GIREP-MPTL 2018
Research and Innovation in Physics education:
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Development of a laboratory practice for physics introductory courses using a rubric for evaluation by competences

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**Abstract.** Competency-based education is oriented towards an evaluation model linked to student training, in order to foster the development of abilities to identify, project, solve problems and make decisions. In this context, the rubrics allow obtaining evidence of the acquisition of competences and application of knowledge outside the classroom.

In this work, we present a proposal for the development of a Physics laboratory practice with the use of a rubric for the evaluation by Competences in the university field. We want to introduce new assessment methods and identify opportunities to develop skills and evaluate learning through indicators of progress.

1 **Introduction**

The first rubric dates back to 1912, derived from a study carried out by Noyes, called Scale for the Measurement of Quality in English composition by Young People emerges [1].

The rubric is an instrument that shares with teachers and students the required criteria to carry out learning and evaluation tasks. It is a task guide that shows the expectations that students and faculty have and share about an activity or several activities, organized in different levels of compliance: from the least acceptable to the exemplary resolution, from what is considered insufficient to excellent [2].

2 **Methodology**

The Physics laboratory practice "Measurement of the magnetic field of a small magnet" [3] is being made since 2015 by students of the bachelor degree in computer engineering degree of the Faculty of Computer Science Engineering at University of Castilla-La Mancha (UCLM), located in the campus of Albacete, Spain. In figure 1 we show the implementation process and in figure 2 the evaluation of this implementation.

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**We will select two study groups (A and B) and two teachers of the area of physics (one teacher for each group), to work as follows:**

**Group A:**

1. The student will develop the practice in the Physics laboratory without the evaluation rubric by competences.
2. The assigned professor shall be asked to correct the results in order to evaluate the student without giving a grade.
3. An assessment will be made of the degree of difficulty and the levels of the students' perception.

**Group B:**

1. The student will develop the practice in the Physics laboratory with the evaluation rubric.
2. The assigned professor will correct the results with evaluation rubric and will assign a grade to the student.
3. An assessment will be made of the degree of difficulty and the levels of the students' perception.

**This same activity will be carried out following the process described above.**

Will be providing the students and the teacher with the practice together with its evaluation rubric.

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Fig. 1 Implementation process.
3 Result

We have designed the laboratory practice and we have developed the evaluation rubric aimed at students and then its impact will be assessed. In this phase, we have designed the laboratory practice and the evaluation rubric; at the end of the next course we will have data to evaluate the usefulness of this rubric.

4 Conclusion

With the implementation of the competencies approach, the aim is to contribute to the improvement of the educational quality, ensuring that the student is competent in his/her area of study and able to solve the problems that arise in the field of employment; it is a student-centered education [4], in which the student integrates five understandings linked with knowledge (know), skills (know-how to do), attitudes (know-how to act), values (know-how to be) and transference (know-how to teach and/or apply).

The use of rubrics benefits teachers and students, but the results depend on the people involved in this process. Is considered necessary to evaluate its implementation and results obtained when they are used, as it is proposed in this work.

References