeditions of the English settlers in South Africa, in the 1850s.

It is important to note that hiking is not a running, so the physical conditioning is not the main factor for this activity. Furthermore, this practice can be divided into three categories:

- a) **trekking:** a hiking that lasts several days;
- b) **speed trekking:** the winning team is the one that fulfill all the tasks in the shortest possible time;
- c) **Time-Speed-Distance Foot Rally:** the winning team is the one that fulfill all the tasks closest to the given time (ideal time).

In this activity, each team must calculate the ideal times to be met along the way. The distances need be estimated without precision instruments. For execution of this activity it is needed a roadmap with instructions using tulip arrows notation (DeWolfe, 2001), a calculator, a pencil, a watch and a compass.

2.1 A few definitions

In this section will be presented the main terms of the Time-Speed-Distance Foot Rally.

Roadmap

The roadmap shows the path that the team must follow. It has relevant information about distances that must be traveled and the indications of the directions and velocities to be observed. The figure 1 shows an example. References are given using tulip arrows notation (DeWolfe, 2001).

Distance	Reference	Comments
Section 01		Speed: 55 m/min
000 000	1 	 Heading NORTH
33 33	2 	
17 50	3 	Take 2 minutes to read information
... ...	4 	Cross the bridge
21 71	5 	 Direction 290°
117 188	6 	First trail to the right

Figure 1: Example of a roadmap

Each row of the roadmap represents a point which the team must pass through. These points are called references and they are numbered sequentially from the beginning of the roadmap (Jaguar Clubs of North America, Inc., 2013).

First column has two numbers: the upper one represents the distance, in meters, from one reference to another, and the lower one represents the accumulated distance from the beginning of the section to the actual reference.

In the second column there is a graphical representation of the place where the team must pass through: the pictures show how the team must navigate between streets or buildings in each reference, using tulip notation. There is a number at the top left showing the number of the reference.

The third column represents the comments of the section and express information to help the team in the choice of direction to proceed.

Checkpoints and Penalties

Along the path are positioned checkpoints (CPs) (Northbrasil, 2010), where the current time is noted by each team. It is assigned a penalty for the team in each CP, proportional to the difference in seconds between the current time and the ideal passage time, described in Table 1.

Table 1: Penalties on each CP

Situation	Penalty
Arriving late at CP	1 point per second
Arriving early at CP	2 points per second
Arriving more than 10 minutes late at CP	600 points
Arriving more than 5 minutes early at CP	600 points
Miss CP	600 points by missed CP

In addition to the penalties described in Table 1, each team may be penalized if their elements are too distant from each other, at 600 points per incident. This rule prevents teams to use "scouts", which are students that walk the path ahead of the team, warning of the presence of CPs.

The winner team is the one that lose the smallest number of points during a match. The evaluation of each team will be depending on its placement in the ranking of the class.

Distance estimates

For making navigation between references, teams must check the distance indicated on the roadmap and walk for that distance.

In a competition of this nature, one of the team members is responsible for the estimate the traveled distance. This can be done by counting footsteps.

Gomes & Parteli (2001) show that it is possible to establish a relation between the size of the footstep and the height of a person.

The student responsible for step counting must add one unit to the count when the **same foot** touches the ground. Illustration in figure 2 shows a step cycle. When the right foot touches the ground is added one to step count.



Figure 2: Cycle of one step

Calculation of ideal times

From the distance and speed of each section, it is possible to determine the instant when the team must pass in each reference. To control speed, the team must verify the clock and check if it is early or late when they pass on each reference.

The ideal times for each reference should be calculated in the sexagesimal system, whose base is the number 60. To express this value, we use the notation **hh:mm:ss**.

Division of tasks

As in any team sport, the affinity is a critical point that good results be achieved. The figure 3 shows which information is required during activity.

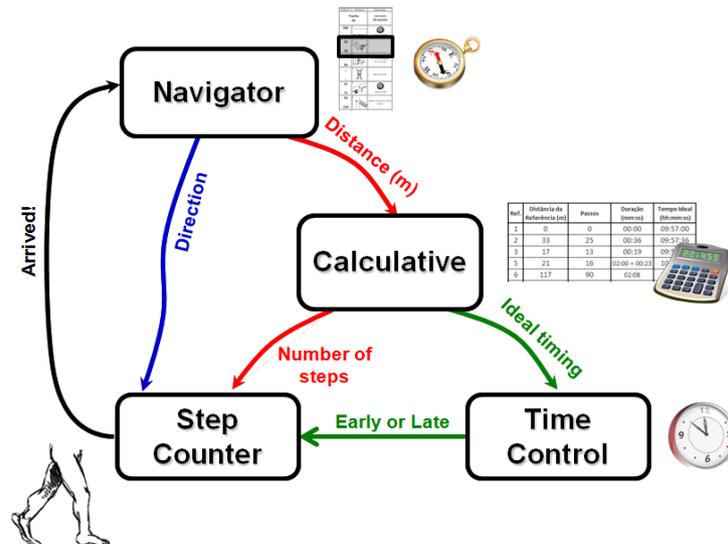


Figure 3: Information flow

3 Development and Application of Activity

The Instituto Mauá de Tecnologia (IMT) has a Campus in São Caetano do Sul with 21 buildings, as well as the Sports and Physical Activities Center - CEAF with covered gymnasium with three courts, soccer field, running track and pool, plus living area, parking lots and so on, counting a total area of 129,352 m² (Instituto Mauá de Tecnologia, 2005), more than enough space for the development of the activity.



Figure 4: Aerial view of the Campus

3.1 Routes Planning

At first, it was designed a path that included points of interest for the freshmen to know the various sectors of the Campus. Then, there were determined possible distances between references and the speeds in each section.

To avoid agglomeration among students along the way, it was decided that teams would start every 2 minutes. In addition, four other routes were prepared by Campus, separated by roadmaps with different colors. The activity was held in three days, during morning and evening classes.

Each of these five routes were drafted to include approximately 2.0 km and take about 55 minutes, with an average speed of approximately 36 meters per minute, speed considered low for such activity. For this distance, it was decided

that would be allocated 6 CPs along each route. From the distances and selected references were prepared roadmaps with Tulip notation.

From Sectors of interest located in Campus were created Information Stations (ISs), in contrast to CPs, these do not have the task of scoring, but only to inform to the students about activities in each sector. Each route must contain five of these ISs and the students who circulate through these routes should record one of the activities developed in those sectors. The nine ISs created were: Library, Technical Services and Tests Center, Sports and Physical Activities Center, Service to Students, Industrial Automation Laboratory, Electrical Engineering Laboratories, Computational Methods Center, Pilot Plant and the Dean's Office.

3.2 Training of the Teaching Staff

By the amount of students, the realization of the activity was divided into 17 classrooms (10 in the morning and 7 in the evening) with 80 students each. Thus, it became necessary to invite 15 professors for the application of this activity, since, throughout the project, the activities are given by pairs of professors in each classroom.

So that the activity would be conducted evenly, and for the lack of experience of professors in the sport, it has been proposed training sessions for professors.

During training sessions, professors acted as the students themselves, that is, attended a presentation in Microsoft PowerPoint about the sport, use of compass, reading roadmap, navigation, estimation of distances, calculation of ideal times and division of tasks among students of each team.

Then professors received roadmaps and made the calculations of the ideal times and the number of footsteps of each section.



Figure 5: Training offered to professors

So that professors could help students during the conduct of the activity, it was essential that they traveled the route, by noting times on each CP and the information of the ISs. With this, there was a friendly match among professors!

3.3 Calculation of Results

During the interval of thirty minutes between the arrival of the first and last teams, the professor divided the blackboard into nine regions corresponding to each IS. The professor guided the teams on arrival to note in their region blackboard the information obtained in each IS.

Students were instructed to return to the classroom when completing the route and inform the professor their times on each PC. These information were inputed on a Microsoft Excel worksheet.

After the arrival of the last team, the blackboard became a panel summarizing the main activities and services of the various sectors of the Campus.

Finished typing the times of teams on each CPs, the sum of penalties along the track, as the ranking of the teams, are shown.

3.4 Evaluation and Award

The spreadsheet of verification is also responsible for generating the grade of every team. The team with the lowest score on the sum of missed points besides winning, had assigned the maximum grade. To emphasize the activity's sporting aspect the winners' teams in each classroom are awarded with customized medals. The other teams are assigned grades that vary according to the position on the rank of that group.

In case of adverse weather, there is an option to delay the start time in 30 minutes. However, if after 30 minutes weather condition did not improve, a presentation was made to freshmen with pictures of the main points that would be seen along the track as well as the services available to students at the Sports Center. In this case, evaluation was made based on the calculation of six ideal times chosen according to the route.



Figure 6: Awarded team

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4 Results

The activity was done with 5.645 students, since 2009 up to 2013. Table 2 shows the participation teams number in this period, as morning classes as evening classes.

Table 2: Total number of teams

Year	Morning course	Evening course	Total
2009	180	123	303
2010	191	112	303
2011	163	103	266
2012	164	105	269
2013	178	116	264

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In the subsequent week to the “Projeto Primeira Semana”, the students answered a survey, this asked how their opinion about activities. Between 2010 and 2011, 1728 students answered the survey. Two question were more important:

Question 1: Considering “Trekking de Regularidade” the activities' aims were:

1. Presentation of Campus
2. Presentation of sectors and their services
3. Integration among team members
4. Meet deadlines
5. Physical activity

Alternatives:

- ★★★★★ The objectives of the activity were fully achieved
- ★★★★ The objectives of the activity were almost all achieved
- ★★★ The objectives of the activity were moderately achieved
- ★★ The objectives of the activity were practically not achieved
- ★ The objectives of the activity were not achieved

For this question, 72.1% reported that all or most of aims were achieved during the activity. The graphic below (figure 7) show the distribution of answers.

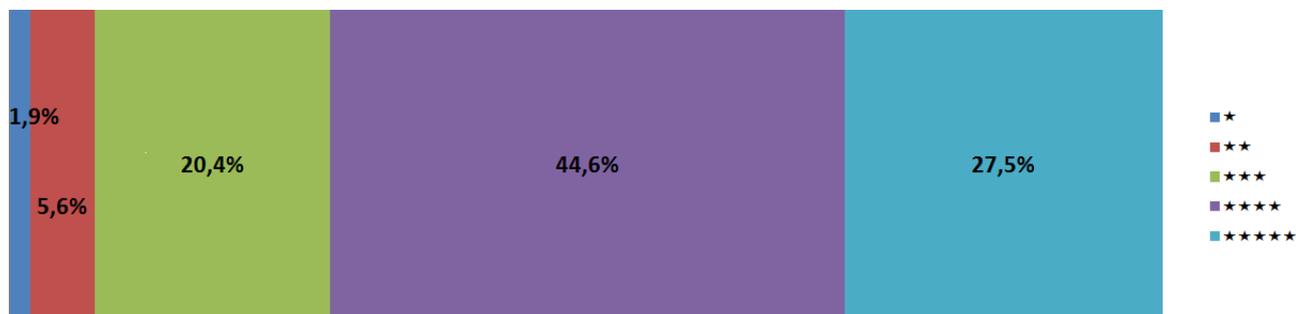


Figure 7: Objectives

Moreover, it was asked how was the integration among the team members, even subjectively.

Question 2: How do you consider the participation of team members during the activity "Trekking de Regularidade"?

Alternatives:

- ★★★★★ There was integration among all team's member
- ★★★★ The most team's member were engaged to execute their tasks
- ★★★ Some team's members were engaged to execute their tasks
- ★★ My team had difficulties in the task's division
- ★ For rainy weather reason, my team only made the calculation

The first attempt got 69.5% of answers, while the second was marked by 19.1%, as show in figure 8. This show that the most of freshmen realized that teamwork was essential for the good performance of the activity.

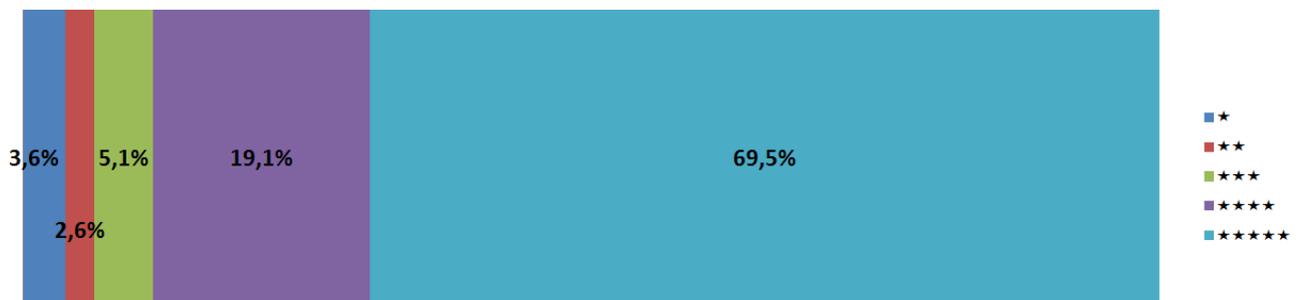


Figure 8: Integration

The analysis of these results shows that freshmen were engaged and motivated to accomplish the activity.

5 Final Considerations

Throughout five years when this activity was applied, the rallymasters could notice that most of the teams manage to navigate without problems. However, some other teams needed to be helped on several occasions. Teams with the most difficulties were addressed more frequently by rallymasters.

In some cases, rescue was required for completely disoriented teams, so they were instructed to return to the classroom.

With respect to the route, only one routes point had a special attention during the evening due to poor lighting. At that point, were designated rallymasters equipped with flashlights.

The experiment has shown to be valid from the point of view of attaining the proposed objectives. However, the organizers expected greater interest for the sport among the students.

It was noticed the commitment of applicators professors, who were interested in the activity and the sport. The format of the applied training to those professors proved to be correct and essential for the proper conduct of the activity, because it allowed to the professors to work around situations that are not trivial.

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