

# Soft Computing for Learner's Assessment in SoftLearn

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**Abstract.** This paper describes the contributions of the SoftLearn platform to key issues in learning analytics, as i) discovery of the learning path that students follow in a course and ii) provide interpretability of graphs in dashboards

## 1 System's Purpose

SoftLearn is a process mining-based platform that identifies and highlights all the content generated by the learners during the course, enabling teachers to improve the learning paths as well as the evaluation process for each of the learners. Moreover, SoftLearn has an intuitive graphical interface that has been specifically developed to evaluate both the learning paths and the data generated during the learning activities, to automatically build natural language reports describing the most relevant facts about them, and to visualize statistics regarding the learning process of the students.

## 2 Significance of the Approach

The development of SoftLearn was designed to support the teachers in the learners' tracking and assessment. Hence, it enables the access to information related to both the sequence and timing of the student work, thus allowing a better understanding of both the students' behavior and their activity patterns during the course. It also provides graphical and textual reports regarding the students' activity and impact during the course. Two novelties distinguish SoftLearn from other learner's assessment tools:

- **Process Learning Discovery.** ProDiGen [1] is a process discovery algorithm. Its purpose is to discover the workflow that represents the learning path followed by the learners. In order to guarantee feasible evaluations of the learning paths, it retrieves *complete* and *precise* solutions, i.e., models explaining only what the students did. Last, but not least, it retrieves *simple* learning models.
- **Automatic Textual Reporting.** The dashboard includes a service that provides automatically generated natural language reports [2] built from every student activity data. This service is based on linguistic description techniques adapted from the fuzzy sets field and natural language generation (NLG) tools.

### 3 Outline

The graphical user interface of SoftLearn [3] allows teachers to (i) understand the learner behavior through the visualization of the learning paths followed by the learners and (ii) also facilitates the evaluation of the learning activities carried out by learners during the course. This graphical user interface is divided in three sections: (i) the Workflow Analytics section, where the learning paths are displayed and where the teacher can evaluate both the learning data generated by the students –through a defined rubric by the teacher– and the students' behavior; (ii) the Dashboard section, which provides different statistics about the students in both a graphical and textual form; and (iii) the Content of the course, where all the data generated in the course are showed in a table in order to provide a easy access to specific learning activities.

### 4 Experiments

To evaluate the benefits of the SoftLearn tool for students' assessment, we have conducted an experiment with two teachers of the subject Educational Technology of the University of Santiago de Compostela. The subject uses the open source platform ELGG which integrates an individual space and also a social network with forums, blogs, microblogging, a personal wall, calendar, favorites and pages. The assessment of the students' behavior is *extremely time consuming*, given the number of students (60 in this course) and the amount of documents associated to each personal space. In this experiment, we have studied the time invested to evaluate these 60 students involved during the learning process. The results of the teachers' assessment set a time saving of 54%. This time saving occurs because the tool eases the reading of the contributions of the students through a better and more accessible overall display.

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