

Towards a Complete Description for Individual Course Units

A follow-up to the Bologna proposals

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Abstract—The ECTS User’s Guide prescribes the use of learning outcomes in the description of individual course units and states the need to specify the associated assessment criteria. Here, we present a concrete template proposal for the description of individual course units that adds two additional alignments to the well-known double alignment strategy. More specifically, we propose the specification of four alignments: learning outcomes to contents; learning outcomes to assessment; assessment to the teaching and learning strategies; and assessment to grading. To support the latter, a specific grading strategy is briefly presented. Additionally, learning outcomes are classified according to the European Qualification Framework for Lifelong Learning.

Keywords - course description; learning outcomes; assessment; grading; ECTS; alignment; curricula design; EQF.

I. INTRODUCTION

The Bologna agreement in Europe and the associated ECTS User’s Guide [1] have significantly contributed to a much wider use of learning outcomes in the description of individual course units. Yet, anecdotal evidence shows that this use is often imposed on faculty, who has no adequate knowledge on how to properly design and, especially, on how to use those learning outcomes. Hence, even when present, learning outcomes are misunderstood and misused or simply not considered at all. Numerous and good resources about the design of learning outcomes and the associated taxonomies are already available (e.g. [7]). But, after their specification, learning outcomes should be used to improve the course and, consequently, the student results. Here, starting from the ECTS User’s Guide and the literature (e.g. [3, 4]), we provide a concrete proposal for a course description template that expands and details the recommendations in the ECTS User’s Guide. The template reinforces the consistency of the curricular unit description forcing the curricula designer to better reflect on the course objectives and methods. The paper follows a stepwise approach that starts from the ECTS User’s Guide recommended data. Along that path, we present a template for the description of individual course units. The following section presents the first step in that direction: the curricular unit general information based on the ECTS User’s Guide. Section III shows how to align learning outcomes to contents and Section IV discusses the alignment between learning

outcomes and assessment. Section V presents the alignment between assessment and teaching and learning activities. Next, Section VI, presents the alignment between assessment and grading. This is accomplished by a stepwise grading method. Finally, Section VII concludes.

II. GENERAL DATA,

The ECTS User’s Guide already specifies a large set of data that should be present in the description of each curricular unit [1, p. 28] (the ones in bold are object of further discussion in this paper):

1. Course unit title;
2. Course unit code;
3. Type of course unit (compulsory, optional);
4. Level of course unit (e.g. first, second or third cycle; sub-level if applicable);
5. Year of study (if applicable);
6. Semester/trimester when the course unit is delivered;
7. Number of ECTS credits allocated;
8. Name of lecturer(s);
9. **Learning outcomes of the course unit;**
10. Mode of delivery (face-to-face, distance learning);
11. Prerequisites and co-requisites;
12. Recommended optional programme components;
13. Course contents;
14. Recommended or required reading;
15. **Planned learning activities and teaching methods;**
16. **Assessment methods and criteria;**
17. Language of instruction;
18. Work placement(s).

In the following sections we propose additional and specific detail related to those three points (9, 15, and 16).

III. LEARNING OUTCOMES AND CONTENTS OF THE COURSE UNIT

Typically, a learning outcome (or an *intended* learning outcome, ILO) is defined by a simple and direct sentence. Our template for an ILO adds four additional fields to that sentence. For better readability and completeness, we show part of a description for a human-computer interaction course that follows our template. This is as second year course included in a computer science programme. Students have background in computer programming and in this course they learn user interface design and build functional prototypes. Here, we also show two additional sections, “Aims” and “Contents”, as they are closely related to ILOs:

(Data proposed in the ECTS User’s Guide)

Aims

This course presents the principles and methods that support the design of interactive systems. This knowledge should be applied by students in the development of hardware or software interfaces.

Intended Learning Outcomes

On successful completion of this course unit, the student should be able to:

LO 1: *Analyse* the usability of an interactive system.

Type: Skill.

Level: SOLO 4.

Main contents: 2.

Secondary contents: 1 and 3.

LO 2:

(...)

Contents

1. Basic Concepts.
2. Usability Principles and Rules.
3. Universal Design.
4.
- (...)

Even before the list of intended learning outcomes and contents, the proposed template includes an “Aims” section. This section, should contain one or two small paragraphs that presents the course unit by summarize its the general objectives.

Regarding the intended learning outcomes, the four additional fields are the following:

1. The **Type**; according to The European Qualifications Framework for Lifelong Learning (EQF) [2] this should be “Knowledge”, “Skills”, or “Competence”;
2. The used taxonomy and the respective **level**, e.g. “SOLO 4” for the taxonomy by John Biggs [3] or

BLOOM 2 for the Blooms’s taxonomy [8] or the revised Bloom’s taxonomy [9];

3. The list of the “**main contents**” this learning outcome uses;
4. The list of the “**secondary contents**” this learning outcome uses.

Field 1 aligns learning outcomes with the classification in EQF. Hence, it is also a way to align course outcomes with higher-level outcomes. Naturally, other similar alignments can be added, e.g. relating this learning outcome at course level to outcomes at programme or institutional level. Yet, this also implies an even more ambitious template, which in our opinion should be left to a second implementation step.

Field 2 is recommended practice for the specification of learning outcomes.

Fields 3 and 4 force an alignment between learning outcomes and a numbered list of course contents. In the authors’ experience, this alignment is extremely important for two reasons:

1. It guarantees that all contents are really necessary, in the sense that they contribute to at least one learning outcome;
2. It acts as a facilitator and motivator for course designers that are using learning outcomes for the first time.

The alignment in the last point connects the “old” view of simply listing contents, to the “new” view that learning outcomes should come first. In this way, the newcomer to the design of learning outcomes can still see and even start from contents, while, at the same time, being forced to define learning outcomes. This is very important as a motivational factor, as it integrates the old and undesirable view of “contents first” with the objective of “learning outcomes first”. The course designer can even start by listing the contents, but after each of the listed contents must be used by one or more learning outcomes as the main or secondary content. Also, it is especially important that the list of ILOs appears before the contents. This is a simple and effective way to value ILOs against contents.

It is probably quite obvious that not all contents are equally relevant for each learning outcome. Yet, instead of defining a (large) scale for specifying the degree of importance, we opted by a simpler approach, where for each outcome, each contents is either a main one, a secondary one or it is simply not relevant enough to deserve mention.

Together, these first three parts define what the students should achieve, the *objectives*, and what the course *is*. Now we are going to present the specifications for *how* the course works and *what* the students and teachers should do. In that sense, the following section shows how to specify a second common alignment: between learning outcomes and assessment activities (e.g. [3, 4]).

IV. FROM LEARNING OUTCOMES TO ASSESSMENT ACTIVITIES

In a less prescriptive way, the ECTS User's Guide alerts for the importance of connecting learning outcomes to assessment:

"The successful assessment of learning outcomes is the pre-condition for the award of credits to a learner. Therefore, statements of learning outcomes for programme components should always be accompanied by clear and appropriate assessment criteria for the award of credits, which make it possible to ascertain whether the learner has acquired the desired knowledge, understanding and competences" [1, p. 14]

Another important example is given by the report of the European Association for Quality Assurance in Higher Education (ENQA) [5], which also emphasizes the importance of connecting assessment to learning outcomes:

"Student assessment procedures are expected to (...) be designed to measure the achievement of the intended learning outcomes and other programme objectives;" [5, p. 17].

This is also recommended by many authors to the point that it can be considered good general practice. To this end, we propose that for each assessment activity, the curricular unit description will specify which learning outcomes are being assessed. Additionally, each of the several assessment activities should be classified as "individual work" or "group work".

Schematically, and summing up the proposals in this section, we continue the presentation using the human-computer interaction course as an example:

(...)

Expected Learning Outcomes

On successful completion of this course unit, the student should be able to:

- LO 1: ...
- LO 2: ...

Contents

- 1. Basic Concepts.
- 2. Usability Principles and Rules.
- 3. ...
- (...)

Assessment Activities

Individual work:

- 1. Analysis of system usability. Development of a solution. Assesses the intended learning outcome 1.

Group work:

- 2. Interactive system design. Assesses the intended learning outcomes 2, 3, 4, and 5.
- 3. Implementation and evaluation of an interactive system. Assesses the intended learning outcomes 6, 7, and 8.

Note that for each assessment activity the teacher must state to which ILO that activity is relevant. This enforcement acts as a reality check for each assessment: implicitly, the teacher has to wonder about several questions, e.g.: "Why do I ask for this assessment?", "What will I be assessing?", "Is it really necessary?", "Is it similar to other assessments", "Am I assessing all the ILOs?". This last question is especially relevant, as every learning outcome must be measurable, hence assessable and gradable. It is also well-known that students learn better if they are given multiple vehicles: e.g. readings, videos, practice, discussion, etc.. For that reason, each teacher has to specify the type of assessment activity. In other words,

the teacher has to classify the assessment activity. Little assessment variability should work as a warning as it can promote surface learning and unfairness among students. Naturally, this is even more important for teaching and learning activities, which are discussed in the next section. The following section also shows how to specify the alignment between assessment and teaching and learning activities.

V. FROM ASSESSMENT TO TEACHING AND LEARNING ACTIVITIES

Teaching and Learning activities should prepare the student for the respective assessment. We propose that those activities be grouped by type and/or context. Those types and contexts should be provided as a list to choose from. This list can eventually motivate teachers to try new assessment methodologies. Typically, the list should be open, as teachers are usually free to choose the kind of assessment activities for their students. Continuing our template, we would add the following structure (with exemplary content):

Teaching and Learning Activities

Group work:

Designing of an interactive system.
Prepares for assessment activities 2, 3, and 4.

Large class:

Presentation and discussion of course topics.
Prepares for all assessment activities.

Individual work:

Analysis of an interface usability and solution proposal.
Prepares for assessment activities 1 and 4.

Autonomous research:

Research about additional topics.
Prepares for assessment activities 2 and 3.

Here, we have exemplified with four types/contexts for teaching and learning activities. As with assessment activities, the specification of the "types" of activities should increase motivation to increase variability thus fostering reflective teaching and, hopefully, improved student learning.

An important aspect is that the teaching and learning activities must be aligned with the assessment activities. It should be clear that their objective is to prepare students for the assessment activities. Hence, the specification of these connections promotes additional reflection from the course designer and guarantees that no proposed activity is unnecessary for the assessment. This offers an "automatic" answer to the classical student question, which is usually a variation of "What is the use of this?" or "Why am I doing this?". Now, it should be clear that what the student does is preparation for the assessment activities, which, in turn, measure the accomplishment of all the ILOs.

VI. FROM ASSESSMENT TO GRADING

Finally, we propose the use of a stepwise grading approach. Each assessment activity should be graded accordingly to a mixture of summative and subtractive criteria. The subtractive criteria should be used when important but simple requirements are not complied. For example, in computer programming,

code formatting by itself can be seen as necessary but not sufficient to contribute to a better grade in a given assignment. Additionally, the summative requirements can be divided in two steps: essential and non-essential. The non-essential are only counted if and only if the essential ones are totally accomplished. This avoids the temptation to deliver a fully incomplete work that “does” a bit of everything but fails to accomplish anything meaningful. Finally, the higher grades should be achieved only if the student adds something more that is not specified, thus valuing and encouraging creativity. A much more complete explanation for this stepwise grading method was already presented in [6].

VII. CONCLUSIONS

Taking advantage of some of the numerous sources already available about course design and description, especially the ECTS User’s Guide [1] and the work by Biggs and Tang [3], this paper presented a proposal for a course description template that expands and details the data and general advice contained in the ECTS User’s Guide. To that end, it adds further detail to each major component in the curricula (learning outcomes, assessment activities, teaching and learning activities, and grading) and emphasizes several alignments between the curricula components and between those and the EQF document. All these dependencies and additional data contribute to more complete, coherent, and useful course descriptions as they induce additional reflection from the teacher. In the end, the here proposed template should provide improved course descriptions at all levels and for all the stakeholders, while being especially useful for students.

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REFERENCES

- [1] European Communities (2009, February 6) *ECTS Users’s Guide* [Online]. Available: http://ec.europa.eu/education/lifelong-learning-policy/doc/ects/guide_en.pdf.
- [2] European Communities (2008), *The European Qualifications Framework for Lifelong Learning (EQF)* [Online]. Available: http://ec.europa.eu/education/pub/pdf/general/eqf/broch_en.pdf
- [3] J. Biggs and C. Tang. *Teaching for Quality Learning at University*. Open University Press, 3rd edition, 2007.
- [4] L. D. Fink. *Creating Significant Learning Experiences: An Integrated Approach to Designing College Courses*. Jossey-Bass, 2003.
- [5] ENQA (2009), *Standards and Guidelines for Quality Assurance in the European Higher Education Area* [Online], 3rd edition. Available: http://www.enqa.eu/pubs_esg.lasso.
- [6] João Paulo Barros. 2010. *Assessment and grading for CS1: towards a complete toolbox of criteria and techniques*. In Proceedings of the 10th Koli Calling International Conference on Computing Education Research (Koli Calling '10). ACM, New York, NY, USA, 106-111.
- [7] Kennedy, Declan, Hyland, Aine, and Ryan, Norma (2006) ‘Writing and Using Learning Outcomes: A Practical Guide’ in: EUA, Bologna Handbook. Making Bologna Work. Berlin: European University Association <http://www.bologna.msmt.cz/files/learningoutcomes.pdf> Presented to the Bologna Seminar: Using Learning Outcomes (July 2004, Edinburgh) http://www.bologna-bergen2005.no/EN/Bol_sem/Seminars/040701-02Edinburgh/040620LEARNING_OUTCOMES-Adams.pdf.
- [8] Bloom, B.S., Engelhart, M.D., Furst, E.J., Hill, W.H. and Krathwohl, D.R. (1956) *Taxonomy of educational objectives Handbook 1: cognitive domain*. London, Longman Group Ltd.
- [9] Anderson, L.W., Krathwohl, D.R., Airasian, P.W., Cruikshank, K.A., Mayer, R.E., Pintrich, P.R., Raths, J. and Wittrock, M.C. (eds.) (2001). *A taxonomy for learning and teaching and assessing: A revision of Bloom’s taxonomy of educational objectives*. Addison-Wesley Longman.