Chapter 11

Model to Estimate the Human Factor Quality in FLOSS Development

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ABSTRACT

This chapter presents a Model to Estimate the Human Factor Quality in Free/Libre Open Source Software (FLOSS) Development, or EHFQ-FLOSS. The model consists of three dimensions: Levels (individual, community, and foundation), Aspects (internal or contextual), and Forms of Evaluation (self-evaluation, co-evaluation, and hetero-evaluation). Furthermore, this model provides 145 metrics applicable to all three levels, as well as an algorithm that guides their proper application to estimate the systemic quality of human resources involved in the development of FLOSS, guide the decision-making process, and take possible corrective actions.

INTRODUCTION

The success of an organization almost always depends on the skills of the people working towards performing their tasks and attaining the organization’s strategic goals. Communities related to Free/Libre Open Source Software (FLOSS) do not escape from this reality. These communities are formed by volunteers, who, in some cases, do not receive any financial compensation. Volunteers contribute based on an intrinsic motivation, a personal necessity and/or an expectation of future profitability.
In this work, human factors involved in FLOSS development are analyzed and a Model to Estimate the Human Factor Quality in the FLOSS Development (EHFQ-FLOSS) is proposed. Through 145 metrics, this model aims to estimate quality of individuals, communities and foundations related to the development and design of FLOSS.

The methodology used in this research consisted on an adaptation of the definition of its metrics of the Systemic Methodological Framework for Research of Information Systems, including the Goal Question Metric (GQM) approach, Basili (1994). This framework is based on the action-research approach and includes the DESMET methodology to evaluate the solutions generated (Pérez et al., 2004). The model provides a guide for FLOSS developers, communities, and foundations, who are willing to manage and improve quality of their human capital. This model was defined based on a compilation made by different authors and defined below.

This chapter, in addition to the Introduction, presents the background for the next section and the proposed model, followed by the metrics that allow its operationalization and the algorithm that allows the application of the model proposed, and finally, the conclusions and future work.

**BACKGROUND**

The Human Perspective of the Systemic Quality Model (Pérez, et al., 2006) was used as a reference. This Model, takes into account the fundamentals of best practices of Personal Software Process (PSP), Team Software Process (TSP) and People-Capability Maturity Model (P-CMM). This is a quality model that contemplates three perspectives: product, process and human and its structure has 4 levels:

- **Level 0- Dimensions:** Defined by internal aspects and contextual aspects of the product, the process and the people.
- **Level 1- Categories:** Defined in the human aspect are: individual, team and organization.
- **Level 2- Characteristics:** Each category has specific characteristics associated with it. The individual has seven characteristics associated with it. The team has four characteristics and organization has four characteristics.
- **Level 3- Metrics:** The human perspective proposes 128 metrics to estimate its quality.

Contributions by various authors are also included and aspects that software developers should have have been classified as individual and teamwork-related. Individual aspects that software developers should have include voluntary work and motivation, according to Somerville (2006), and labor skills according to Marelli (2000). In teamwork-related aspects, the mechanisms proposed by Crowston (2010) to coordinate FLOSS development were taken into account. These mechanisms highlight the presence and skills of a leader, communication as analyzed by Pressman (2006), and evaluation of human behavior based on ethics according to Montuschi (2002). Ethical values presented by Himanen (2004), which are present in the hacker’s behavior, are also underscored.

The first area of the model, which is the Personal Software Process (PSP) is a framework used to provide a structured and disciplined focus in the development of software applied to process control and management at a personal level (Humphrey, 2000). It highlights the developers’ skills and habits such as, individual work planning, use of well-defined processes and error prevention for managing quality in their projects. Humphrey (2000) adds that developers need to understand well the work to be done as well as know, select and use the best methods in order to do extraordinary work. And that only highly motivated developers build superior software.
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