

# The use of test plans as a quality instrument in the production of rooms on Moodle

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## SUMMARY

*This article has as a goal to present a quality instrument used by the CEAD/Ifes' materials production team, for the elaboration of virtual rooms on the Moodle environment. For this, it is done initially, a discussion about the matter of quality in the production of institutional material for distance courses. In the following, it is reported the production process of these materials used by CEAD/Ifes and the actors involved in that. The developed instrument of evaluation- a thesis plan with 21 items - is now explained. At last, it is done an analysis with basis on the data obtained after the application of the thesis plan in thirteen disciplines of the Ifes' Technology in Analysis and Development of Systems distance course.*

**Keywords: Quality, Thesis Plan, Quality Guarantee, Audit, Production of Instructional Material.**

## **1- Introduction**

The Distance Education (DE) is the planned learning that normally happens in a different place from the teaching place [2]. So for the teaching and learning process can happen in an effective way, it is necessary to guarantee three important aspects: the planning, it means, the didactic organization of the course according to the pedagogic project of the course; suitable technological infrastructure; mediation and systematic following of the students by the facilitator.

Concerning to the didactic organization, we should consider, among other factors, the production of printed and/ or digital material that should be available for the students. The technical and pedagogic quality of the institutional materials favors the success of courses offered in distance.

After the approval of the Technology in Analysis and Development of Systems graduation course (TADS) on the first edict number 01/2005 from UAB, the Instituto Federal do Espírito Santo (Ifes) created the Distance Education Center (DEC) - which goal is the introduction of the course and the management and technological support as well, for the offer of other courses in several levels in the distance modality.

At DEC/Ifes there is a material production team who is responsible for the technical review and layout of all the printed material and also of all the material digitally available. Besides, it is this team's responsibility, the edition of the virtual rooms by the use of the learning virtual environment (LVE) Moodle.

Observing the importance of the didactic material "pass through a rigorous process of previous evaluation (pre test), which goal is to identify adjustment needs, searching for its improvement" mentioned in Quality Reference for Distance Courses [1] the production team elaborated a quality evaluation instrument of the rooms edited on Moodle.

This paper intends to present the challenge of searching the quality in the production of virtual rooms through the verification of the work performed according to the standards and procedures previously established. There

are presented the test plans used by DEC/lfes for the validation of the rooms edited on Moodle.

## **2- The Instructional Material Quality**

When it talks about instructional material for the distance modality, there are a range of actors involved until the delivery of this material final version. It knows that the quality of a distance course doesn't depend only on the instructional material but on a collaborative and integrated work between the involved parts. So, it is important to focus on the quality during the materials production.

According to ISO 9000:2005 [5], "quality is the level in which a group of inherent characteristics satisfies the requisites". It means it is possible to affirm that, if some product or service attends to the specified requisites, this same product or service has the desired quality. Applying this concept to the instructional materials is complex because it depends on the target public that will use it, as concern to previous knowledge about the subject, learning facility as in other abilities necessary to an effective learning.

The quality is a recurrent theme in the systems development area. Many practices applied by the Software Engineering may be used, not only to construct systems, but also in other activities including the construction of virtual rooms on the Moodle environment, task that needs a reasonable level of the software knowledge, but also involves pedagogic and instructional design concepts.

The guarantee of the software quality comprehends 7 (seven) great activities: application of technical methods, performance of formal technical reviews, activities of software test, application of standard, change control, measurement and maintenance of records and reportings [3]. As soon as an specification is created, it must evaluate the quality.

The quality is defined as a way that involves supervising the process of software development, with the purpose of assuring that the procedures and the standards of quality guarantee are followed [4]. This will do for the

process update that must be adjusted when the product of the created work stops satisfying its specifications.

The quality has some basic principals, such as:

- Trying to prevent defects instead of fixing them.
- The found defects must be corrected as soon as possible.
- Establishing and eliminating the defect causes and the symptoms
- Auditing the work according the previously established standards and procedures.

Looking for applying these principles in DE, some attitudes were already taken at DEC/lfes: replaned qualification with basis on the main mistakes found in the printed material and in the construction of the room on Moodle, creation of a checklist (tests plan) of the produced material, improvement in the communication process among the staff involved in the material production and a follow-up of the main activities to guarantee the continuous improvement.

The table 1 presents the norm ISO/IEC 9126-1 [6], which describes a model of software product quality. In the third column, it is presented an adaptation for the creation of the room on Moodle.

<b>Characteristics</b>	<b>Sub-characteristic</b>	<b>Adaptation for the room in Moodle</b>
Functionality (needs satisfaction)	Adequacy (performance of what is appropriated). Accuracy (performance in a correct way) Interoperability (transparent communication) Conformity (being according to the norms). Access security (blockage of no authorized use).	All the resources must be created according to the DEC/lfes standard for the rooms of Moodle.  Creating titles with precise and complete information.  The users must have their profile configurated according to their position (student, professor, specialist, facilitator, etc).
Reliability (immune to failures)	Maturity (decreasing the frequency of failures). Tolerance to failures (way of reaction to failures)	The information about necessary plugins or players must be precise.  The backups must be performed

	Recoverability (way of failures recovering).	everyday.
Usability (easiness of use)	Intelligibility (easiness of understanding). Learnability (easiness of learning). Operacionality (easiness of operation).	All the information must be detailed and attend to any user..
Efficiency (fast and clean)	Time (answer time, speed of execution). Resources (used resources).	The files must respect the maximum size estimated (currently 5M). The answer time in the rooms depends on matters if infrastructure and access to Internet..
Maintenancebility (easiness of maintenance)	Analyzability (facility of finding failures). Changeability (easiness of change). Stability (low risk when it happens alterations) Testability (easiness of testing).	The Moodle presents itself as a simple maintenance tool when it concerns to rooms edition.
Portability (use in other environments)	Adaptability (easiness of adapting to other environments). Ability to be installed (easiness of installing in other environments). Conformity (suitable to standards of portability) Ability to replace (easiness of being replaced).	All, the tests on the Moodle rooms must be done in different navigators.

**Board 1.** Norm adaptation for the Moodle room.

In this article the emphasis will be given to the quality test of the virtual rooms, one of the requirements for the quality evaluation.

### **3-The Production of Instructional Material of DEC/Ifes**

One of the first activities performed by DEC/Ifes searching for the quality control was to establish a process. It enables to identify which stages must be developed, which actors are involved, which deadlines and tasks to be performed.

The first stage consists in the elaboration of the activity map by the content teacher. The instructional designer must insert his comments and send them to the professor for changes. After the corrections, the professor must

work with two parallel activities: the production of the printed material and the production of the adapted activity map. The production of printed material involves another process that is not focused in this article. On the other hand, the production of the adapted activity map involves the confection of a range of standard forms for the requirement of resources construction on Moodle, besides videos, images and other medias. After the forms viability and suitability analysis made by the designer, the professor must do the necessary changes and finish this stage. Then, the designer sends the forms to the production team to implement the resources of the several forms.

After the production of virtual rooms, the production team performs a tests plan to verify if all the resources are suitable to the DEC/lfes' quality standard

It is important to highlight that several tools are involved in this process and they help a lot to guarantee the quality. However, the focus of this paper is to specifically analyze the tests phase and the quality criteria evaluated in this stage.

#### 4 The Evaluation Instrument of the rooms on Modle

With the goal of evaluating the quality of the virtual rooms, it was developed a test plan model based on the principles of Software Engineering. The central idea of the developed instrument is to avoid a room being online with the absence of any especial resource or even with pedagogic problems, although these problems must be analyzed before this stage. For the elaboration of the tests standard, there were identified 21 items considered essential for a good quality virtual room. The table 2 shows these items in short.

1. Verifying the initial orientation. Evaluate if the professor is directing the student to his profile and if he presents his educational background and professional experience.	12. Checking if the lessons PDF files are open correctly.
2. Verifying if the professor's video is in the room. Open the video and check if it works.	13. Checking if the questionnaires are configurated with feedback in each question and if they are with a suitable number of tries
3. Verifying if the discipline dynamic is in the room. Open the dynamic and evaluate if it is working.	14. Verifying if all the weeks have Doubts Forum. They always must be the weeks' last resources.
4. Verifying if the News Forum is in the room.	15. Checking if in the tasks that require to send files , the

	extension of the file to be sent is specified.
5. Verifying if the "Hora do Cafezinho" Forum is in the room.	16. Verifying if all the tests in attendance are created as off-line tasks. Cheking if the tests are scheduled on Wednesdays.
6. Verifying if the room is organized by weeks. Evaluate the number of weeks according to the Activity Map.	17. Verifying that the substitute tests are without grades or with grade 0 (zero).
7. Verifying if there is the discipline syllabus is in the room description.	18. Verifying if all the animations and all the room's videos work correctly.
8. Check if there is the virtual Library. In case of no file at all, the professor must be asked if he wants to insert some complementary reading.	19. Verifying the feedback of all the resources with automatic answers. Checking if there is a satisfactory answer and not only right or wrong.
9. Check if the integrated weekly schedule of the current month is in the room. Check if the dates are consistent.	20. Checking on the grades table if the total of the activities is 100.
10. Verifying if all the weeks have Activity Schedule..	21. The closure dates will always be on the following Tuesday after the activity of the week, at 11:55pm.
11. Verifying in the evaluative tasks if there is a highlight for the grades and for the performance deadline.	

**Table 2** Items of virtual room tests plan.

The plan previews that happen three sequences of tests until the certification that there are no problems in the room. It is very important that each sequence be performed by a different person from the one who made the virtual room.

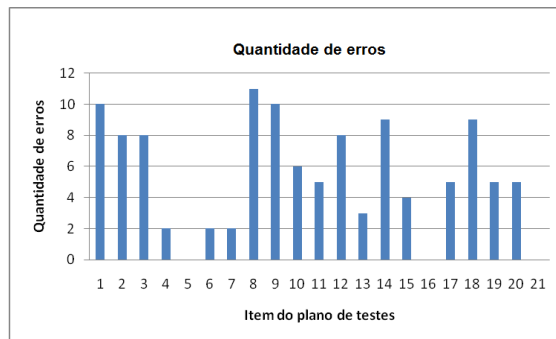
The plan structure also previews that the observations about each item be inserted by who is testing, to make the problems solution easier. The plan sections are: A) Item: Item code to be tested. Currently a number is used; B) Test: description of the tests to be done; C) Sequence: uses the classificators "OK", when there is no problem; "NOK" when there is a problem and N/A when the analyzed test isn't concern to the analyzed room; Observations: observations that can help on the solution of an eventual result "NOK".

## **5 Analysis Results obtained by the Use of the Tests Plan**

The tests plan with 21 items, mentioned in the previous section, was used in 13 disciplines of the DEC/Ifes' Technology in Analysis and Development of Systems graduation course.

The graphic in picture 1 shows the quantity of mistakes according to each item of the tests plan. It is possible to notice that there weren't found

mistakes in the tests of the items 1, 16, and 21. The items 4, 6 and 7 presented few incidences of mistakes (2). The items 10, 11, 13, 15, 17, 18 and 19 had an average quantity of mistakes (from 3 to 6). But the items 1, 2, 3, 8, 9, 12, 14 and 18 presented problems in a high number of items (from 8 to 11).



**Picture 1.** Quantity of mistakes by item of the tests plan

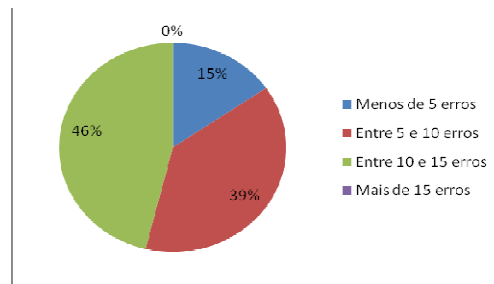
By the results of the tests plan use for each discipline, it was possible to identify the problems and correct them before their beginning. But other important aspect can be highlighted from this paper: when the results of the different evaluations are compared, the materials production team starts having condition of analyzing more carefully each item, in special the ones that had more incidence of mistakes and plan preventive actions to avoid that these mistakes happen in future disciplines. For example, determined subjects can be included in future qualifications, the professors instructions can be more detailed, more templates can be created, etc.

Another positive aspect related to the use of the tests plan is because despite this evaluation activities has, apparently, more technical character, it also allows to detect variations in pedagogic standards. For example, through the item 18, it was possible to verify that, in many evaluations, the kind of feedbacks that was being given to the students wasn't appropriate. They were like: "Very good, the answer is correct!" or "I'm sorry. Your answer is wrong."

The picture 2 shows the distribution of mistakes by disciplines. As it can detect, despite none of the disciplines has reached more than 15 mistakes, few of them had less than 5 mistakes (only 15%, it means, 2 disciplines). Most of them had from 10 to 15 mistakes (46%, it means, 6 disciplines), with great



representativity also of the ones which had from 5 to 10 mistakes (39%, it means, 5 disciplines).



**Picture 2.** Disciplines according to the quantity of mistakes.

It is important to realize that if a methodic process of evaluation hadn't been performed, possibly a great part of the problems found wouldn't be noticed, and that would cause negative consequences later. It is worth to highlight that one of the disciplines that presented a greater quantity of problems (13) was Programming I, a first semester discipline, considered as a key in the course and pre-requirement for several other disciplines of the following semesters. On the other hand, the discipline that presented less mistakes was FTI (2).

The first impression can be that Programming I, has lower quality than FTI, as there were detected much more mistakes in the first one. But this analysis is wrong. Some disciplines might present few mistakes for using few resources. So, at the moment of the tests, many items will appear as "not available". On the other hand, several mistakes might be detected because it uses several didactic and audiovisual resources. Obviously, as much as it creates as much risks it takes, so there are more chances of having mistakes.

So, it must be clear that the tests plan hasn't, as goal, to inform if a course has quality or not. It aims to identify problems in the creation of the virtual room on the Moodle environment so these tests might be corrected in time.

It also isn't the aim of the tests plan to encourage the creation of simple rooms with few resources. On the contrary, it is desired that the DEC courses use the maximum of distinct resources to favor the student's motivation, socialization and other different learning styles.

## 6. Conclusions

The use of the tests main goal is to guarantee the quality of the material produced at DEC/lfes. Using these tests it is possible annul possible problems in the use of the room by the student. This article presented a tests instrument, with 21 items to use in the evaluation, post-edition on Moodle of the learning virtual rooms of the disciplines to be offered.

It evidences, with basis on the analyze of the results obtained through the tests given to 13 disciplines, important follow-ups to be given by the production team. Among them: identifying the problems and correcting them before they start to happen; identifying the frequency of mistakes and planning preventive actions, among others.

It is also important to highlight that the incidence of mistakes is not directly related to the complexity of a discipline, but to the quantity of resources used to its edition.

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