Soft Skills Training: Performance Psychology Applied to Software Development

Carol Cárdenas-Castro†
People Development
S4N
Colombia
carolcardenas@s4n.co

Jenny Gil
Organizational Development
S4N
Colombia
jennygil@s4n.co

Paula Rodríguez
Organizational Development
S4N
Colombia
paularodriguez@s4n.co

ABSTRACT

This article aims to present a training program based on Sport and Performance Psychology designed to improve employees' soft skills in a software development company in Colombia. We used psychological skills training methodology adapted to the company's and the employee's needs. Needs identified from psychological measuring tools. Qualitative results show that employees tend to improve their soft skills and general well-being. Nonetheless, the intervention still requires additional work to include other soft skills measures.

KEYWORDS

Soft skills training, Performance psychology, Software Development

1 Introduction

The knowledge about and development of soft skills in software development in Colombian context is poorly studied and nurtured. People entering the labor market do not have specific training in soft skills and every company decide whether to train or not its employees in such skills.

We consider software development a social as well as a technical activity. This assumption implies the validity of using psychological skills to achieve synergy between individuals and teams.

With the company's needs towards high performance team's conformation, the knowledge of sport and performance psychology field became a viable option to take into consideration in the company.

2 Performance Psychology and Soft Skills Training

Hays [4] defined performance psychology as the study and application of psychological principles of human performance to help people consistently execute in the upper range of their capabilities and more thoroughly enjoy the performance process (...) and the improvement of performance environments to facilitate more efficient development, consistent execution, and positive experiences in performers.

The intervention methodology followed the principles of the Psychological Skills Training (PST) [2], and sports training planning [5]. In this case, the authors also included progress in the research of human factors in software development and diverse disciplines in psychology and neuroscience in the construction of the guidelines.

Even though there are multiple training principles, the ones pointed out by Balagué [6] were adapted to this software team particular context, as follows:

1. Different skill levels and experience have a significant impact on the sequence of abilities to teach.
2. Different sports have different requirements. Software development was considered a team sport. Every team in the organization compete in different "leagues". Hence training should be individualized for every team, role, moment of the project, and the team's members according to his/her needs.
3. Soft skills training is done parallelly with technical skills. Also, cooperation between the psychologist, the trainer and the leader is pivotal.
4. The psychologist working in this task needs to have a solid knowledge in the software development field; this allows her to understand the psychological requirements needed in order for the trainee to fulfill the tasks assigned.

2.2 Training Phases

The program initiates with the diagnosis of the team's needs (Figure 1). This diagnosis is made with an interview with every one of the team members. Questions seek to understand how the team analyses its interaction dynamics and its collective and individual needs.

Then the training process begins, commonly it follows three phases: the first one is the psycho-education, in which participants recognize the keys of PST and the ability they want to improve. The second phase is called the acquisition phase, which focuses on developing strategies and techniques for learning various psychological or soft skills. The third phase is the practice phase and has three main objectives: automate skills through overlearning, teach people how to integrate the skills into their performance and simulate abilities required in competitive situations.
After the practice phase, a follow-up evaluation is carried out. The outcome of the evaluation can result in the person needing new training or passing to individual training, which follows the same described methodology.
Finally, the trainer and the trainee execute a process of closure, which includes periodic follow-ups and evaluation of the skills preservation.

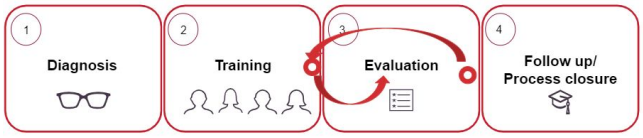

Figure 1: Soft skills Training Phases

3 Methodology

3.1 Participants

One hundred forty employees distributed in 6 teams of a software development company in Colombia participated.

3.2 Instruments

Spanish version of the Coping Strategies Inventory [7]. **Communication tests** modified depending on the difficulties of the participant. **Interviews**: **Observation:** Observation of coping strategies used at critical moments such as project ceremonies in which the participant faces stressful situations. **Self-report:** depending on the needs, the participant had to fill out a self-report form where he/she had to write his/her cognitive, emotional, physiological and behavioral responses and outcomes in a determined situation. **Biofeedback:** the psychologists used an EmWave@ device and a heart monitor.

3.3 Procedure

During 2017 a training pilot was conducted with 30 employees from one team. This pilot allowed making an exploration of the training methodology, to characterize the psychological factors of the company's population, and to characterize the psychological needs of the employees and the software development teams had.
In the year 2018, the total population of the company was invited to participate in the training program. Participation was voluntary to increase commitment through intrinsic motivation and self-determination. 69 people completed the initial diagnosis. The most recurrent working needs pointed out during this diagnosis were: coping strategies (in particular high levels of self-criticism combined with wishful thinking), communication (assertive, fear to speak in public), time management (procrastination and the limits of effort), emotional regulation, motivation to finalize undergraduate studies, and leadership.
Due to the number of people that were interested, the authors designed programs to train soft skills with specific contents for the first phase of the training and flexible individual training according to the employee's goals.

3.4 Soft Skills Trained

The authors used the classification of the psychological skills to train from Vealey [8, 9], considering four types of psychological skills as shown in Table 1.

Types of skills	**Skills trained**
Fundamental skills	Introspection, Motivation, Identification of the limits of the effort put in a task, Self-confidence.
Performance skills	Attention and concentration, Organization of information, Physiological regulation, Procrastination.
Personal development skills	Coping skills.
Team skills	Assertive communication, Asynchronous communication, Teamwork, Cohesion.

4. Results and Discussion

This work has an exploratory scope. The qualitative reports of the participants show an overall improvement in the skills worked and in the general feeling of well-being. Nonetheless, to get to completion, this report requires an additional type of measurements that allow identifying more clearly the impact of the treatment, such as psychophysiological measurements or reliable and valid tests that measure skills.
The psychological training is useful in the operation phase. Nevertheless, in the software development phases before the initial deployment into production, it is better to make an accompaniment that facilitates the processes already established by the team. The introduction of variation to the

team's dynamics without giving enough time for the skill to become automatic may generate unnecessary noise.

One of the main findings is that the individual intervention benefits both the diagnosis phase and the results of the soft skills training. Even though a certain number of people are involved in the same training process, the progress obtained is not standardized from the number of sessions or the information the trainees are learning; every participant has its own initial needs and skills and embraces the information given at her own pace. People responsible for the design of group training sessions tend to overlook this aspect. Another aspect that traditional software engineering process consistently overlooks is the capacity of the person to determine the factor to pay attention to, the crucial factor for his/her training process, and the individual responsibility of the trainee against the advances accomplished during training.

Another important finding from this exercise is that the context defines the intervention process from the needs detected from the team and its team members. Taking the context into consideration can produce higher value and impact in comparison with pre-established talks or workshops. Although it was found shared psychological needs throughout the different teams, the training sessions and programs must be flexible enough in order to facilitate its adaptation to the context: type of client, type of project, project times, team maturity, among others. These characteristics will influence the duration of the training.

From experience gained in the software development company, the psychology team could establish the importance of having a close relationship between the trainer and the trainee. This closeness allows the trainee the opportunity to receive valuable personal information for the training process in the least amount of time possible. Also, a close relationship allows the trainee to develop confidence in the accompaniment process and mutual feedback.

It is important to point out three obstacles that were found during the whole process:

1. Remote intervention: Assisting to educational and training sessions remotely can result in not having total attention to the information, especially if the person is multitasking, increasing the probability of missing out on relevant information [10]. In this condition, it is also difficult to give immediate feedback to the behavior since the observation is not done directly or in the person's natural environment.

Available time for the interventions included Daily tasks, classes, and training sessions done by the company, as well as the learning curve at the beginning of a project, limits the availability of people to attend training.

Definition of performance: Traditionally in the corporate context it has been talked about efficiency or productivity, which refers to the consecution of specific results. A typical way to measure these results include measuring the time taken to complete the task, the number of tasks executed, and so forth. On the other hand, a more precise definition of performance refers to the mastery achieved in the development of abilities and knowledge, assuming this development translates in a better performance [15]. As a result, it is essential to elaborate personalized metrics in the exercise of software development, that allows for performance evaluation of the people working in this context.

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