1. Introduction - This paper is placed in the intersection of these three fields: learning outcomes, assessment of student's learning and learning. The purpose of this study is to contribute to accrediting learning as an assessment delivery tool that can be applied independently of the learning pathways. It intends to contribute to the achievement of recognition and mobility of students and to the creation of a flexible Education System. In general terms, the approach chosen was to develop a model that matches specific assessment methods to measure the achievement of the learning outcomes (LO). Again in general terms, this means that it could be possible for a teacher to define the LO of hers/his online course and from this definition to have an indication of the assessment methods she/he might consider using. Formally, this problem is defined as "To what extent assessment methods may be used to measure intended the achievement of LO in education?"

2. ALOA Conceptual Model - The model for the alignment of intended LO was developed from the concept of alignment defended by different authors [1], [2], [3]. In terms of the alignment component, what is defended is that the LO of a course or unit should be used to define the teaching and learning activities, ensuring these will address the same LO. The same applies to the assessment tasks. To ensure the validity of assessment in relation to what is intended from the course, it is necessary that the outcomes measured by the assessment tasks are the same as the intended ones. The initial step to approach the problem was to identify and define the different components of the problem: the two variables, intended LO and assessment methods; and the link between them that is the alignment question.

The main tool used for developing this conceptual model was the revised version of Bloom's Taxonomy [2]. This tool, designated in this paper as matrix rBloom, is in fact an alignment matrix for LO, teaching and learning activities and assessment. However, for the current research project the adopted matrix assumed distinct functions: describe and classify the LO in a way that facilitates comparison between different levels and different sources; describe the assessment methods and assessment tasks; align the LO with the assessment methods.

The conceptual model suffered several iterations resulting from small implementations. The final version of the ALOA model was defined as a sequence of operations [6]. The LO at the qualification level are transduced to the program level using the rBloom approach. From the program level the LO at course level are defined using the same method. Finally, the assessment tasks are aligned with the LO of the course level using the rBloom based method.

It is clear in this sequence of operations that the revised version of Bloom's taxonomy is the main tool that will be used to achieve the stated goals of this work. Each LO from the courses that were part of the case studies was described using the same tool. Also, an rBloom matrix was produced for each assessment method, mapping assessment to the cognitive processes and types of knowledge, based on the description of the methods found in literature research. Forty matrixes were produced for categories and general assessment methods. This set of matrixes is the actual alignment instrument of the conceptual model. They represent the standard against which the LO matrixes of the case studies were compared to produce aligned assessment strategies or to verify current alignment.

3. Assessment Methods Considered - It was necessary to systematize some knowledge about assessment. The work of Brown, Bull and Pendlbury were of great help for producing a working list of general assessment methods, adapted from the work of Brown et al [4]. For the purpose of this research and specifically for the development of the model, six general categories of assessment methods were identified:

a) Multiple choice questions (MCQ)
b) Short answer questions (SAQ)
c) Essays
d) Practical case
e) Problems
f) Reflective practice

It was considered that these categories were too general to provide information for the alignment with the LO. It was necessary to add detail and specificity to the assessment. The categories were further analyzed and detailed. Thirty-seven assessment methods were identified and described in terms of knowledge and cognitive processes.

In terms of the assessment methods and practices, the definition was also derived from literature. From the initial analysis, it was decided to drop the idea of assessment methods and replace it by assessment methods that could be implemented using learning technologies or assessment practices. This decision had consequences in terms of alignment, since it was now being approached from the perspective of general assessment methods. If the alignment was reached between the LO and the general assessment methods, it was then possible to define implementation strategies using assessment tasks. After reaching a classification system for the assessment methods, the following step was to associate to suggest implementation strategies using assessment practices.

4. Alignment of LO and Assessment - The concept of aligning learning outcomes (LO), learning activities and assessment is explored by several authors [1], [2], [4], [5]. As Biggs explains this means that the teaching methods and assessment tasks should be aligned with the learning activities expressed by the intended or desired learning outcomes (LO). In the work of Bloom et al [5], the concept of alignment is also present. In their view, the educational goals should be used to shape the curriculum, guide instruction and provide specifications for the definition of evaluation instruments, techniques and methods. For each class and sub-class the taxonomy provides examples of questions to assess that specific LO. In the revised version of the taxonomy, Anderson et al have a practical approach to the concept of alignment. In this work, alignment is the level of correspondence between objectives, instruction and assessment. As already referred, this was the

tool chosen for this work both for the definition of LO but also, for the alignment component.

5. The TALOE Project - It is a fact that not all assessment methods are valid for each type of the learning outcomes or competences. The ALOA model provided tools for linking learning outcomes and assessment tasks. The main goal of TALOE was to develop a web-based platform to help teachers and trainers decide on the assessment strategies to use in their courses. The rationale of TALOE is that a teacher/trainer will describe the learning outcomes of the course or module and the TALOE platform will analyze them and provide an assessment method that is consistent with the set of intended learning outcomes.

6. Conclusions - Assessment of student learning is a complex field of research. Assessment and learning are deeply contextualized processes and it is not possible to have a solution that fits every case. The model ALOA intended to provide a flexible way to guide teachers and institutions the achievement of a better alignment at course and at program level. ALOA is by no means a closed system. It is possible, and even expected, to add or improve the model in terms of assessment methods and of learning outcomes in education.

In terms of the teacher activities, the ALOA model can provide support at the two levels when preparing the course teaching activities and planning. The first level of influence is related with the definition of a file for each LO or competence that students need to acquire. The ALOA model can provide options for assessment tasks that can help the evaluation of the student for that particular LO or competence.

REFERENCES

[1] J. B. Biggs and C. Tang, *Teaching for quality learning at university: what the student does*, 3rd edition, Society for Research into Higher Education, Open University Press, Buckingham, 2007.

[2] L. W. Anderson and D.R. Krathwohl, A taxonomy for learning, teaching, and assessing: a revision of Bloom's taxonomy of educational objectives, Pearson, New York, 2000.

[3] J. B. Biggs, *Teaching for quality learning at university: what the student does*, Society for Research into Higher Education, Open University Press, Maidenhead, Berkshire, 1999.

[4] B. S. Bloom et al, Taxonomy of educational objectives; the classification of educational goals, Longman, New York, 1984.

[5] A. J. Lien, Measurement and evaluation of learning; a handbook for teachers, Dubuque, Iowa, 1967.

[6] R. Falcao, "Evaluation of the Application of learning Methodologies to the Education of Engineering", PhD Thesis, Digital Media Doctoral Program of Universidade do Porto and University of Texas (Austin), Porto, 2013.