Project SOL – Strategy about use of on-line support tools for optimization and integration of learning and teaching process in blendedlearning modules on graduation

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Method and technology

Higher education

Description of the Project in progress

Innovative experience

Context of the proposal development

In Brazil, since the approval of the law of the “Diretrizes e Bases da Educação” (Law 9.495/97), with his 80th article, the Distance Education has been stimulated by the Federal Government as a strategy of democratization of education access. Among other actions, wiht the ordinance 4.059/04, high education institutes were allowed to offer by 20% of the curriculum in “distance graduation courses” mode (blended learning) [2]. This premise has been used with different objectives, like the features optimization, use of new information and comunication technologies applied to education, and also as a strategy to improve learning and teaching processes [6,8,9,13,14].

Discussions about this subject had triggered a bunch of reflections, not only about Distance Education, or the use of technologies applied to education, but had triggered reflections about the didatics and pedagogical issues, such as methodologies, curriculum, assessment, processes of teaching and learning objectives [5,8].The organization of the education modules, where the disciplines are addressed in an integrated way, is an example of paradigm in discussion. In this model of curriculum organization, teaching teams, which was before responsible for different disciplines, now is capable of organize the approach of its contents related, in an attempt to get closer the academic training to the professional actuality, through an integrated view of the phenomena under study, rather than a fragmented perspective. This design brings new challenges, not only to the management team, but mainly to the University, on the reorganization of curricula and the activities develpoment in classrooms.

In this regard, with a portion of the workload of these modules in a blended learning format, with the help of support on-line tools, could be a strategy not only facilitating the integration of knowledge and methodologies, but also to supporting student learning and teachers' work.
Project SOL - Learning and Teaching with Support On-Line proposal is to promote the achievement of these goals.

Project SOL

Project SOL was conceived during discussions about the process of reformulation of the pedagogical projects of courses for the Healthy College at “Universidade Metodista de São Paulo”. From this restructuring activity, the curricula of different courses no longer consist of disciplines and began to integrate content through Teaching Modules. The proposed project aimed to meet the following demands that emerge from discussions between teachers, coordination and direction:

Demands regarding the organization and integration of information and strategies

1. Integration work of teachers responsible for different modules that make up the school semester and the topics addressed by these different modules.
2. Integration of information among teachers, coordination, students and staff monitors.
3. Alignment of speech and educational vision of all personnel involved in the processes of learning and teaching.
4. Monitoring the activities of students and teachers for the course coordinator, to integrate aspects of management and didactic teachings.
5. Facilitating access to learning objects and activities available online by teachers of different modules in a same internet web page.

Demands on the strategies of study of students

1. Development of new study strategies by students involved
2. Adaptation of the study activities of students through extracurricular activities, without compromising the quality of education.
3. Support online students on several doubts and questions.

Demands for the improvement of the proposals and strategies

1. Improvement of teaching and pedagogical strategies used
2. Change design and improvement of pedagogical design of learning objects and activities developed in the courses

3. Data mining strategies for personalized support to students' studies

4. Definition and monitoring of the objectives of each semester in terms of skills, abilities and knowledge individually.

5. Registration of semesters in a single platform for integration with other modules in subsequent semesters of the course (historical records).

6. Optimization of processes of learning and teaching

At first, the proposed actions were intended to satisfy the demands concerning the organization and integration of information, proposals and strategies, and strategies for students' studies. With these objectives the project was implemented as a pilot project in 2009 to the First Semester of Biomedicine Course, in the morning and night periods, involving a total of 4 study modules (Table 1), 11 teachers, 8 monitors and 114 students.

Modules study	**Includes the knowledge of the following disciplines and/or themes**
Cells and Genoma	Cell Biology, Molecular Biology, Genetics and Basic Histology
Biomolecules and Metabolism	Organic Chemistry and Biochemistry
Biomedical Instrumentation	Biophysics, General Chemistry and basic laboratory
Stage	Practical activities in laboratory and clinical disciplines (in view of the activities developed by the Biomedical)

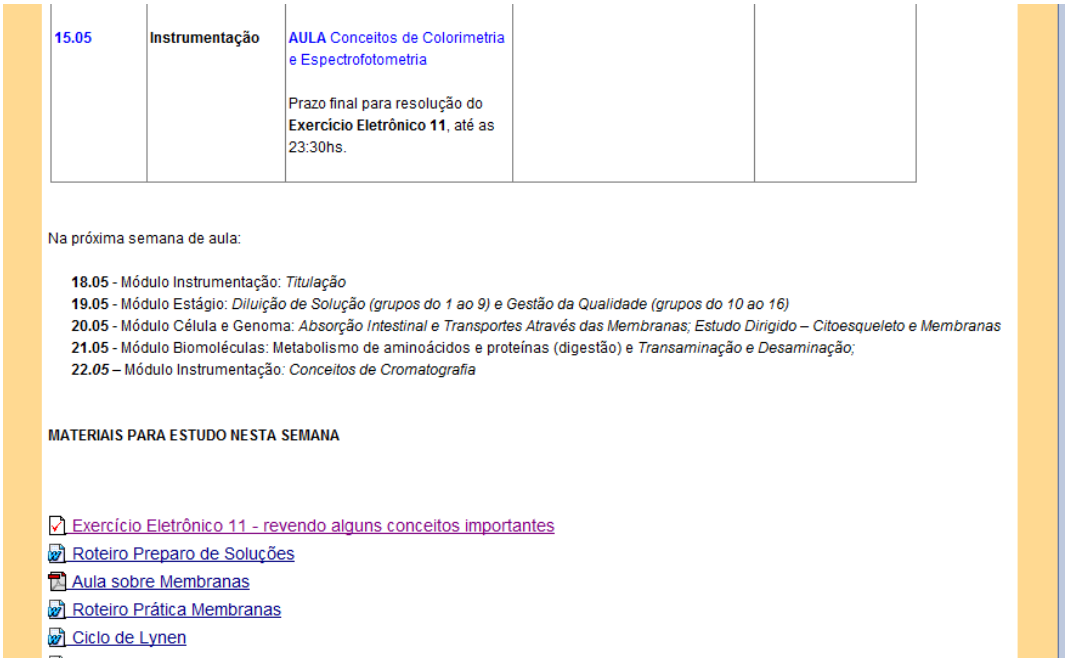
Table1. Modules of Study 1. Semester Course Biomedicine and correspondence with the former organization's disciplinary curriculum.

Organization and integration of information and strategies

To meet the didactic and pedagogical needs an operational design was used the Virtual Learning Environment Moodle, considering its characteristics in terms of navigability, usability, and the possibilities of system configuration in a flexible and self-learning way.

This configuration would allow each class to have access to a unique environment of course, which were all registered: coordination, teachers, students, monitors and all modules of the semester. Moreover, in each Class, the configuration of the course would be set in 'topics' format, updated weekly. Thus, both students and teachers involved, could view and be aware of all activities carried out daily for each module, and monitoring the demonstrations of students, teachers, and coordination through communication tools also available. Every Friday a new topic of the course would be available through the weekly schedule, containing information about the classes of relevant week and for the next week too, like activities, study materials, references and other information from all modules, as shown in below:

Figure 1. Weekly Schedule: You can view the two permanent forums available and part of the weekly schedule, with different information. The above schedule includes the activities carried out between days 05 to 08.05.09, was released on Friday for the previous week, in 01.05.



15.05	**Instrumentação**	**AULA** Conceitos de Colorimetria e Espectrofotometria Prazo final para resolução do **Exercício Eletrônico 11**, até as 23:30hs.		

Na próxima semana de aula:

18.05 - Módulo Instrumentação: *Titulação*
19.05 - Módulo Estágio: *Diluição de Solução (grupos do 1 ao 9) e Gestão da Qualidade (grupos do 10 ao 16)*
20.05 - Módulo Célula e Genoma: *Absorção Intestinal e Transportes Através das Membranas; Estudo Dirigido – Citoesqueleto e Membranas*
21.05 - Módulo Biomoléculas: Metabolismo de aminoácidos e proteínas (digestão) e *Transaminação e Desaminação;*
22.05 – Módulo Instrumentação: *Conceitos de Cromatografia*

MATERIAIS PARA ESTUDO NESTA SEMANA

Exercício Eletrônico 11 - revendo alguns conceitos importantes
Roteiro Preparo de Soluções
Aula sobre Membranas
Roteiro Prática Membranas
Ciclo de Lynen

Figure 2. Weekly Schedule showing information about next week's activities, and other study materials available, among them “exercício Eletrônico”, which is a Moodle questionnaire. Available access as a visitor at www.metodista.eduead.com.br.

In drawing up these Weekly Schedules teachers who would use the Google Docs, through which could registration the necessary information, and provide to teaching colleagues all the scripts for study, learning objects and questions for preparation of online Exercises Weekly. This tool allows for collaborative editing of documents online form, reducing the need to face meetings for discussions about it. One of the teachers responsible for coordinating the project, along with members of the team of monitors, would review and finalize the material, as well propose strategies for integration. In addition all teachers, with time allocated for activities on line, could participate in this activity to integrate and manage the project.

As shown in Figure 1, two forums were set up permanently: the *Forum of Course Coordination*, with general information about the course, notes of the coordination and teachers about activities, deadlines and other academic information, and the *Discussion Forum of the Class*, in which students could exchange information about questions, and discuss various issues of study with teachers and monitors. The tool *Messages*, which allows the exchange of messages between all participants was also provided. Both the messages and threads in the forums would be sent personally to an e-mail address of all

participants registered in the academic system, facilitating access to this information.

Development of strategies to studies by students

Providing the course content material in advance (every Friday through the Weekly Schedule concerning the activities of next week) students could be organized to study in advance, conduct preliminary activities, printing scripts and attend school classes with some knowledge of the subjects [1]. As of Monday would be available a Weekly Exercises for Electronics (Moodle questionnaire), with questions on the topics of the week in progress, and weeks earlier, for all of the modules to be resolved until the Friday of that week, as the following schema:

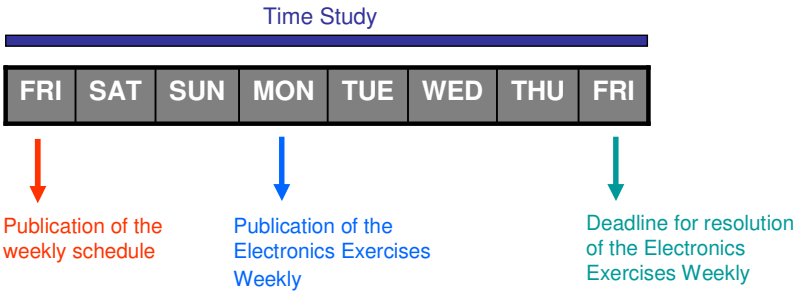


Figure3. Spatial organization of weekly activities.

The objectives of the Exercises Electronics would be:

• Encourage the study of materials of the weeks related to the classes content in advance. This is because there is a critical period for increasing the retention on a subject after his initial presentation, enhances learning about it [1,7,14].

• Integrated issues raised by different modules, through the collaboration of all teachers in the preparation of the exercises. The integrated content gives them context and enhances learning process [1,4,12].

• Encourage the previous study. In this kind of exercise, after each response, the system would provide feedback to the student, as this could learn

from their mistakes and discuss with colleagues any questions, counting on the support of teachers and monitors through the Forum for Discussion of the Class [1,4,5].

• Correct and discuss assessments already carried out, with students answering the same questions again, and having access to the feedback system. This would allow for reflection and learning about their mistakes, with the possibility of answering questions through the Forum for Discussion of the Class [1,4,5].

To each new week of studies published, Weekly Schedules published earlier would be concealed in order to provide focus attention on the organization of studies in the Weekly Schedules in progress. Weekly organizing has been indicated as the most suitable option for managing time and organizing tasks [3].

In addition, we calculated an average time of 4 hours per week, corresponding to hours of online study (in blended learning) so that students could carry out the activities requested. With the integration of information teachers could scale more adequately the weekly workload of pupils' study [11]. Another action would be to divide the class into groups and the assignment of tutors (senior students of the course) as guiding of each of these groups. The functions of monitors includes:

- Monitor the frequency of student access to Moodle and verify any problems or troubles to access the system.
- Motivate the study of materials available in advance
- Encourage and mobilize participation in the *Forum Discussion of Class*
- Clarifying doubts, with the help of tecahers
- Testing tools and Exercises Electronics, before publication
- Organize study groups for students with attendance problems
- Making a diagnosis of the Project with the students participating in the offering of the course
- Suggest strategies and evaluate the actions in progress since they have studied the same modules in 2008.

Project Progress

To access its progress and some indicators were defined, and will be obtained through the following instruments to collect information:

1. Data mining provided by Moodle.

2. Application of an evaluative questionnaire for participants, based on valuation models DL course [9,10,11].

3. Collection of opinions from the course coordination.

4. Performance comparison between the Initial and Final Test, with themes of all Modules

5. Students scores in different modules of study

6. Comparison of the final scores of the classes from 2008 and 2009, on the same topics list

7. Comparison of data obtained in items 2, 4 and 5 for the students of Nutrition, Pharmacy, Biology, and Biomedicine concerning the module Cell and Genome (offered for the other courses with the same team of teachers, but without the structure of Project SOL)

From these data we will achieve a analysis of every student performance, highlighting: where knowledge are better assimilated by using support of online tools, and what strategies are more effective in fostering learning through these tools [9,10,11,12]. This information will serve to the appropriateness of the proposed project, given its effectiveness in achieving the objectives initially set. Then be made any adjustments and implementation of actions related to other objectives as originally proposed.

By the time the project is in offering, to the 2nd. semester, with some changes, based on data mining from experience by the 1nd. semester (reported here). We emphasize that this was already done and the project was restructured (subject for a future article about it).

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