

AULATIVA: DIGITAL LEARNING WORKPLANS

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Abstract:

The *Aulativa: Digital Learning Workplans* project is an effort to implement didactic activities for 600 computer labs of the State of Rio de Janeiro public school system. The project developed a set of 960 ICT-based workplans, covering 9 disciplines, from grades 5 to 12, and reaching around 60.000 students. The project started with the development of a unique educational framework that connects curriculum guidelines, contents and transversal skills. The workplans developed established links between the classroom and the computer lab: in the classroom, activities are suggested to motivate students for the upcoming computer lab work; in the lab, computer resources are used to develop skills and to help cover content; back in the classroom, teachers broaden the learning process.

1. Introdução

The present stage of development of information technology makes mandatory that we take seriously into consideration their use in the school systems. For that effect it is also essential that care be observed in the formulation of the adequate conditions for its use, if we want to foster discovery and independent construction of knowledge as fundamental components of the learning process (**SUTHERLAND, 2004**). From the very moment computers were introduced in our Public School Systems, it is fair to assume that teachers have endeavored to develop laboratory activities that would help their students to use them and improve their learning results. It is also fair to say that the visible results of this policy are not satisfactory, especially if we take into account the amount of investment involved. Perhaps this is in large measure due to the excessive confidence, on the part of the people responsible for the public system, that the introduction of new technologies in schools would by itself be sufficient to provide significant learning experiences for the students.

The *Aulativa: Digital Learning Workplans* project is an effort to implement didactic activities for 600 computer labs of the State of Rio de Janeiro public school system. The project developed a set of 960 ICT-based *workplans*, covering 9 disciplines, from grades 5 to 12, to be available to around 300000 students every year. The project aims at improving the quality of learning through the use of recent educational methods and to integrate the computer lab and the traditional classroom.

The project adopted a pedagogical strategy that places students at the heart of the knowledge acquisition process and induces collaborative and autonomous work. It thereby raises knowledge retention to levels which are higher than those reached using traditional methods (PERRENOUD, 1999).

The workplans establish a link between the traditional classroom and the computer lab by: (1) in the classroom, suggesting activities to motivate students for the upcoming computer lab work; (2) in the lab, using computer resources to develop skills and to help cover content; (3) back in the classroom, encouraging teachers to broaden the learning process, like in the DNA Interactive Project (**DNA Interactive, 2005**). They aim at improving the student's learning abilities, developing competences and encouraging him or her to look for the solution for the questions proposed by the available reference material and by his/her own experience.

Workplan design followed the curriculum guidelines (SEE-RJ, 2006) defined by the State of Rio de Janeiro Education Department in 2005. The design was guided by a unique educational framework that connects the curriculum guidelines, contents and transversal skills.

Workplan implementation adopted MOODLE, a freeware learning management system which is widely popular (COLE 2005; CORICH 2005; BRANDL 2005). It explores the computer resources available to create attractive material.

This paper is organized as follows. Section 2 introduces the pedagogical model. Section 3 comments on some implementation decisions. Section 4 contains the conclusions.

2. Workplan Pedagogical Model

In general, the design of the workplans was guided by the competence pedagogy. In particular, it followed a matrix that combined competences, content and specific tasks, articulated in a way that each workplan offers the student the opportunity to develop a given competence and to appropriate a given content.

The development of a competence means that the student will leverage knowledge he or she already possesses to develop creative and effective answers to new problems (CHAVES 2003). That is, he or she will be encouraged to find resources to face a given problem-situation.

Table 2.1 shows the transversal competences used to formulate the workplans. This collection was selected after a careful analysis of the objectives and competences enumerated in the curriculum guidelines (SEE-RJ, 2006) elaborated by for the State Secretary of Education of Rio de Janeiro in 2005, with the cooperation of the Federal University of Rio de Janeiro (UFRJ).

Table 2.1 – Transversal Competence Matrix.

Competence	Description
Identify	recognize, point, indicate, determine the element or elements that pertain to a situation, process, or phenomenon, etc.
Characterize	indicate the attributes that identify a situation, process, or phenomenon, etc.
Differentiate	indicate the differences between situations, processes, or phenomena, etc.
Relate	indicate the similarities or the causality relationship between two or more situations, processes, or phenomena, etc.
Compare	indicate similarities or differences between two or more situations, processes, or phenomena, etc.
Analyze	critically relate
Evaluate	after analyzing, make a decision, offer a final judgment
Explain	show understanding, creating a new example, a new relationship
Debate	argument, discuss, indicate points in favor or against
Conceptualize	indicate, present, explain the essence of a situation, process, or phenomenon, etc.
Select Information	distinguish relevant information from secondary information pertaining to a theme in question
Produce	write a text, poem, spreadsheet, poster, report, etc.

The competence pedagogy has been criticized for adopting a perspective which is generalist (RAMOS 2002). Another source of criticism is that, when one starts from the students' own experiences, one has to deal with his presuppositions. Such presuppositions, considered as "folk knowledge", may be placed at the common sense level, and may in fact be misconceptions. This question must be seriously considered, as otherwise one runs the risk of considering that the mere systematization of knowledge suffices for the student to establish relationships between ideas, fact and phenomena. In addition, one must not assume that knowledge systematization will be possible from the intuitive knowledge that the student possesses. Quite to the contrary, in the competence pedagogy model, knowledge created throughout the ages is not relegated to a secondary level, but it is understood as a valuable asset, although not absolute, to produce new knowledge. What is at stake is not knowledge content, but how to address it.

To illustrate this point, Padilha (2003, p.23) reports that a high school student, after a Chemistry quiz, commented:

“– I think I scored it! – commented the student.

Asked about the topics of the quiz, she answered back:

– It had to do with the chemical compounds added to food.

Asked again:

– Then tell me which ones are harmful?

The answer was:

– Ah, that we have not studied”

Padilha questioned the purpose of studying chemical compounds added to our food, if it were not to induce criteria to select which food to buy or to help curb the abuses of the food industry.

The competence pedagogy leads to a new didactic architecture whose foundations are laid on a different triangulation between teacher, student and knowledge. The teacher, in this new architecture, guides his/her students through different didactic activities.

Not all activities are adequate to organize the work around competences, though. The workplans developed in the project emphasized didactic situations with a potential to instigate, compare, experiment and debate.

Case studies offer a good example of one such didactic situation. A case study consists of presenting, in a succinct way, a real or fictitious situation for group discussion. The presentation of the case may take the form of a narrative, a dialog, a photo sequence, a film, a journal article, etc. It aims at contextualizing and bringing realism to the activity. In addition to proposing and discussing alternatives to problems of various natures, the workplans also request the production of advertisement material, news, posters, multimedia presentations, etc. They invite the student to alter or paraphrase the lyrics of a song, a poem or a tale, or invent new endings to fragments of literary works. They also encourage collaborative work, using Wikis, for example.

The workplans indeed offer a plethora of opportunities for the students to exercise their abilities for autonomous production, critical analysis, and creative drive. These opportunities reinforce the students' self-esteem, motivating them to reach higher levels in their education throughout their lives.

The workplans also explore the possibility to transform students into authors. In the traditional classroom, the activities proposed are a prerogative of the teacher or the textbook, putting the student in a passive role. The teacher becomes the sole responsible and the only target of his productions, ending up with little or no commitment to them. If, otherwise, one stipulates that the students' productions will become available to all, they will hopefully become much more involved with their work.

Moving the authorship to the students does not transfer the teachers' responsibilities to the students. It just means to re-balance the responsibilities between the players. The teacher will be responsible to plan the learning opportunities, taking into account the specificities of the individuals, the innumerable opportunities for an interdisciplinary approach, and the technological and linguistic challenges that the authorship calls for. The student will become the author of his assignments and, when assuming the responsibility of sharing his/her production with others, he or she will become more conscious of knowledge construction and of the ethical responsibilities of his work.

Indeed, the workplans develops in the Aulativa Project propose activities where the student is the main author, encouraging him to explore a large variety of languages, using multiple computer tools where appropriate.

3. Implementation Highlights

The implementation of the Aulativa Project reflects a few characteristics of the computer lab environment of a typical school, including hardware and software characteristics, as well as the user profile. This section highlights some implementation decisions that influenced the design of the workplans.

First, and foremost, the computer lab environment imposed severe restrictions on how the workplans were designed:

- workplans that depend on Internet access must be optional, since not all schools have Internet access;
- workplans must assume that the typical student is not familiar with computers;
- workplans must be designed to fit into the standard classroom schedule (a little less than one hour), and they must not presuppose that the student will return to the lab within a short period of time.
- workplans must be self-contained, that is, they must contain all instructions necessary to their execution and they must not assume that the student will be helped by a computer lab assistant.

The environment, as well as budget limitations, imposed constraints on the deployment of the workplans. The implementation team opted for *Moodle – Modular Object-Oriented Dynamic Learning Environment* (COLE 2005; CORICH 2005; BRANDL 2005), basically because: it is offered under the *GNU*

General Public License, that is, there is no licensing cost; it is widely used and, hence, it does not constitute a technological risk; it basically offers all facilities expected from a learning management system; and, lastly, there is a version in Portuguese.

The interface and the structuring of the courses were carefully designed to meet the usage restrictions, mostly the computer lab limitations and the low level of familiarity with computers expected from the students. The navigation through the courses and inside a course is uniform and follows a pattern which is easy to learn and remember (see Figures 3.1 and 3.2 at the end of the text). Activities within a workplan that require Internet access are clearly identified, and considered optional. Therefore, all computer labs will support the workplans, independently of Internet access. Finally, a color scheme was adopted to differentiate among the disciplines, and a set of icons was used to distinguish between the grades.

In addition to the resources that MOODLE offers, some workplans used specific applications to illustrate the content topic or to exercise some form of production. For example, the HagáQuê application (HQ 2006), a comics editor designed for educational purposes, was adopted to create an interesting environment where the student may author new material; the NASA WorldWind (**WorldWind, 2005**), which allows any user to zoom from satellite altitude into any place on Earth and the IrYdium Virtual Lab (**IrYdium, 2005**) for chemistry classes

4. Conclusions

The new educational paradigms value the insertion of new technologies into the learning environment to privilege knowledge construction, emphasizing innovation and the discovery of new facts as a fundamental stage in the learning process.

However, the introduction of new technologies, by itself, is not enough to create a learning environment which is stimulating and meaningful for the student. It is a fact that the interest for the new technology among students and teachers alike rapidly decreases, if the cognitive processes are only in the novelty of the media.

The importance of the use of computers in education must not confuse educators. Making students familiar with computers is important, but it is not sufficient. One must encourage students: to reason and assimilate, in a creative way, the information they receive through this media; to evaluate and criticize the information they receive; to understand the decision making process; to understand that learning is a life-long process.

Lastly, we remind that the Aulativa Project was conceived to integrate traditional classroom work with computer lab activities, thereby contributing to improve the learning process.

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Figure 3.1 – First screen of a course showing the list of workplans.

Figure 3.2 – Main screen a workplan.