Chapter 8
A Sports Science Approach to Computer Programming Education

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ABSTRACT

Learning computer programming is for most of the new students a difficult task. Besides the computer language learning of the syntax and all the aspects related with the compiler or the IDE environment, programming also has its artistic counterpart, where the individual personality is indissociable of the way he programs. Therefore, the main difficulties identified in students are closely related with aspects of their personality: self-confidence, resiliency, creativity, and autonomy. The sports science approach emerged naturally as all the authors were involved in high performance training for several years. The personality characteristics one needs to develop in students are similar to elite sports athletes in order to cope with the stress associated with their activity. In this chapter, the authors present a case study that took place at the Polytechnic Institute of Setubal with 28 students with different backgrounds and a workload of 8 hours per day.

INTRODUCTION

As a starting point, it's important to state that the study presented here was not originally considered by our team or by the external elements involved, as research work or something that would have its outcome as a report or other type of academic production.

By consequence, this work was not preceded by any type of profound literature or review or by an extended overview of the area. The foundation of this experiment is based in a truly multidisciplinary team, composed by academics that are working in education related fields, by elements involved in lecturing computer programming, psychologists, academics from the social sciences, experts in sport's neuropsychology, athletes, coaches, performance analysts and as experts in sport's technology. This team was not created with the purpose of developing this study or this experiment, this group is working together for more than 10 years in elite sports.

The experimental gathering toke place because of a simple challenge:

"We believe that part of the difficulties we face when teaching computer programming are not related with the difficulty of the subject or the quality of the educational materials available to the students.

Computer programming, like its mental counterpart, deal with the necessity of taking risks, be able to learn from the mistakes, to be resilient, and above all to take decisions.

This type of difficulties is the same we face when teaching (training) athletes to be prepared to compete in elite sports. In most cases, the technical aspects of the sport are not the main cause for a young athlete to not succeed or to achieve performance levels clearly above their capacities.

In sport, mostly in Sailing but also in Tennis and Boccia (Paralympic Sport), we have deal with exactly the same type of problems, which are mostly related with anxiety management and the capacity to clearly define objectives that are simultaneously tangible and challenging.

Can we coach our students and apply strategies that lead to more autonomy in the learning process, to promote their confidence and the capacity to take risks in the decision process? Can we do it the same way we promote self-esteem and anxiety control in our athletes?

And in the other way around, can we define performance goals (skills or capacities) that makes the student to be aware of their evolution, a crucial aspect to improve resilience, self-confidence? And can we define performance objectives in functional terms, objectives that may exceed the boundaries of a specific class or one particular part of the program?"

That was the challenge that put the team working together in a very unusual environment. The athletes were computer programming students. Technical, tactical or physical training, were replaced by different aspects of programming, in our case web programming, database management and server-side programming.

The approach remains the same, precise goal definition, motivational videos, anxiety control and some form of personalized mental training, based on initial personality assessment.

Finally, we maintained the same terminology used in sport's training, namely the microcycle based approach, used in almost all sports. Initially, because all of us were acquainted with this type of terminology, and later because we wanted to reflect the idea that we were training our students to develop their programming skills rather than teaching a programming language.

The terminology helped us to be provocative and to generate some type of curiosity and arousal attention in our students from day 1, when we presented the training schedule and stated the reason we were doing it and the way we will do it.

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