On the Description of Individual Course Units for Programme Assessment and Better Syllabuses

João Paulo Barros
Escola Superior de Tecnologia e Gestão, Beja, Portugal
UNINOVA-CTS, Monte de Caparica, Portugal

Abstract—**Presently, higher education programmes are being assessed at several different levels, locally, or even countrywide. In this paper, we propose a template for the description of each curricular unit in higher education programmes that seeks to promote reflective teaching, widely acknowledged as fundamental to improve practices leading to improved student learning, while being advantageous and convenient for programme assessment by external entities. To this end, we take as a starting point the template that all Portuguese higher education institutions have to fill for each curricular unit, for programme assessment purposes. Based on the literature, we argue this new template format fosters teacher reflection and provides additional and easier to compare data for accreditation boards, and the whole education community, most notably, students. Finally, we argue that it can and should be used to improve syllabuses.**

Index Terms—course design; learning outcomes; assessment; syllabus; alignment.

I. INTRODUCTION

The assessment of each curricular unit is a fundamental part of programme assessment. In fact, sound and coherent specifications of each curricular unit are of upmost importance for good curricula, not only because those specifications provide a more complete knowledge of the programme itself, but also, and more importantly, because, a good specification demonstrates that teachers, also in the role of course designers, have reflected on the curricular unit.

As in other countries, Portuguese higher education programmes are assessed by an external entity. As this assessment is mandatory it offers an excellent vehicle to force institutions to better define and reflect on their programmes, including the respective curricular units. Also, more complete and structured curricular unit descriptions should provide a better basis for the assessment itself and for students as they offer more complete and cohesive contents, as well as a more uniform format.

The present paper proposes a new template for the description of individual course units. It revises and expands a previous work [1] and builds upon another article [2] and the curricular unit specification required by the Portuguese Agency for the Accreditation and Assessment of Higher Education Programmes (A3ES). We argue that this proposal brings several important benefits compared to the existent one as required by the A3ES.

In the next section we present the core part of the curricular unit description. Section III, presents the current model used by A3ES. Section IV presents the proposed model and Section V discusses its use to improve syllabuses. Finally, Section VI concludes.

II. THE STARTING POINT

Based on numerous literatures on the subject (e.g. [3-15]), and well-known practice as anecdotal evidence, we postulate that, besides "formal data" like year, semester, hours, credits, timetable, etc., the fundamental parts that should be present in a curricular unit description are the following:

1. Intended Learning Outcomes
2. Contents
3. Teaching and Learning activities
4. Evaluation
5. References

These data are also a minimal set of relevant information regarding each curricular unit. Yet, they only become really useful when the relations between the several parts are specified in a concrete and objective way. Based on the nomenclature of other authors, most notably Biggs and Tang [13], here we call those relations *alignments*.

Learning outcomes have become especially relevant in the last few years as they are mentioned and recommended in numerous reference documents most notably, in the European Context, the ECTS Guide [5], the European Qualification Framework [6], and the European Quality Agency reference document [7], as well as in the most accepted qualification frameworks for the engineering domain: ABET [16] and EUR-ACE [17] (see also [18] for an extensive list of references relevant for this domain).

Traditionally, especially from the teacher perspective, contents are the most important part in the curricular unit description. Yet, without clear intended learning outcomes, contents are not sufficient neither to inform the student nor the teacher about the course. In fact, the contents list alone leaves too much "freedom" to the teacher and too little information to the student. It simply does not inform the student about what should be learned, done, evaluated, and why. To that end, the curricular unit description must also list what students and teachers will be doing along the course. These should also be presented as a list of items, in this case, activities.

From the student point of view, evaluation is extremely important, probably as much as or even more than

contents and learning outcomes. If there is no careful alignment between evaluation and intended learning outcomes, student learning will be seriously compromised, leading to an unaligned course (e.g. [13]).

Finally, references should all be useful to student learning. More concretely, it should be clear to which contents each one is relevant.

It is important to emphasize that here our focus is a more complete description of a curricular unit. A complete syllabus should also include several other important topics. This is further discussed in Section V.

Although probably everyone will agree that these five parts of a curricular unit description should be present, that is clearly not sufficient. It is necessary to guarantee global coherence not only to improve correctness and information completeness, but also to force significant teacher reflexion and to better inform the student. How to do this is the subject of section IV where a new model for the specification of curricular units is presented. But first, in the following section, we present the existent model, and the reasons why we believe it should be improved

III. THE A3ES MODEL

Although with a few minor variations, the documents that institutions have to fill, regarding proposals for new programmes [19] or the accreditation of active programmes [20, 21] include the need to specify the following parts for each curricular unit:

1. Learning outcomes of the curricular unit;
2. Syllabus;
3. Demonstration of the syllabus coherence with the curricular unit's objectives.
4. Teaching methodologies (including evaluation);
5. Demonstration of the coherence between the teaching methodologies and the learning outcomes;
6. Bibliography.

Each of those parts corresponds to a free text field to be filled. No structure is enforced. The only restrictions are the size of each text field.

Fig. 1 illustrates the model. The parts are represented by rectangles. The need to specify a relation between two parts is represented by dotted arrows between the two respective parts. For example, the model requires the specification of coherence (alignment) between Syllabus/Contents and Objectives/ Learning Outcomes. Also notice that "Bibliography" has no required relation to other parts.

Based on our experience, we were able to identify the following shortcomings or possible improvements to this model:

1. "Intended Learning outcomes" should replace "Learning Outcomes". This is desirable for increased focus and more importantly to allow a clear and objective specification of additional alignments with other parts.
2. The coherence between evaluation and the intended learning outcomes is not stated.
3. The coherence between methodologies and evaluation is not stated.
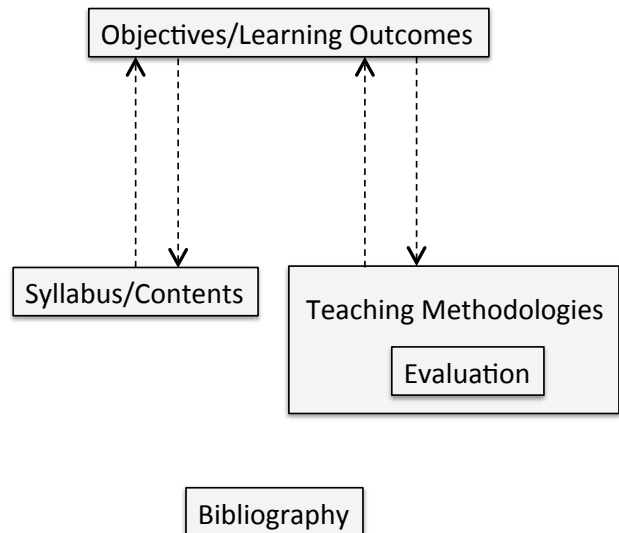

Figure 1. A3ES model for curricular unit description.

4. The free format does not force institutions to take advantage of the required template as a mean to increase and improve reflection about curricular units and the respective programmes. This is true at the level of the individual curricular unit but also at the level of the programme, and even institutional level.

5. As one consequence of the previous point, the texts in the free fields, to be filled for each curricular unit, can significantly vary in their content, format, depth, and emphasis. This is especially true, when no general rules or guidance at the programme or institutional level are defined or imposed. This variety is even more noticeable across different institutions. All this diversity hampers the external and even the desired internal assessment task, as the comparison between different courses and programmes becomes much more difficult.

6. Although present in two parts, the global coherence specification is easily incomplete. Again, the free text fields allow for incomplete and highly subjective justifications, which can easily seem incorrect or useless, as far as they offer too little added value. In fact, existent poor curricular unit specifications have often been simplistically adjusted to the required fields with no apparent preoccupation for a desirable further reflexion effort on the teachers' part.

7. Regarding learning and teaching activities (e.g. [15]), emphasis is put on *teaching methodologies*. Although probably involuntarily, this conveys the message that what matters is *what the teacher does*. This goes against the desired practice where student centred and active learning approaches should play the main role. In fact, the main message should value *what the student does*. These two views are soundly presented in the work by Biggs and Tang [13], where *what the teacher does* perspective is demonstrated to be detrimental to effective student learning.

8. "Evaluation" is mixed with "teaching methodologies", but without requiring a specification of the mutual relation.

9. The bibliography specification can convey the idea that only books should be listed. Also, there is no recommendation to split or order the bibliography by order of importance. Finally, there is no obligation to connect the bibliography to the course contents.

10. There is no structure that effectively enforces a simple way to specify and demonstrate the desirable coherences (alignments) between the several parts.

In the following section, we present a model that answers all these shortcomings while remaining arguably simple and short enough to be successfully completed and used by all teachers.

IV. THE PROPOSED MODEL

From anecdotal evidence, it is appallingly easy to find course descriptions that fulfil what Robert Diamond states:

"Most curricula are unfocused, do not include clear statements of intended outcomes, and do not produce the intended results. There's a notable absence of structure and coherence." [3]

In this section, we present a proposal for a better template for the specification of curricular units. It aims to foster better and additional teacher reflection, and to improve course related data, thus promoting better course design. More specifically, the proposal for a new template has four objectives:

1. To "force", increase, and improve teacher reflexion thus improving the chances of better course descriptions and better student learning experiences.

2. To provide more concrete, complete, and useful course data to all the stakeholders, most notably, students, candidate students, institutional bodies, teachers, and internal and external assessment boards.

3. To be short, simple, readable, objective, and complete, just like what is expected of each intended learning outcome.

4. To offer a uniform structure, allowing an easy comparison among different courses in the same or separate institutions.

The proposed curricular unit specification is illustrated in Fig. 2. Compared to the present A3ES model (already presented in Fig. 1) the following is worth mentioning:

1. It maintains the need to specify the coherence between Syllabus/Contents and Objectives/Learning Outcomes, respectively "Contents" and "Intended Learning Outcomes", in the new proposed model (Fig. 2).

2. "Evaluation" and "Teaching Methodologies" (now "Teaching and Learning Activities") are separated and the alignment (coherence) between "Teaching and Learning Activities" and "Evaluation" has to be explicitly specified.

3. "Bibliography is no longer "isolated"; it has to be aligned with "Contents".

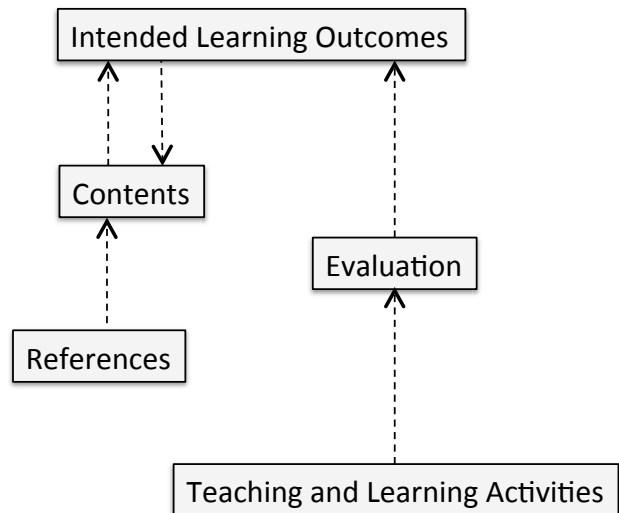4. Evaluation has to be aligned with the "Intended Learning Outcomes".

Figure 2.   Proposed model for curricular unit description.

More specifically, the proposed model has the following characteristics:

1. Each of the five parts listed on Section II is defined as a list of items. For easier reference, and especially to allow a simple way to specify dependencies between these parts, the items in those lists should be numbered. Most notably, the "Intended Learning Outcomes" part is unsurprisingly a numbered list of "intended learning outcomes".

2. The interdependencies are the *alignments* (e.g. [13]) in the sense that we want coherence between several of the mentioned parts. Each alignment — each arrow in Fig. 2 — is specified by referencing the items in the part at the end of the arrow; for example, an evaluation type (e.g. an exam) should reference the "intended learning outcomes" that will be evaluated by that exam. As another example, a specific "intended learning outcome" should reference the contents that are relevant to itself, and each content should reference the intended learning outcomes to which it contributes.

3. The often-recommended "double alignment" (e.g. [4, 12, 13]) is a fundamental part of the model. More specifically, it is present on the right side of Fig. 2 through the arrows between "Evaluation" and "Intended Learning Outcomes" and between "Teaching and Learning Activities" and "Evaluation". The fundamental idea of the sequence *intended learning outcomes-evaluation-activities* is very well justified and documented in several significant references, e.g. [3, 4, 12, 13]. In one of those references [4] it is called "Backward Design" and is defined as three steps corresponding to the three components of the presented sequence; additionally, in Biggs and Tang [13] it is part of the "Constructive alignment" principle.

4. The "Bibliography" is now named "References" to induce the use of several distinct types of sources, books, articles, websites, videos, etc. It is also aligned with the "Contents". Hence, each item in "References" should include a list of items in "Contents".

5. Each item in each part should be short and use a single clear and objective sentence or even a simple

designation or name (for example for the items in the "Contents" part). This can be seen as somehow generalizing, to other parts of the curricular unit description, the recommend practice to specify intended learning outcomes.

As already stated, learning outcomes have become especially relevant in the last few years as they are mentioned and recommended in numerous reference documents. They should be seen as the main part. Yet, as most teachers are used to start from contents, both can in fact be specified in parallel as long as the alignment between both is also detailed.

The next section proposes and discusses the advantages of including the presented curricular unit description as part of the syllabus.

V. A BETTER SYLLABUS

As already stated, some references about curricular design stress the importance of the alignments in the course (e.g. [12,13]. This paper focus is on a new template for curricular unit description, which should not be confused with a *syllabus*. This should include *all* the relevant information for the student and so it should also include the presented curricular unit description. Here, we will briefly discuss the contribution that the proposed description can bring to student learning. But first, based on several references [12, 22-26] and anecdotal evidence, we identify the following data that is typically recommended, even if not always found, in syllabuses:

1. Information about the teachers and other important personnel, including name, title, office hours, office location, e-mail address, online attendance, etc.;
2. Prerequisites (previous courses, competencies, etc.);
3. Relevant course webpages and emails;
4. A more detailed list of study materials; specific chapters, articles, videos, etc.;
5. Resources needed, e.g. software, hardware that students are expected to use, and/or have available;
6. Instructional methods; different types of classes, what will be the role of students in each type of class; what the teacher will do;
7. Recommend practices and tips for students' success;
8. The course schedule, the periods where each activity, assignment, evaluation, etc., will take place and the topics and the learning outcomes that apply;
9. Detailed rules for grading each test, assignment, etc. including the respective rationale;
10. Incomplete grades; rules about eventual validity in future;
11. The criteria for each evaluation;
12. Evaluation of the Course;
13. Requirements that are expected even if not graded;
14. Reasons for penalties in grades including their rationale;
15. Policies on attendance and timetable compliance;
16. Policies of late or missing assignments, tests, exams, etc.;
17. Policy on interrupted exams (e.g. fire alarms);
18. Policies on academic dishonesty, including cheating and plagiarism;
19. Possible types of collaboration;
20. Safety and emergency procedures, e.g. in laboratories or related to the campus and its buildings;
21. Netiquette;
22. Allowed equipment in class (phones, music, etc.);
23. Services available for students in campus; this is especially relevant for novices. For example, access to the campus internet, the library, the canteen, etc.;
24. Include a disclaimer; to foresee eventual changes in the planned activities;
25. Other statements, required by the institution.

All these are usually mentioned in literature and should not be seen as a surprise to any experienced teacher. This implies a quite large document, which also justifies a fresh and attentive look to its structure and design [27]. Unfortunately, the document dimension is a deterrent to a complete specification. This is true to the listed twenty-five topics, but also to the inclusion of the proposed description as part of the syllabus. This is unfortunate, as even if all the twenty-five topics are presented, their direct and indirect contribution to student learning can be increased by the presented description, as the already underlined alignments are really the main way to improve the traditional syllabus by showing to the student the rationale for the assessment and learning activities:

"What such syllabi often omit is any mention of learning. They list the assigned readings but not reasons why the subject is worth studying or important or interesting or deep, or the learning strategies that will be used in the course." [28]

Most references about syllabus mostly focus on templates with the recommended contents, some part of the listed topics, while giving little and sometimes no importance to alignments. Even when learning outcomes are present, the focus is not given to the relation between them, the teaching and learning activities, and the assessment tasks. Typically, that preoccupation is only present in course design references like the ones already mentioned [12, 13].

As already stated, the definition of the proposed alignments, forces additional teacher reflexion and fosters better curriculum. More specifically, the following well-known good practices for better learning, from reference [29] are promoted:

1. "Teachers must teach some subject matter in depth"; "superficial coverage of all topics in a given subject area must be replaced with in-depth coverage of fewer topics"; [29].
2. "The teaching of metacognitive skills should be integrated into the curriculum in a variety of subject areas"; [29].
3. "To develop competence in an area of inquiry, students must: (a) have a deep foundation of factual knowledge, (b) understand facts and ideas in the context of a conceptual framework, and (c) organize knowledge in ways that facilitate retrieval and application."; [29]
4. "In order for learners to gain insight into their learning and their understanding, frequent feedback is critical: students need to monitor their learning and actively evaluate their strategies and their current levels of understanding."; [29]

5. "Four perspectives on the design of learning environments – the degree to which they are student centered, knowledge centered, assessment centered, and community centered – are important in designing these environments."; "(…)there needs to be alignment among the four perspectives of learning environments."; [29]

6. "Outstanding teaching requires teachers to have a deep understanding of the subject matter and its structure, as well as an equally thorough understanding of the kinds of teaching activities that help students understand the subject matter in order to be capable of asking probing questions." [29].

The need to justify which content is needed for each learning outcome makes clear to the teacher that some contents are more important than others, and some are possibly even superfluous. This, together with the addition to each learning outcome the kind of skills being assessed (e.g. [2, 13]) will allow syllabus to clarify where and how metacognitive skills and the several cognitive domains are being considered. Also, the recommend practice of using some adequate taxonomy for the verbs in the learning outcomes will offer a direct way to check the weight given to knowledge and the respective organization, including its application to solve problems.

Feedback is only possible if some intermediate assessment (formative or summative) occurs. This implies more than one assessment, as the final one does not allow such timing feedback. Here, the alignment between teaching and learning activities and evaluations, and between evaluations and learning outcomes is of upmost importance. In fact, if the final assessment assesses all the learning outcomes it should become much more obvious the need to have several assessment or evaluations moments.

Even the design of whole learning environments is made easier if the design of each curricular unit already includes the four perspectives listed in point 5. Again, the alignments and the classification associated to each learning outcome are significant contributors to the design of the learning environment.

The "deep understanding of the subject matter" by the teacher is much more evident with the proposed template as part of the syllabus. In fact, it can be used as a tool to "force" teachers to be more demanding with themselves. Also, the fact that the teaching activities are explicitly listed, clearly promote additional reflexion on the teachers' part, thus increasing the odds of arriving at better activities for improved student learning.

VI. CONCLUSION

Based on previous works [1, 2], the literature, and field experience of the author, a new template for the description of curricular units in the context of programme assessment was proposed. Comparing to the current situation, we argued that the resulting description for curricular units would bring several significant advantages at several levels. Namely, it should "force" additional reflexion when designing the courses resulting in a more uniform, complete, readable, and coherent information to the whole community. This should provide a very improved basis for programme assessment and most importantly for better student learning.

Finally, we argue that the same template, if added to a "traditional" syllabus, will improve the information presented to the student. This, together, with the additional teacher reflexion will facilitate a better learning experience to all students, our ultimate objective.

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AUTHORS

João Paulo Barros is Professor of Informatics at the Polytechnic Institute of Beja, and a Researcher at UNINOVA Institute, both in Portugal. He received the Lic. and M.Sc. degrees in informatics engineering in 1993 and 1997, respectively, and the PhD degree in 2006, in Digital Systems all from New University of Lisbon, Portugal. His research interests include Petri nets, graphical specification languages, languages and tools for object-oriented and model-driven software development. He is also especially interested in mobile computing, software educational tools, computer science education, programming didactics, and curriculum development. (e-mail: joao.barros@ipbeja.pt)