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Newsletter N°3

PBL in EUCLIDES: a new way to develop skills and to become a passionate life-long

PBL for promoting the passion for learning

Learning, however difficult, can be fun and rewarding. Do you know that when the brain learns something it releases the chemicals that produce some delirious happiness?

But learning can be also frustrating and demanding. There are times when we would just rather someone tell us what to do so we don't have to go through all the practice and failures.

If you don't have periods of frustration and periods of excited happiness you aren't learning.....or not very much.

Problem based learning (PBL) was invented to promote a passion for learning. Medical schools found that after earning their degrees a large percentage of doctors quit reading any medical research. That meant that many physicians were prescribing treatments that were out of date. The cause of this lack of life-long learning was simple. The doctors had come to hate learning. Listening, reading, and regurgitating memorized descriptions, terms, and formulas had wrecked their ability to enjoy medical learning.

Problem based learning is the simple but revolutionary idea that problems should come before answers. Instead of instructors giving you answers and then testing to see if you have memorized them you will encounter problems or "messes" to tackle before teaching begins. Beginning with a problem puts you in the driver's seat.

It's possible to fail and that doesn't mean that you are a bad person - it means you made a mistake. You have to find out what you did wrong and try something different.

That's the way we learn best: by failing.

As strange as it seems the human brain is failure machine. It generates models of reality, acts on them, and adjusts or creates new models based on failures. Look at the life of a successful entrepreneur, author, artist or scientists and you will find a history of failures. Successful people use the failures to improve. Others worry over failure and try not to take chances. But there is not much to learn from success - indeed, we often learn the wrong things.



Euclides for studying science through the solution of scientific problems

Students rarely can apply what they have learned to the unpredictable problems of life. Students get little practice in thinking for themselves or framing problems that interest them. As a result, students come to see learning as something grim to be avoided.

PBL in Euclides is a pedagogical approach to the study of sciences, which is based on a collaborative method through the use of ICT.



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It's a methodology which improves learning and facilitates new habits in studying and learning science.

Problem solving is not the same as doing an exercise. In "exercise solving" we recall and apply past routines. We work forward from the past to the solution. Usually there is one right answer. In "problem solving" we begin unsure about how to proceed and what new knowledge we need for a solution. We work backwards by starting with a plausible solution and then search for the necessary knowledge to support it, change it, and apply it. There is no single right answer, but better and worse solutions. Solving problems is more difficult.

The good news is you have been doing it and you'll have to do it for years. Your first task is think about how you go about solving problems like buying a car, choosing a major, or getting your room to pick up clothes...



Today the world of work, citizenship, and daily tasks require more knowledge and thinking skills than ever.

The days of going to work and having someone tell you what to do are disappearing fast. We call our times the age of information. It means that we all need to be experts, leaders, managers, creators, and innovators. The necessary knowledge to do these things changes rapidly. What you have learnt quickly will be obsolete. As a result, you must prepare to learn throughout your lifetime and PBL can be a good and funny way to do this.

Setting the PBL

There are many ways to solve problems and lots of experts to tell you how. Nearly all of them agree that groups can solve problems better than individuals if they plan and take certain steps. This outline will introduce you to the basics of the PBL method: the importance of the setting.



The setting is the first and very important step of the Euclides work and it consists of setting the rules to regulate the work group.

Students, under the teacher's supervision, establish the group organisation (criteria), the system of rules (teacher and students) as well as the definition of ethic rules for the group, the establishment of the typology of product presentation (communication of results), the assessment tools and the sharing of criteria and tools for documentation.

The most important task in this phase is to establish a non-judgmental climate in which students recognize and list what they know and what they do not know.



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During a setting phase one of the student asks to his teacher, "You mean in the Euclides work we have to figure out what we need to know and then help each other learn it? That's the teacher's job, not mine."

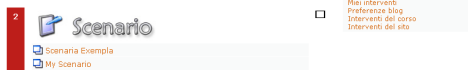
The teacher replies, "Yes, that is just what it means. My job is to design the problems, select resources, help you manage your learning, be your coach, and constantly strive to make the process better. Your job is to learn".

The Scenario, a "ill-structured" situation for the problem definition

A PBL Scenario contains a problem to be presented to the group. The Scenario could be inspired by literature, television programmes, news programmes or newspaper articles. Here learners experience an information-rich situation that will make them understand important physical and social contexts relevant to the task. Scenarios should be introduced to students without giving them any prior information. They should gather the information needed or learn new concepts, principles, or skills to solve the problems presented in the Scenarios.

A good and effective Scenario is close to reality, in line with the student contexts and with the learning results and assessment; it should also be appropriate to the level of study, to the level of complexity/openness and challenging.

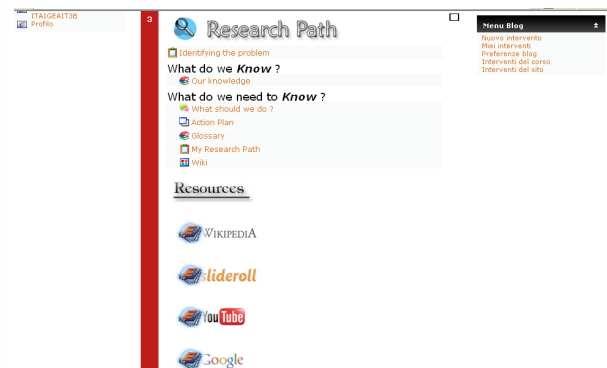
The scenario could be a cartoon, a video, a newspaper article, a photographic document, audio file, a TV programme which may arouse the interest of the class (e.g. the EUCLIDES platform).



The research path: where's Your Evidence?

Adopting the Problem Based Learning methodology, students learn to investigate the same way as scientists, conducting real life science investigations. This simply means they gather the necessary information or learn new concepts, principles, or skills as they engage in the problem-solving process.

During the research path, they apply many strategies such as: asking questions, designing experiments and developing hypotheses. Using the scientific method in combination with problem based learning, students develop a better understanding of experimental investigations.



The best types of investigations for this strategy are science mysteries. Students use critical thinking skills as they design and conduct an investigation to solve a mystery. To do this the students have to: List what is known - Develop a problem statement - List what is needed - List possible actions, suggestions, solutions, or hypotheses.

So PBL gives the students the opportunity to examine and try out what they already know; discover what they need to learn; develop their skills for achieving higher performance in teams;



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improve their writing and speaking abilities to state and defend with sound arguments and evidence their own ideas; and to become more flexible in their approach to problems that surprise and dismay others. Despite the work and effort it requires, PBL In EUCLIDES is never dull and is often fun.

What About Evaluation in PBL?

Problem based learning provides learners with the opportunity to become self-coaching. It helps students learn to evaluate their performance and figure out how to improve. How do you know if your argument is sound, your presentation effective, your explanations meaningful, and your understanding useful? Schools use the mechanism of grades. Students can use grades to reflect on and improve performance or they can use grades to avoid the struggle of learning.

Some researches pointed out that the correlation between grade point averages and success in life - measured by satisfaction with work, family, community, plus income level - is close to zero. What does that mean? Mostly that the ability to memorize stuff doesn't help much in the work world. The abilities to understand and solve problems do pay off, but both require students to fail and learn. In Euclides the evaluation consists in assessing the solution to the initial problem. Each group assess the validity of the work carried out.

It is important that each student as well as the group have the opportunity to reflect on the process of learning that has taken place. This includes reviewing the knowledge acquired, and is a chance for group members to share the feedback on contributions to learning and an evaluation of the group's work.

Furthermore, summarizing new learning helps consolidating it for future application.

It involves a lot of talking - stating ideas, defending propositions, and criticizing: also the assessment contains ideas on how to make learning more effective and more efficient for students.

For entering the Euclides Platform:

Through the web page <http://www.era-edu.com/euclides> or from the project's website <http://www.edu-projects.eu/euclides> , and by clicking on "E-Learning Section", the platform for the experimentation opens.

