



## A COURSE TEMPLATE FOR UNDERGRADUATE COURSES

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### Summary

*We present in this paper a template for Moodle courses according to Universidade Aberta's pedagogical model.*

*The template for first cycle (undergraduate) courses enables teachers with little technical knowledge to deliver their online courses according to a pre-defined format. UAb's pedagogical model defines several features that can be directly implemented in a VLE, particularly in Moodle: course plan, learning card, assessment decision, and assignments, with proper configurations. This gave origin to a template that saves work and avoids technical problems caused by misconfigurations. Procedural guidelines were written to help teachers in their handling of the mechanisms implemented in the template.*

*We found that the use of the template allowed teachers to concentrate on their pedagogical activity rather than on technical details. Some teachers that already had given online courses felt an improvement in their interaction with the VLE, since they didn't have to build things from scratch, especially those resources that weren't directly connected to their teaching activities, and were common to the University's model.*

*An institution that is changing rapidly from paper-based distance learning to online learning must provide resources and mechanisms so that teachers and students may accommodate to the new model. Change, particularly the re-organization of the institution and the training of staff takes time, so any pre-configured package such as the proposed template is welcome.*

### 1. Introduction

Universidade Aberta's (UAb) pedagogical model (Pereira et al., 2007) is based on four principles:

- student-centred learning
- flexibility
- interaction
- digital inclusion

The model has variations according to the study cycle to which it is applied. In the first cycle, since there are many more students than in subsequent cycles, the interaction component is smaller. Discussion forums are opened throughout the course for limited time periods, some

of them are moderated by students only, and a few are moderated by the teacher/tutor. All interactive online activities have a merely formative purpose, and are not formally assessed.

In the beginning of each course, students must choose their assessment mode: continuous or final exam. If they choose final exam assessment, their final grade is what they obtain in a final written, face-to-face, exam.

When in continuous assessment, students must produce two or three small digital documents (called e-folios) at specified times, that can be submitted online. They are also subject to a compulsory written, face-to-face, test at the end of the semester, which we call a p-folio.

E-folios, which globally form online assessment, are worth 8 points in total, while the p-folio is worth 12 points. The final grade is the sum of points earned in e-folios and the p-folio. The maximum final grade is thus 20 points, which is consistent with the standard evaluation scale in Portuguese higher education. Also, according to the Portuguese system, students complete a course when they have at least 10 points.

Additionally, in UAb's model, students must attain minimum values in both online assessment and in the p-folio. If they don't have at least 3.5 points in online assessment and 5.5 points in the p-folio, they cannot complete the course. For instance, if a student has 6 points in online assessment and 5 points in the p-folio (a total of 11 points), she cannot complete the course, since the p-folio grading is below the minimum acceptable.

The student's evolution in a course is registered in a virtual device called the "learning card" (Rocio et al., 2008), that is conceived using the metaphor of the credit card. As students complete assessment pieces, they accumulate points in the card, so they can see at any time how they are doing in each course.

## **2. Building a template for the first cycle**

A template course for the first cycle is a regular Moodle course, with all the basic elements and configurations determined by the pedagogical model: course plan, e-folios, p-folio, assessment mode choice, groups and groupings for continuous assessment and final exam, and the learning card. Also, a mechanism to automatically export grades to the academic system is included (Coelho & Rocio, 2009).

By storing a backup of this template course, each teacher (with course creation permissions) can restore it to a new first cycle course, already equipped with the basic devices, and then complete it with contents and activities. Fig. 1 shows the elements that are already included in the central area of the template.



**Figure 1 - Elements included by default in the template (News , Course Plan, Assessment mode decision, e-folios and p-folio)**

The course plan is a book resource, already formatted for teachers to fill in their specific contents.

The assessment mode choice is a simple choice activity in Moodle, so that students can choose between continuous assessment and final exam. The template also includes two default groups, for each assessment mode, where students must be placed according to their assessment choice. Since some activities are available only to continuous assessment students, a continuous assessment grouping (a set of groups) is also defined, containing only the continuous assessment group. This grouping is then associated with any activities that are exclusive to continuous assessment students, namely the e-folios and p-folio (configured to work in separate group mode). Students in the final exam group won't see these activities.

Assignment activities are defined for each e-folio and p-folio. An e-folio is an assignment where students can submit a single file, whereas for the p-folio, as the test is done offline, the corresponding Moodle assignment prevents any kind of online submission. The p-folio assignment must exist, however, since teachers must use it to give grades (and post comments) to students.

The learning card is built with the gradebook feature of Moodle. We changed its identifying icon, name and configured it properly (figure 2).

## Ficha do utilizador - Afonso Henriques



Item	Notas	Área	Nota	Percentagem	A suas opiniões
 E-fólio A		Avaliação electrónica	1,00	50,00 %	
 E-fólio B		Avaliação electrónica	1,00	33,33 %	
 E-fólio C		Avaliação electrónica	3,00	100,00 %	
<b>Σ E-fólios</b>		<b>Avaliação electrónica</b>	<b>5,00</b>	<b>62,50 %</b>	
 P-fólio		Avaliação Contínua	8,00	66,67 %	
<b>Σ Pontos acumulados</b>		<b>Avaliação Contínua</b>	<b>13,00</b>	<b>65,00 %</b>	
 Nota final		<b>Introdução aos Fundamentos</b>	<b>13</b>	<b>65,00 %</b>	

Nome de utilizador: Afonso Henriques. (Sair)

### Figure 2 - Learning card

Because of the icon and name change, the template course is configured with a web style and language different from the standard courses. As a bonus, we can in the future define a style and language for the first cycle that is completely different from the other courses.

The configuration of the learning card in the template involves four major steps:

1. Activity (e-folios and p-folio) configuration
2. Definition of categories
3. Definition of aggregate grades and calculation formulas
4. Mapping of numeric grades to symbols for final grade display

In step 1, e-folios and the p-folio are configured for maximum grade - 12 points in the p-folio and 2 or 3 points in each e-folio. The gradebook is then configured in order to reflect the behaviour of the learning card. Grade items corresponding to e-folios are included in a category called "Online assessment", which needs to be created (step 2) so that an aggregate grade can be associated with it. A category for "Continuous assessment" is also defined, including the p-folio and the "Online assessment" category. The corresponding aggregate grade contains the amount of points accumulated in the learning card.

In step 3, aggregate grades are defined as the sum of all grade items in the category, - as UAb's model establishes - not their average, as Moodle proposes by default. However, the final grade (i.e. the aggregate grade for the whole course) takes into account the proficiency criteria for each component. As we have seen in section 1, if students don't attain minimum results in both online assessment and the p-folio, the final grade is not the sum of all component grades - instead, students must see a simple 'R' (fail). Therefore, we introduced

a calculation formula to determine the final grade according to those criteria. The version of Moodle we use is rather limited regarding conditionals, which resulted in the rather cryptic formula:

$$= \text{sum}(1 - \min(\max(10 * (\text{sum}([\text{efolioA}]; [\text{efolioB}]; [\text{efolioC}]] - 3, 4); 0); 1); \min(\max(10 * (\text{sum}([\text{efolioA}]; [\text{efolioB}]; [\text{efolioC}]] - 3, 4); 0); 1) * \min(\max(10 * ([\text{pfolio}] - 5, 4); 0); 1) * \min(\max(10 * (\text{sum}([\text{efolioA}]; [\text{efolioB}]; [\text{efolioC}]; [\text{pfolio}]] - 9, 4); 0); 1) * \text{sum}([\text{efolioA}]; [\text{efolioB}]; [\text{efolioC}]; [\text{pfolio}])))$$

As we can see, it's a good idea that we define this formula by default in our template!

To display the final grade (step 4), we use the "grade letters" feature, by defining a correspondence table from percentage values<sup>1</sup> to symbols (or letters). Final grades below 47.5% are displayed as 'R' (fail). If the final grade is 47.5% or greater, a corresponding symbol (an integer number ranging from 10 to 20) is displayed.

The gradebook in Moodle 1.9 is very flexible, allowing us to configure it precisely according to UAB's pedagogical model. Two minor issues, however, had to be dealt with by changing source code and by directly manipulating Moodle's internal database.

Both issues were due to the web interface not allowing a finer granularity when inputting values<sup>2</sup>. In the first case, only integer values were allowed when grading an activity. Since some e-folios have a maximum grade of 2, this is very limiting. We thus changed the grading interface, in Moodle's source code, to allow one decimal place.

The other issue was the impossibility to precisely define the correspondence between final numeric grades and the final symbols, also due to the interface only allowing integer values. For instance, we could only define a correspondence between the 'R' letter and the maximum values of 47% or 48%, not the correct value of 47.5%, as we have seen above. In this case, however, we chose not to change the source code, and merely altered the data in the correspondence table in Moodle's internal database. This modification was automatically reflected in the backup of the template course, which was made available to everyone who restored it to their new courses.

### 3. Statistics and problems

The change to an online pedagogical model was a radical departure from the previous paper-based model. Universidade Aberta started that change two years ago, and we expect the transition to be concluded next year. In the first year, about 40 courses were online, and this number increased to ~100 this year. Next year, we expect all first cycle courses (~200) to be online.

Since the template described in this paper was only introduced in the second year, most teachers that also taught online courses in the first year found it a major improvement over the manual configuration of the first year. Other teachers didn't notice the improvement, since they didn't have the experience of the previous year.

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<sup>1</sup> Moodle represents grades internally as percentages.

<sup>2</sup> There are technical limitations that make it difficult to combine interface user-friendliness with finer control when selecting numeric values.

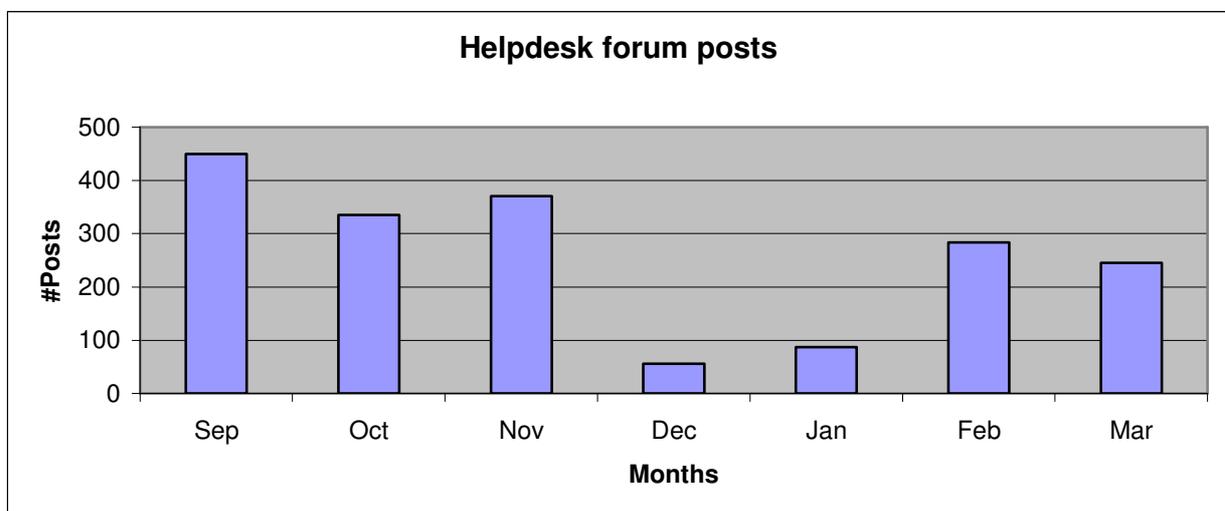
We now have 4300 students online from the total ~8000 students in the University. The pedagogical model establishes a maximum of 60 students per class, and for the 100 courses we have a total of 323 Moodle courses, one for each class.

The success of the template is confirmed by the number of classes that used it correctly: 283 from the 323 created. However, we still detected 40 classes that didn't use the template or that need to be correctly configured.

A helpdesk service, supported in a forum, was created to answer teachers questions and help solve technical problems. This service produced documentation with instructions on how to use the template, how to configure and how to clone courses for each class. Most problems that teachers had were due to difficulties in the restoring process, especially when the courses were loaded with many files or had many quizzes. The helpdesk service and the Moodle administrators effectively helped teachers to complete partially restored courses.

Another problem had to do with the formula calculations: in some cases calculation was so time-consuming that the system timed out, while in other cases mis-calculated grades appeared in the learning card, leading to student complaints. Mis-calculated grades also occurred when teachers edited the grades directly in the learning card, since Moodle doesn't recalculate the end result in this case.

Problems are always expected to occur, but the efficient response of the helpdesk and the administrators solved them so that all courses could function normally. Even when help requests were high (see Figure 3), all problems were solved in due time, and the experience from the first semester (September/October) significantly reduced the number of requests in the beginning of the second semester (February/March).



**Figure 3 – Posts in the helpdesk per month**

#### **4. Conclusions and further work**

Moodle, as an open source learning management system, is one of the best and most flexible solutions available for implementing online education. This paper describes the construction of a Moodle course template for the first cycle according to Universidade Aberta's pedagogical model.

This was done by pre-configuring a course with the required elements as defined in the pedagogical model and distributing it to teachers. Most of the features of the learning card could be implemented directly in Moodle, by appropriately configuring its gradebook component. Only two minor issues needed modifications to internal Moodle code. Since this code is available through Moodle's open source licence, the small modifications required were very easy to perform.

The goal of producing a template for first cycle courses, available to teachers, was fully achieved. Universidade Aberta has gone through a very rapid change from traditional distance learning to online learning, and most teachers are not familiar enough with virtual learning environments to be comfortable with the configurations and tweakings required by the pedagogical model. Some problems occurred, as we can expect, but they didn't hinder the process. Apart from performance and availability problems that were overcome in the initial transition stage (Coelho & Rocio, 2008), we faced several technical problems in this second phase that we were also able to overcome.

Other technical aspects have been addressed in related work, such as the connection of Moodle and the academic information system (Coelho & Rocio, 2009). This allows us to use Moodle to automatically publish grades into the academic system. Another aspect that we dealt with is the automatic enrolment of students in courses, according to the information in the academic database.

Besides improving the documentation and updating the template using the present experience and feedback, we intend to optimize usability by contributing to the Moodle user community with code that overcomes the problems we detected in formula calculation and backup restoration.

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