PBLMD

GUIDE FOR PBL PEDAGOGICAL TRAINING CURRICULA AND PROGRAMMES

Editors
Otilia Dandara, Valentina Pritcan, Lucia Cepraga, and Elena Gogoi

www.pblmd.aau.dk

Erasmus+





This project has been funded with support from the European Commission. This communication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

EPP-1-2015-1-561 884, DK-EPPKA2-JP-CBHE

Introducing Problem Based Learning in Moldova: Toward Enhancing Students' Competitiveness and Employability (PBLMD)

www.pblmd.aau.dk

Problem-based learning (PBL)

WORK PACKAGE 5

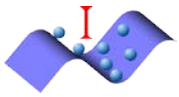
Elaborated by: Otilia Dandara, univ. prof., SUM
Valentina Prițcan, PhD, assoc.prof., SUARB
Lucia Cepraga, PhD, assoc.prof., AESM
Elena Gogoi, lecturer, PhD student, TUM

Evaluated by: John Reilly (external expert), University of Kent, UK
Olle ten Cate (external expert), Utrecht University, The Netherlands
Ralph Dreher, University of Siegen, Germany
Olga Kordas, Royal Institute of Technology, Sweden
Colin Simpson, University of Gloucestershire, UK
Olav Jull Sørensen, Aalborg University, Denmark
[the name of the AAU staff from the respective discipline in alphabetical order: Ivan Aaen, Diana Stentoft, Louise Faber, Marianne Stokholm, Olav Jull Sørensen

„This project has been funded with support from the European Commission. The European Commission funding support for this project does not constitute endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein"

Content:

List of conventional signs



Introduction to the stated subject

Module outcomes

Information benchmark

Tasks performed in group or individually

Transfer of acquisitions in situations of professional activity

Reflections on personal and professional development based on what was learned

RATIONALE

This guide aims to provide conceptual and methodical support to teachers in higher education for implementing the PBL strategy. The context of achieving education in general, as well as initial professional training in particular, requires universities to be receptive and flexible to the beneficiary's requirements. Today more than ever, the student and the employer are the ones who get involved, or should be involved in designing and carrying out the educational process. This is dictated by the need for the most efficient connection of the purposes of the professional training to the conditions of the professional activity. Undoubtedly, the theoretical knowledge, which the university environment has and which constitutes the scientific and cognitive basis of the professional training, were and remain important. Over the years, good skills training practices have been accumulated, but the conditions of socio-professional integration at the moment are different than a few decades ago, changes in different sectors of the labour market are rapidly occurring, which increases the knowledge and skills gap accumulated at faculty with the realities of the professional activity. In these conditions, an essential change in the conceptualization of the study programmes and the teaching-learning-assessment strategy becomes inevitable.

This change also has methodological premises. In the last decades, the field of education sciences has also evolved considerably. In educational practice, various paradigms and approaches are known. The educational environment can choose strategies depending on purpose and context. These can be adapted and applied creatively and individually according to the mission and the particularities of functioning of the academic environment. The methodological condition, which was mentioned, is in agreement with the operating principles of the higher education institutions, which presuppose academic and research autonomy, a normative framework that allows universities to decide on the way of organizing the educational process.

This guide, that we propose to the university professors, comes to cover the difficulty of methodological support that this category of employees faces. Unfortunately, the university pedagogy in the Republic of Moldova has a modest contribution in supporting teachers. Employees from universities are left to deal with the challenges of the constantly changing teaching process. The presentation of the conceptual benchmarks of the teaching strategy based on problem solving, as well as the tasks of self/assessment, have as purpose the training of the competences necessary for the application of this strategy in the universities of the country.

In the elaboration of this guide, there were used materials / papers developed by colleagues from partner universities and reference specialists in the issue of PBL.

The structure of the guide reflects the structure of the curriculum of the professional training and development programme and is focused on:

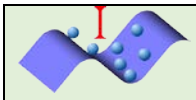
- formation of the attitude regarding the necessity of change in higher education;
- demonstrating the fact that today the university environment is an environment that values the diversity of methodological approaches in the professional training process;
- presentation of conceptual benchmarks and configuration of good practice examples regarding the main aspects of the educational process: designing the study programme

and curriculum of the discipline; organizing teamwork; applying interactive strategies; conducting an authentic assessment.

The guide is only a methodical support that offers the possibility for trainers, but also for each teacher, to use the bibliographic resources on their own to study the problem-based learning. Even in the universities with the richest traditions of using the PBL, each study programme adapts this strategy to the particularities of the professional training field and to the concrete conditions. The responsible and creative approach of the support materials will contribute to the implementation in the higher education system of the Republic of Moldova of a strategy focused on the active involvement of the student in the professional training process and strengthening the partnership with the representatives of the labour market.

The authors

1 MODULE I. THE NEED FOR CHANGING EDUCATIONAL STRATEGIES IN HIGHER EDUCATION. PBL, AS AN OPPORTUNITY OF CHANGE



INTRODUCTION

Higher education, from the moment of its establishment, expressed the level of the aspirations of the society and responded to the needs of the social environment. Universities have evolved over time along with the society, they have been the environment in which knowledge and values have been strengthened and amplified. The element of academic autonomy, the research potential and the mission of training specialists in various fields of professional activity, transformed the universities into centers of intellectual elite, which have ensured and continue to ensure the evolution of human civilization over time. Not in vain, the complex and uncertain socio-economic conditions of the late twentieth and early twenty-first century, have transformed universities into one of the most important factors of economic growth and of strengthening social cohesion.

The new conception of higher education, known as the Bologna Process, aimed at transforming the European economy into one of the most competitive economies in the world, by creating a unique European higher education area, open to young people from all regions of the world. This conception also changes the educational paradigm, by promoting a student-centered education, ensuring the quality of professional training through the partnership of the university and the labour market environments. Through this openness, the teaching strategies that emphasize diversity, active learning, critical thinking are encouraged. Under the respective conditions, the university management and the teaching staff in the Republic of Moldova must adopt a different kind of training than the teacher-centered one, centered on the teaching of the teacher. Problem-based learning in project activity is a strategy that is in line with the new trends in higher education. This approach offers a conceptual framework and a mechanism for achieving the education, focused on the active involvement of the student in the formation of professional skills, through the direct contact with the problems of the professional environment.

OUTCOMES

At the end of the module the trainees will be able to:

- describe the essence of PBL;
- identify the basis / theoretical benchmarks of PBL;
- analyze the possibilities of applying the PBL, depending on the specific field of professional training;
- argue the need to change the traditional training strategy in the university, through the PBL strategy;

1.1. CHARACTERISTICS OF THE EDUCATIONAL CONCEPT IN HIGHER EDUCATION

How has higher education evolved in recent decades?

The post-war period, anywhere in the world and throughout Europe, becomes the golden age of university expansion. The geopolitical restructuring of the world, as well as the reconceptualization of the role and purposes of the higher education institutions, produces that quantitative massification of the universities and the admitted students, a fact admired and praised at the moment, but with unpredictable and unforeseen prospective effects. This educational expansion has been the most pronounced of all time, catalyzed by the hopes and visions of newly created states, of nations consolidated on the international arena, and has become a symbol of social equity and democratization of society.

The 1960s marked a doubling of the number of students who received initial training in higher education institutions, spendings on the education sector increased significantly, and education became a national industry. This process of development never encountered, eventually generates certain difficulties, such as the education crisis.

Philip Combs, in the work that revolutionized the vision on education and marked its reconceptualization, the *World Education Crisis: Systems Analysis*, founded three terms as pillars of that deep crisis in education, which characterized the entire world at that stage. Change, adaptation and disparity become those symbol elements of the education crisis in the 1960s, materialized by the metamorphosis processes through which all the states of the world went, adapting the educational systems to the new social requirements and thus producing a disparity between supply and demand for education worldwide, this phenomenon becoming, in fact, the essence of the global education crisis. (Coombs Ph., 1989). Later, this problem is also highlighted by E. Faure in the UNESCO report of 1972, who comes with the term “learning society” as a prospective model for remedying the crisis and adapting the educational systems to the daily realities of society (Faur E., 1974).

The key elements of the crisis of the mid-twentieth century were: failure to relate curricular content to the increasing level of student needs, non-relating the education to social realities, educational inequalities in various social groups, increasing the ratio between the investments required by education and the costs that could be incurred supported by different states, as well as the failure to adapt the educational system to the labour market (Coombs Ph., 1989).

Some scientists were pleading at that time for the “recovery of the university spirit” of Humboldt in order to prevent the university from giving up functionalist tendencies, the result of economic systems. Others were of the opinion that the Humboldtian model should be taken as a benchmark and adapted to new conditions (Moraw P., 1990). However, the key initiative of this period was the launch of the project “university - research center”, which would have three missions: research, professional training and public service, defined by JR Perkins as “an organization of scientists engaged in discovering and disseminating knowledge, with the

responsibility of pursuing that knowledge to be used to improve the human condition" (Perkins JR, 1965).

Sorin Cristea, in his numerous approaches to the problem of the contemporary world and the existence of educational models valid for the 20th-21st centuries, cites Coombs and emphasizes the existence, at the level of the education systems of the most developed countries, of four categories of fundamental contradictions: a) the contradiction between the high demand for quality education and the impossibility of the education systems to provide a quality education (beyond the "political" success of the formal access to education); b) the contradiction between the investment in education (which may be significant in the case of the developed countries) and the results obtained over time, which do not confirm the investment made at the social or community level (an example being the one of unemployment among young graduates); c) the contradiction between the social systems (economic, political, cultural, even religious), which are becoming more and more flexible in modern society (industrialized, democratic), and the education systems, which remain extremely rigid, increasingly rigid, more conservative; d) the contradiction between the need for renewal of the educated, of innovation and the "sclerosis of tradition", characteristic of some teachers, but also of those who design education (Cristea S., 2006).

The 1970s, '80s of the twentieth century outline new parameters of the crisis, transforming from a crisis in education to one of confidence in education, when the results offered by education systems in different states cease to satisfy people's expectations. The abundance of people with higher education not employed in the field of work, the global recession and the slowing growth of national economies, as well as the advancement of technologies and the changes of economic structures in both developed and developing countries, have cataloged this situation as a "metacrisis" which continues to this day, despite common attempts to remedy the situation.

By the beginning of the 21st century, the consolidation of the national socio-economic systems is noted; establishing and consolidating national education systems; elaboration of educational concepts and educational policies in correlation with the ideology of national states and the needs of developing national economic systems. At the socio-cultural and economic level, the phenomenon of globalization starts. The transfer of knowledge, the efficient use of resources is perceived by the European community as a chance of consolidation and revitalization within the parameters corresponding to the 21st century society of the European economy. In this sense, universities, higher education is appreciated as a primary means of achieving development desires.

What are the conceptual benchmarks of the new conception, the Bologna Process?

The new conception of the functioning of higher education is oriented towards the establishment of the European System of Higher Education, which was launched in the 1990s of the 20th century.

For this process, there were premises such as: the technical-scientific revolution that generated the phenomenon of globalization, facilitates indirect communication; the predominance of the economic interest at regional / global scale in relation to the national ideological provisions; intensifying social mobility; the demographic crisis in Europe; appreciation of education as the

main source of overcoming economic crises; internationalization of the economy; strengthening the position of some international languages.

The concept of higher education, called to revitalize the European economy, is called the Bologna Process. This name is accepted on the basis of a historical event (the one thousandth anniversary of Bologna University),

At the basis of the current conception of higher education, the following principles are placed:

- The principle of using / capitalizing on existing international / regional structures, the normative framework and the practical experience;
- The principle of receptivity of education to socio-economic issues;
- The principle of establishing unity on the basis of diversity;
- The principle of openness and flexibility;
- The principle of the tendency to emphasize the prospective character of education in the context of permanent changes in the society.

At the base of the conception is placed a socioeconomic objective: the rational use of human capital and labour force, by creating a transnational system of higher education.

The core of the Bologna Concept is stipulated in the *Magna Charta Universitatum*, which configures the following ideas: the future of humanity depends on education, and the universities are meant to carry out this process; universities must ensure for the younger generations a cultural, social, economic future through university studies and preparation for further education; universities, through education, must ensure a balance between the natural and the social environment (MCU).

The concept of higher education is configured on the basis of the following provisions:

- Adopting a system of diplomas that is easy to read and compare;
- Adopting a system based on study cycles, which makes it absolutely necessary to adopt a common amount of qualifications;
- Adopting a credit system such as ECTS or a compatible one, which offers both the possibility of transferability and accumulation;
- Promoting mobility;
- Promoting European cooperation for quality assurance; the consolidation of the European Quality Assurance Network in Higher Education (ENQA);
- Promoting the European dimension in higher education;
- Lifelong learning;
- Higher education institutions and students;
- Promoting the attractiveness of the European higher education area for young people from other regions of the world;
- The social dimension that includes measures taken by governments to help students, especially those from disadvantaged social groups, as well as to provide guidance and counseling services to widen access to higher education;

- Employment in the field of work and the correspondence of the studies with the demands of the labour market, the stimulation of the professional insertion capacity of the graduates throughout the active life.

NB The new concept of functioning of higher education, emphasizes the active involvement of the student, the partnership between teacher and student; professional training from the perspective of labour market needs; academic mobility in order to know and capitalize on the diversity of the European university environment. These conceptual dimensions are in line with the problem-based learning strategy

	**Tasks** • Identify, based on the supporting information and previous knowledge, the cause of the crisis in education, found by the UNESCO commission, in the 70s of the last century; • Analyze, using the informative benchmarks and professional experience, which is the difference between the traditional conception of higher education and the new conception, Bologna Process; • Argue the necessity and importance of the functioning of higher education based on the systemic approach of all the conceptual benchmarks of the Bologna Process concept;
	**Synthesis and transfer** *Try to answer a few questions, to determine the possibility of applying those learned in the professional activity*. • What difficulties does my institution face in achieving higher education according to the Bologna Process conception? • Which of the provisions of the Bologna Process is best fulfilled within the institution in which I operate? • What will I have to change in my professional activity to achieve the provisions of the Bologna Process conception in their entirety? • What will I have to change in my activity in order for the individual working hours of the students to bring value to the professional training of the students?
	**Reflection** • What opportunities for professional growth did this activity offer me? • What would I improve on this topic / problem if I organized a training with colleagues? • What should I study / do in the near future, to improve the knowledge

	and skills I have acquired? • What arguments would I bring to my colleagues in order to motivate them to make full use of the possibilities offered by today's European Higher Education Area?
Conclusions	Higher education is an expression of the evolution of human society. The changes produced in the society are also reflected in the functioning of the universities. Today, changes are fast and sometimes unpredictable. In these conditions, universities must respond to a challenge, such as professional training adapted to the ever changing conditions of the labour market. Although since the 70s of the last century UNESCO commissions find a crisis of education, caused by the mismatch between university acquisitions and the demands of the labour market, the European community, towards the beginning of the 21st century, emphasizes the role of universities in ensuring a sustainable development of the economy and strengthening social cohesion. Starting from this goal, the conception of higher education is developed, the Process Bologna, which emphasizes the focus of the didactic process on the student, the partnership with the labour market and the exploitation of the didactic and scientific potential of the university environment.

1.2. THEORETICAL SOURCES OF THE PBL STRATEGY

Why did various educational strategies appear?

Problem-based learning is one of the strategies used in the didactic process conducted in the university education. As the field of pedagogy and psychology developed, the debates on the efficiency of the application of various theories became more intense, sometimes the relationship between the learning context and the life experience being little understood.

Without pretending an exhaustive presentation of all approaches, we will try to present the links between various educational and psychological theories (behavioral, cognitive, humanist) and problem-based learning.

Learning theories that are based on student experience and the role of tutors have increased in importance since the 1980s, so we present theories that focus on the value of meaning building, personal transition, learning context and student identity. Thus, the diversity of educational and psychological theories have generated a diversity of educational approaches / strategies, each with its strengths and disadvantages, which gives the decision-makers the possibility to choose from them, depending on what is desired to be achieved through the educational process.

How did behavioral theories influence problem-based learning?

While some behavioral theories seem to be contrary to problem-based learning, the approach has certain elements that can be classified as behavioral in nature, such as those presented by Thorndike, which have provided an understanding of improving learning through feedback, clear goals and practice, concepts that underlie many forms of problem-based learning. In addition, theories that underlie learning motivation promote a key aspect of problem-based learning and state that students should be motivated as stakeholders trying to solve an important problem. One of the provisions of the behavioral theories, which does not correspond to the ideas promoted by the PBL, is the assertion that we can observe learning only through behavioral changes. Thus, they see that learning is a relatively permanent change in behavior as a result of experience or practice. This makes the product or outcome the most important factor, rather than the iterative learning process that problem-based learning is trying to promote.

What was the contribution of cognitivist theories to problem-based learning?

Unlike behavioral theories, cognitive theories are directly related to mental processes (which include intuition, information processing, memory and perception), rather than products (behavior), which some would suggest are more consistent with the process approach of solving the problem. Cognitive theorists try to understand how individuals learn and what happens inside the mind when learning occurs. This type of education focuses on the cognitive structuring that is essential to develop the capacity and skills for better learning, or to learn how to learn, one of the main goals of problem-based learning.

The existing cognitive structure is the main factor influencing meaningful learning. In practice, this indicates that a significant material can be learned only in relation to a learning context relevant to the concepts. Supporters of problem-based learning, as well as promoters of other forms of active learning, argue that students enter any learning environment with pre-existing knowledge and structured cognitive acquisition. The key idea in this approach is focused on supporting the students, so that they can use their previous knowledge and ways of thinking to build a new cognitive structure, which are intelligible and meaningful to them.

The cognitivist theories highlight two types of approach: deep and surface approaches. Students who might focus on memorization (surface approaches to learning) and those for whom deep essence acquisition is important. The deep approach predominates the intention to understand the vital interaction with the content. It connects new ideas with previous knowledge. It connects the concepts with the daily experience. It correlates the evidence with the conclusions. The surface approach is focused on the student's intention to complete the assignments, according to the teacher's requirements. The assignment is treated as an external constraint. To memorize the information needed for the assessment. Learning activities are perceived as separate elements, without being integrated with the purpose and strategies.

The deep approach correlates well with problem-based learning. Students can often start by engaging in the problem using a surface approach, and as they become more experienced, they tend to adopt deep approaches.

In addition to cognitive theories, as support for problem-based learning, there are also theories of cognitive development. Developmental theorists provide models that take into account knowledge and development. The teacher's concern is to allow students to develop both understanding of the nature of knowledge and ways to manage different conceptions of the world, so that the acquisition of knowledge is seen as an active process. Piaget's theories of cognitive development (Piaget 1929), for example, are based on the notion of cognitive structures. Like Vygotsky, Piaget believed that the activities that the students could carry out are well suited to their cognitive stage or preparation. Piaget defined four major stages of development since birth. Piaget's theory is perhaps one of the first to analyze how people grow and develop over time and how the act and process of learning itself changes. Later, Perry expanded this concept. In the process of attaining intellectual and emotional maturity, the student passes from an authoritarian and polarized perspective on the world, through stages of uncertainty and acceptance of uncertainty, until finally an understanding of the implications of managing this uncertainty. The student then accepts the need for guidance by adopting a commitment to values and finally gaining a distinct identity through a careful and constantly developing commitment to a set of values. The theory of assimilation of Ausubel (Ausubel et al., 1978), emphasizes the idea that better learning occurs if people can find meaning in learning. Learning occurs when a learner is presented with new information that possesses some external or internal characteristics that allow it to be associated with previous learning. This theory shares the idea of Gestalt theories, as learning requires a vision of the whole. According to Ausubel, there must be a bridge between the new material and the existing ideas, which are instrumental to learning. These approaches recognize that what is lacking in many study programmes are a recognition of the role and relevance of learning from and through experience, which can determine the formation and reconstruction of people's lives as students and teachers.

What is the relationship between humanist theories and problem-based learning?

Humanist theories, including the work of psychologists such as Maslow and Rogers, give us a further understanding of problem-based learning. Maslow (1968) presented a hierarchy of needs that range from essential physiological and safety needs to self-actualization and transcendence. These psychologists see learning as a personal act designed to harness the potential. Students, they believe, have both emotional and cognitive needs, so the goal of learning is to self-actualize and self-notice, and education should facilitate the development of the person as a whole. Learning involves the transition to self-development of a fully functioning person. The student's previous experience is recognized and it is also recognized that students may be constrained by their own negative learning experiences. According to this theory, in a problem-based learning environment, the mentor (here referred to as facilitator), helps to create a supportive environment in which students are able to recognize and explore their needs. Learning in problem-based learning, from a humanistic perspective, is considered as involving the whole person and not just the intellect.

How does constructivism correlate with problem-based learning?

The followers of constructivism consider that knowledge is not absolute, but is built by the learner on the basis of previous knowledge and general world views. As for mental processes,

constructivism shares some ideas with cognitive theories. However, when comparing constructivism with behaviorist and cognitive theories, the constructivist sees reality as determined by the experiences of the learner. The transition from behaviorism, through cognitivism to constructivism, represents changes in the approach of the learning process: for behaviorism, the internal processing has no interest; for cognitivism, the internal processing is important only insofar as it explains how the external reality is understood. Instead, constructivism views the mind as a symbol constructor - the tools used to represent the reality of knowledge. Constructivists consider reality as being personally constructed and claim that personal experiences determine reality, not vice versa.

Constructivism is a theory developed by Bruner along with Tolman, Lewin, Bigge and Alrport. Constructivists mention that students build knowledge and are predisposed to learning. It also suggests how knowledge can be structured and dissociated so that it can be learned, arguing that the learner must be active, because only he can select and interpret information from the environment. Thus, constructivism considers that motivation comes from interactions with the environment, cognitive conflict stimulates learning and knowledge appears when students negotiate social situations and evaluate individual understanding.

How does experiential learning integrate into PBL?

A close connection with problem-based learning can be found in Dewey's pragmatic work (1938), which emphasized the human capacity to reconstruct the experience and to assign meaning to it. Dewey believed in education as a process of continuous reconstruction and growth of experience. He was convinced that the role of the teacher is to organize learning activities based on the students' previous experiences and to direct them to new experiences that would enhance their growth. The study programme should be closely linked to students' experiences, structured in ways that promote continuity. Dewey opposed the theories of knowledge that regarded specialized knowledge as independent, without a direct role in problem solving. Dewey's ideas have contributed to the concept of active and experiential learning as well as problem-based learning.

	**Tasks** • Identify, based on the supporting material, the theoretical benchmarks of learning based on problem solving; • Compare, which of the theories presented had a greater influence on the PBL strategy; • Spread over time the appearance of the theories presented in the support material, based on supplementary documentation; • Establish a functional link between the time of theories emergence and the degree of influence on the PBL;
	**Synthesis and transfer** *Try to answer a few questions, to determine the possibility of applying those learned in the professional activity.* • Which of the approaches presented in the supporting material already

	apply to teaching? • Which of the ideas set forth in the theories presented could I use in my discipline? • How necessary is a change of strategy in teaching the discipline for which I am responsible? • What difficulties would I encounter if I decided to change my teaching strategy? • Who in the institution could support me in implementing the elements of a new teaching approach?
	**Reflection** • What opportunities for professional growth did this activity offer me? • What would I improve on this topic / problem if I organized a training with my colleagues? • What should I study / do in the near future, to improve the knowledge and skills I have acquired? • What arguments would I provide to my colleagues to motivate them to move towards new teaching strategies?
Conclusions	In a variety of purposes, contexts, educational content and subjects involved in the educational process, it seemed necessary to diversify educational strategies. Each strategy is based on a certain theoretical benchmark, which bases, argues and directs the didactic process towards a certain way of accomplishment. Multiple approaches have influenced the establishment of the PBL strategy, including: cognitivism, experiential learning, humanism and constructivism. It is good for the teacher to know the theoretical-reference approaches, in order to be able to explain certain provisions of the teaching strategy that they apply.

1.3. THE ESSENCE OF THE PBL PHILOSOPHY AND STRATEGY

How did the PBL strategy evolve?

Education based on problem-solving projects is not a novelty. This educational philosophy, which implements a learning and professional training strategy focusing on the active involvement of the student, has evolved over time, taking over conceptual elements from educational theories and practices that appeared at the beginning of twentieth century. One of the conceptual milestones is the behavioral approach of Thorndike (the 1920-1930s), the principles of which allowed teachers to teach students more effectively.

A special contribution to shaping the PBL strategy is brought by J. Dewey, who emphasizes experiential learning, promoting the idea that school does not teach you for life, but must be life

itself. Dewey criticises the closed character of school learning and advocates for opening up learning to life issues. Dewey's pedagogical ideas fall into the pedagogical movement of the early twentieth century "*New education*" in the "*Active school*". New education is the pedagogical current that comes to the opposition of the magistrocentrist style in education, where the teacher required the student certain contents, and the pupil was the passive listener and executor of the tasks formulated by the teacher. In the ***active school***, the student is learning through action, solving concrete problems in everyday life. The ***motivation for learning*** was an intrinsic one, incited by the natural curiosity of the person to solve an important problem for himself. The mobilizer factor of knowledge came from the learning ***context***, which creates a mechanism to boost educational process. Through this approach, strengthened over the years by cognitive and personality/humanistic theories, intercalation between theory and practice occurs, the practice generates the need to study and know the theory. An ***integrative approach to content*** is also important. No emphasis is placed on specialised disciplines, as on an interdisciplinary approach, which allows multidimensional knowledge of a phenomenon, process, object, which allows solving a problem.

In the late 1960s, 1970s, the PBL strategy is taken over by higher education institutions. The possibility of acquiring professional knowledge and practical skills by solving real problems in the professional environment has approached the academic environment to the socio-economic environment, which facilitates the integration of graduates in the labour market.

What are the key benchmarks for PBL?

The PBL strategy is based on several elements, which gives it a certain configuration and specificity.

- **The problem** - introduces the student to the basic theory relevant to the PBL (*student centered learning, group work; learning to learn; critical approach and high level of knowledge*);
- **The project –** organization of activity (*includes project and time management*)*;*
- **The group work** - *including team learning and group dynamics, roles and rules, mutual evaluation;*
- **The facilitator** - *are the roles played by the teachers, which aim to facilitate the learning situation, to overcome the difficulties that the students face, distribute the tasks to the students and monitor the fulfillment of the responsibilities*;
- **The disciplines** or other types of resources (*including how we can learn more PBL-oriented: from focusing on training to focusing on student*).

PBL is based on several conceptual benchmarks, which allow the educational process to be carried out in a specific way: principles, the conceptual framework of the training process, the practical implications and the functional support.

- **Principles**
  - The problem is the starting point
  - Learning through projects carried out in group

- The project is supported by courses / disciplines
- Exemplary collaboration in group, supervisor / tutor and external partners / labour market representatives

- **Conceptual framework**
  - Educational conception (at the programme or institution level an educational conception, which promotes active learning, must be accepted and promoted);
  - Study programme / curriculum (curriculum design, by establishing the number of disciplines, the combination of disciplines and projects during the semester, the year of study and the entire academic course, creates the favorable context for the application of the PBL);
  - Assessment (an authentic assessment is applied, one that encourages student success and offers a permanent feeadback on successes and shortcomings; in PBL emphasis is placed on formative, current assessment);

- **Practical implications** (the people involved, which creates an atmosphere of partnership)
  - Students
  - Teaching staff
  - Relations with the socio-economic environment (employers).

- **Functional support**
  - Resources (creation of logistical and material conditions: spaces adapted for the group activity of students; necessary materials);
  - Institutional management (providing the atmosphere conducive to an active-participative learning; capitalizing on human resources, through the distribution of functions; developing a timetable adapted to the PBL strategy)
  - Research in PBL (acquisition of knowledge and skills by solving problems, investigating situations).

Problem-based learning is a learning method in which students first encounter a problem, followed by a systematic research process (Barrows and Tamblyn, 1980). Although the purpose of using problems in PBL is to stimulate learning of information and concepts generated by problems (rather than to “solve” problems), PBL teaches both a method of approach and an attitude towards problem solving.

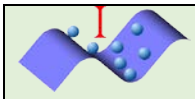
In PBL, students usually work in small groups with a tutor, who acts as a facilitator of discussions and learning, rather than as a direct source of information. Thus, in order to get involved in accommodative learning, students must work on relevant, real-life problems, guided by the project methodology to mobilize systematic knowledge-based research approaches. The application of the learning strategy based on problem solving, through activity realized in the project, must be directly supported at the institutional level.

	**Tasks** • Identify the key conceptual elements of the PBL strategy; • Analyze the difference between the traditionally applied strategy in your institution / programme and the PBL strategy; • Argue the possibility / impossibility of applying the PBL in the programme / discipline you teach;
	**Synthesis and transfer** *Try to answer a few questions, to determine the possibility of applying those learned in the professional activity.* • What are the advantages / disadvantages of the programme / discipline for which I am responsible, if I apply the PBL strategy? • Which of the key conceptual elements would be difficult for me to apply in practice and why? • What should change in the institution / programme in which I work, in order for the PBL strategy to be implemented? • What should I and my colleagues change in the professional activity to transform us into facilitators of the teaching process?
	**Reflection** • Which conceptual issues are confusing to me? • What should I change in the way I approach professional issues in order to implement the PBL strategy? • What should I study further to reduce the confusion, gaps, regarding the PBL strategy?
Conclusions	The PBL strategy ensures an opening of the teaching process to the student and the real problems of the professional environment. There is no single approach, an "ideal model" of the PBL, but various implementation variants can be applied. But important is the presence of the conceptual-reference elements: the problem, the project, the teamwork, the facilitator and the content-support.

BIBLIOGRAPHICAL REFERENCES

1. Faure, E., A învăţa să fii: un raport al UNESCO. Bucureşti: Editura Didactică şi Pedagogică, 1974.
2. Delors, J., Comoara lăuntrică. Raportul către UNESCO al Comisiei Internaţionale pentru Educaţie în secolul XXI. Bucureşti: Polirom, 2000, 240 p.
3. Coombs, Ph. La crise mondiale de l'éducation. Bruxelles: De Boeck Université, 1989.
4. Moraw P., Kleine Geschichte der Univarsitat Giessen, Giessen, 1990.
5. Perkins R. James., The University in Transition, Princeton University Press, 1965
6. Cristea, S., Curriculum pedagogic. Bucureşti: Editura Didactică şi Pedagogică, 2006.

2 MODULE II. PBL: APPROACHES AND MODELS



INTRODUCTION

In this module, we will present, in a synthesized form, the information on the diversity of the possibilities of applying the PBL. Being an educational strategy, emerging as a result of the need to diversify the modalities of the educational process, focused on the student's activity and oriented towards the real problems of the socio-economic environment, PBL cannot, conceptually, be limited to rigid approaches and „pure" models. The diversity of the modalities of using this strategy depends on the particularities of the academic culture of the university, the vision of training of specialists for various fields of professional activity. For these reasons, the diversity footprint can be observed not only by analyzing the activity of the different higher education institutions, but also by analyzing the functioning of the different study programmes within the same institution.

OUTCOMES

At the end of the module the trainees will be able to:

- Describe various ways of applying the PBL strategy;
- Determine the causes / circumstances that influence the way the PBL strategy is implemented;
- Propose the optimal way of applying the PBL within the institution, or the programme in which they work

2.1. POSSIBILITIES AND WAYS OF APPLYING THE PBL

In which areas of professional training is the PBL strategy welcome?

One of the areas of professional training, which was among the first to accept the PBL strategy, was medicine. This strategy was first introduced at McMaster University Medical School in Canada in the late 1960s as a primary teaching / learning approach. Several medical schools (especially Newcastle in Australia, Maastricht and New Mexico) followed in the 1970s. Since then, a growing number of institutions and programmes have implemented PBL.

PBL has been used in almost all areas like health sciences, social assistance, engineering, architecture, business, law, economics, management, mathematics, education, university introductory science, agriculture and other disciplines. Examples of PBL programmes or courses can now be found in almost all parts of the world, including at least North and South America, Europe, Africa, the Middle East, Asia, Australia and the South Pacific.

By 1989, eight of the one hundred and twenty-seven medical schools in the United States had either full PBL programmes or PBL elements. Another ninety-six institutions stated that they have „some variants" of PBL (Jonas etal, 1989). Howard Barrows, one of the initiators of PBL, proposed a „taxonomy of problem-based learning methods" and said that „PBL does not refer to a specific educational method, but can have many different meanings" (Barrows, 1986) (Charlin and et al., 1998; Harden and Davis, 1998).

How is PBL applied in universities in Denmark?

Denmark is one of the countries where the PBL strategy is widely applied in the university system and this approach is constantly being strengthened. In the Danish tradition, the focus was on **problem**-oriented pedagogy, structured on the **project**, with an emphasis on **interdisciplinarity**. Problem-based projects as a way of learning developed in the 1970s, when the number of students admitted to Danish universities was greater than ever, and the labour market required graduates whose skills were more relevant and specialized. At the same time, the student movement was interested in anti-authoritarian, critical and student-centered approaches to learning. The Danish Students' Federation published a resolution in 1970, which asked for new Bachelor degree programmes based on the principles of the problem-oriented, interdisciplinary and participant-oriented project, where faculty members were to provide assistance in solving problems. The studies had to be socially relevant and there should be no exams. Eventually, the German school of critical pedagogy became more and more influenced and lost due to rigid demands. These factors together modeled the development of problem-based project pedagogy and the emergence of two new Aalborg and Roskilde universities, in which the respective pedagogical approach becomes the core of the Bachelor degree programmes. In this institutions PBL is not only a teaching-learning-assessment strategy, but a true philosophy of existence and operation of the university environment anchored in the real problems of the socio-economic environment, in which the employer, the teacher and the student are active partners, trying to find some solutions relevant to real problems.

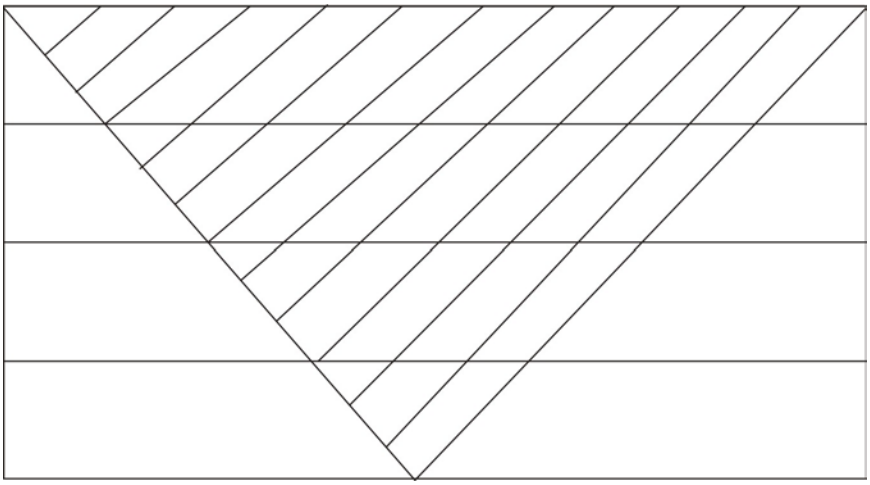
(H. Hüttel, D. Gnaur JPBLHE: VOL. 5, NU. 2, 2017)

What is the correct configuration of the PBL?

As part of the Erasmus + project „**Introducing problem-based learning in Moldova: Toward enhancing students' competitiveness and employability**", the universities of the Republic of Moldova had the opportunity to learn about the experience of European partners in the issue of PBL.

For Aalborg University, Denmark, problem-based learning, solved within group projects, is a philosophy of existence of the university environment. All programmes apply PBL to both Bachelor and Master degree studies. The model adopted by this university is based on the principle of amplifying the activity in the project, as the student progresses in the study programme. (Fig. 2.1)

Fig. 2.1 The PBL model of Aalborg University



According to this model, at the beginning of the academic year, the students are initiated in the project activities, they carry out projects with solving problems of low complexity, and the last year of studies is focused only on project / projects. At the same time we mention that the PBL strategy is adapted to the particularities of the professional training field. For example, the activity of the students in the project within the Law programme differs from the activity of the students in the programmes in the Economics field.

Another approach is accepted at the University of Siegen, Germany. In this university the PBL strategy is applied only within the didactic module, which the institution offers for the engineers who are oriented towards the pedagogical career in the professional schools with technical profile.

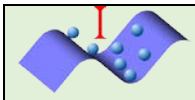
In the Royal Technical University of Stockholm, Sweden, there is an opening for the application of the PBL, but each programme decides the share of this teaching-learning-assessment method depending on the involvement of the teachers, the available resources and the relations with the labour market. Such an approach is also promoted at Glocestershir University, UK.

Howard Barrows, one of the initiators of PBL, proposed a „taxonomy of problem-based learning methods", stressing that „PBL does not refer to a single application model, but may have different variants" (Barrows, 1986) (Charlin et al., 1998; Harden and Davis, 1998). The presence of the basic conceptual elements, the ones listed above, is important. In any configuration, an academic context that allows the active involvement of the students and creates learning conditions through research and problem solving elements, favors the formation of professional skills and also, but not less important, of communication and group work skills - skills quite demanded today by the labour market.

	**Tasks** • Determine the causes of applying the PBL strategy in higher education • Identify the modalities of the implementation of the PBL in various universities • Establish the link between the application of the PBL and the field of professional training

	• Analyze the pros and cons of applying PBL in all the specialties of an institution throughout the study programme and the pros and cons of applying PBL only in some specialties, in some disciplines • Argue the importance of the diversity of the methods of applying the PBL
	**Synthesis and transfer** *Try to answer a few questions, to determine the possibility of applying those learned in the professional activity.* • Which way of applying the PBL is most welcome for the universities of the Republic of Moldova? What arguments would I make for the chosen version? • In what way would I like to implement PBL in the institution and programme in which I work?
	**Reflection** • What difficulties would my institution face in implementing PBL? • What will be the benefits of implementing the PBL for the institution? • What will be the advantages / disadvantages for the teachers?
Conclusions	The PBL strategy appeared in response to the need to identify flexible training modalities that would take the student out of the classroom and bring him closer to the real conditions of the professional activity. This strategy is not structured, it can be applied in all professional training programmes, throughout the academic course, or only within a programme, or within a discipline. The experience of the various universities has shown that different PBL variants combined with the traditions of professional training of the university centers are effective, important being the good management of the applied strategy.

3 MODULE III. THE DEVELOPMENT OF THE UNIVERSITY CURRICULUM FROM THE PBL PERSPECTIVE



INTRODUCTION

In this module we will explore the specifics of the elaboration of the problem-based learning curriculum, as well as highlight the distinction of designing a programme focused on a traditional strategy from designing a programme focused on PBL.

The knowledge and learning environment, *in problem-based learning*, influences different aspects of teachers' activity:

- in collaboration and individually,
- in designing the curriculum,
- in the working style of the students and
- in the use of different knowledge resources.

Thus, the problem-based curriculum can be understood as an integrated knowledge and learning environment, which can be studied from several points of view, including from a *psychological, technological, cultural and pragmatic* point of view, so as to contribute to maintaining student interest and motivation.

The purpose of the module is to offer the teachers a conceptual and methodical support, in the elaboration of the curriculum of the study programme from the perspective of the implementation of the PBL strategy.

The module will elucidate the *characteristics of the university curriculum; the relationship between outcomes-content-training methods; establishing the structure of the semester in relation to the PBL methodology and developing the design of the training module / discipline*.

OUTCOMES

At the end of the module the trainees will be able to:

- determine the relationship between outcomes-content-training methods;
- select methods and resources appropriate to the training of competences according to the study programme;
- formulate the competences needed for problem-based education;
- formulate tasks for achieving the objectives;
- ascertains the share of PBL in the study plan;
- establish the structure of the semester in relation to the PBL methodology;
- evaluate the role and importance of curriculum management focused on PBL methodology at institution, faculty, department level;
- elaborate the design of the training module / discipline.

3.1. PARTICULARITIES OF APPLICATION OF THE PBL STRATEGY

Where do we start designing a programme?

In the context of the normative requirements under which the higher education system of the Republic of Moldova operates, the normative - regulatory document of the didactic course is the *study / educational plan*, which is elaborated on the basis of the Framework Plan, which determines the conceptual benchmarks of this document and the structure components.

The study plan contains two basic components:

- *the explanatory note*, in which the *mission of the programme and the study outcomes* are presented, in correlation with the Qualification Standard of the respective programme / specialty, and
- the actual *design* of the academic course for each semester, indicating the academic entities (disciplines, projects, internships, assessment sessions, etc.).

According to the educational policies, promoted in the Republic of Moldova and the current paradigm of higher education, the Bachelor and Master degree programmes are oriented towards training students, future specialists, a system of professional competences. From this perspective the whole process of professional training is subordinated to the achievement of these outcomes - the formation of the professional competences system. Depending on the projected competences, stipulated in the Explanatory Note of the Study Plan, the content of the specialized training is determined, by establishing the disciplines, projects and internships.

What distinguishes the design of a programme focused on a traditional strategy from the design of a programme focused on the PBL?

PBL is a training strategy, which involves the active student in acquiring professional competences. It is a form of training that takes the student out of the classroom, places him / her in a position to know the problems of the real professional environment and to learn by solving them. In general, both the traditional training programme and the PBL training programme, have the same outcomes - the formation of the system of professional competences, determined by the qualification standard, but the modality of training of these competences and respectively, the efficiency of their training, is different.

The PBL strategy creates a learning context, in which the student creates a relationship with the professional reality and acquires not only theoretical knowledge and some skills, but also forms attitudes (an important aspect of a professional competence).

The design of a study programme, focused on the PBL strategy, produces changes to:

– the study plan;
– the curriculum at the discipline;
– the organization of the professional training process;
– the teacher-student relationship;
– the student-student relationship;

– the methods of training and learning;
– the relationship between the university and the respective labour market environment (businesses, organizations);
– the assessment process;
– the degree of active involvement of the student.

A problem-based study programme can be understood as an integrated knowledge and learning environment, which can be approached from several points of view, including from a psychological, technological, cultural and pragmatic point of view. Psychological factors are related to how individuals gain, organize and use their knowledge and skills. The technological advantages are focused on actions, methods and infrastructures of the learning environment created by advanced technological possibilities, such as virtual learning environments. A cultural perspective reflects existing educational beliefs and organizational values and roles (Hannafn & Land, 1997; Poikela & Portimojärvi, 2004).

In PBL, the dynamic of learning is the tutorial. The teacher acts as a tutor for the student group(s) of up to nine persons.

New requirements are also on the quality of the learning materials. For example, the web material available should be useful for solving problems. The useful material, the relevant literature and the established theories must be updated simultaneously. The importance of the material produced by the students increases, because the learning processes are based on cooperation.

A programme based on the PBL strategy, requires a great cooperation between the managers of different positions within the institution and teachers, who cannot handle themselves, because the PBL requires collaboration in the planning and implementation of the teaching and learning programme.

One of the general principles of problem-based learning is the *focus on learning as a shared responsibility, not only among students, but also between tutors and students*. Such an approach, when no individual is responsible for knowing everything, including the tutor, allows everyone involved in such a community to gain a clear understanding of the outcomes (who and what to do) and the process of learning. Learning communities focused on this approach are seen as practice / activity communities, in which students actively build understanding of what it means to be professional. From the PBL perspective, learning is not like a process of common social cognition, which results in the internalization of knowledge by individuals, but like a process of becoming a member of a community that solves supported, assisted and monitored practical problems.

The development of an identity, as a member of a community, and understanding of the situation knowingly, are part of the same process [1] (Lave and Wenger 1991: 65).

The programme based on problem solving (PBL), is designed, taking into account some characteristics:

- *Rallying on certain problems* - problems do not test skills, but contribute to skills development;

[1] Lave and Wenger 1991: 65

- *Problems are indeed post-structured* - there is not a single solution, and as new information is collected in a reiterative process, the perception of the problem and thus the solutions are different;
- *Students solve problems* - teachers are coaches and facilitators;
- *Students are offered only guidance in addressing problems* - there is no single formula for addressing students in that problem;
- *Authentic,* performance-based *assessment* is a component of unprecedented importance [2]; *(Adapted by Stepien, WJ and Gallagher, SA 1993. "Problem-based learning: as authentic as it is." Educational Leadership 50 (7) 25-8 and Barrows H. (1985) Designing a Problem-Based Curriculum Pre-Clinical Year.*

In the professional training programme, achieved through the PBL strategy, the outcomes (designed in terms of competence), which reflect the system of professional competences, constitute the main element, the target towards which the entire training process is oriented.

The problems solved during the years of studies, aim to form these professional competences, to put the student in the situation to acquire these competences, working individually, but also in group, to train their skills necessary for integration in a group of work.


What challenges may arise for the novice teacher when using the PBL strategy?

Challenge 1: *Reorienting the curriculum around professional competencies*

One of the main challenges faced by teachers is to identify the basic professional competences and to put these competences above the teaching of the content (material). This challenge requires a change in teaching and learning culture, identity and practice.

Teachers insist on training competences, which are really important for students' professional activity.

Challenge 2: *The role change - from teacher to PBL tutor.*

Teachers who use PBL identify the increased requirements regarding the role of tutor. Many of the teachers who switch from the traditional teaching strategy to the PBL admit: *It was much easier to teach a course for several groups of students and then read their exam answers, or essays. In the case of PBL, you must be present and actively cooperate with the students for a longer period of time. You also have to face the difficulties that arise in a group and often experience fatigue and even failure.*

Challenge 3: *Supporting self-directed learning.*

Especially at the beginning of the programme, students need more guidance for independent study. Self-directed learning requires exercise and more proactive involvement by students (Poikela & Poikela, 2006); it also, in essence, requires support and guidance from PBL tutors.

---

[2] Adapted by Stepien, WJ and Gallagher, SA 1993. "Problem-based learning: as authentic as it is." Educational Leadership 50 (7) 25-8 and Barrows H. (1985) Designing a Problem-Based Curriculum Pre-Clinical Year.

Teachers need to help students develop and use a wide range of strategies and sources for problem solving.

Another fundamental element of the PBL is a self-directed study period between tutorials, when students use several types of information resources. The purpose of this information search is to reach an understanding sufficient to allow a deeper exploration of the phenomena. The search for information can also be shared between participants by interviewing experts, requesting information on the Internet or acquiring other knowledge based on experience[3] (Poikela, 2001).

The result of this new way of integrating the common study and self-study is to reduce the time spent in courses and increase the time needed for independent study and information seeking. Lectures become a learning resource, like any other type of study, including specialist literature, periods of professional training and exercises. New types of requirements regarding the quality of lectures and exercises are introduced - these need to be adapted and programmed according to the problem-based learning process.

The result of this new way of integrating team learning and self-learning consists in reducing the time spent in courses and increasing the time needed for independent study.

Lectures are also a learning resource, which can act as a wake-up call for information. Its purpose is not to provide answers. There were times when it was tried to avoid lectures, but now it was realized what is the significance of a lecture, that is in its real and authentic sense as an important resource.

Challenge 4: *Making PBL-based pedagogical connections with the workplace.*

When the connection with the labour market is part of the student study programme, it is essential that teachers also familiarize supervisors (business specialists) with PBL principles[4] (Poikela, Vuoskoski, & Kärnä, 2009). It is very difficult to ensure that supervisors at the workplace are fully informed about the stages and schedules of the PBL process. Proper involvement of supervisors can increase or decrease the impact of PBL. Not only the university but also the labour market should be interested in quality professional training.

Challenge 5: *Facilitating deep learning*

In the PBL tutorial, deep learning ability is strong (Poikela, 2003; Silén, 2004). But if this ability is to be achieved in a genuine way, the requirements of the tutor's involvement are substantial. Some new tutors, who try PBL, involve formally in the programmed activities, without looking for creative ways to carry out the teaching process. Tutorial activities in PBL are not designed to be rigid structures, although beginner PBL practitioners may risk using them in this way.

Challenge 6: *Confronting the need to use some resources*

In the PBL strategy, the quality, relevance and accessibility of the learning resources are very important, as the PBL students work on the current problems of professional practice. Since the beginning of the studies, access to relevant materials, ideas, research and tools is a major factor

[3] Poikela, 2001
[4] Poikela, Vuoskoski, & Kärnä, 2009

in maintaining their learning impulse. Often the tutors, or students may face the lack of resources: information sources, equipment / machinery, spaces, etc. In order for the PBL strategy to provide authentic learning based on student involvement in solving real problems, universities must provide access to the necessary resources.

Challenge 7: *Combining the assessment strategies with the PBL strategy.*

If the assessment methods used do not conform to the PBL principles, the new pedagogy loses credibility. For example, if the values and practices of group work are supported throughout the programme, but the assessments are carried out only on an individual basis, the consistency of PBL support becomes confusing and contradictory.

Another challenge of the PBL is to carry out assessments that are compatible with the PBL and stimulate the formation of the identified basic professional competences. Students study according to what and how they are assessed. Designing adequate and effective assessments is one of the biggest challenges in PBL. The problem-based curriculum can be understood as an integrated knowledge and learning environment, which can be researched from several points of view, including from a psychological, technological, cultural and pragmatic point of view. Psychological factors are linked to hidden beliefs about how individuals gain, organize, and use their knowledge and skills. The technological advantages are focused on actions, methods and infrastructures of the learning environment created by advanced technological possibilities, such as virtual learning environments. A cultural perspective reflects existing educational beliefs and organizational values and roles (Hannafn & Land, 1997; Poikela & Portimojärvi, 2004).

	**Tasks** • Identify, based on the normative-regulatory documents, which structure components must have a study plan; • Determine, based on the supporting information, the possible challenges of a novice teacher in applying PBL; • Analyze, using the informative benchmarks and professional experience, what is the difference between a traditional strategy-based study plan and a PBL-based study plan; • Compare, based on professional experience and benchmark information, the teacher's activity when using a traditional strategy, with the teacher's activity when using PBL; • Argue, based on the specific characteristics of PBL, the need to apply the principle of shared responsibility;
	**Synthesis and transfer** *Try to answer some questions, to determine the possibility of applying those learned in the professional activity.* • Is the application of PBL welcome in the specialty in which I teach? • How easy or difficult will the implementation of PBL be in my specialty?

	• What will I have to change in my professional activity to apply PBL? • Which of the typical difficulties, identified in the practice of using PBL, will be the most difficult for me to overcome and why? • What will I have to change in the students' activity, by applying the PBL?
	**Reflection** • What opportunities for professional growth did this activity offer me? • What would I improve on this topic / problem if I organized a training with colleagues? • What am I going to study / do in the near future, to improve the knowledge and skills that I have acquired? • What arguments would I bring to colleagues to accept and apply PBL?
Conclusions	PBL is a didactic strategy that signifies a different relationship between teacher and student in the process of training professional competences. In order to apply the PBL strategy, it is necessary to design the study programme and the study plan in a different way. In this sense, we use university autonomy, which allows higher education institutions to take the provisions of the Framework Plan as conceptual suggestions. In the elaboration of the study plan, we respect the presence of the temporal component (years of studies, credits, semesters, etc.), the training component (disciplines / modules, internships), but we include the project as a way of solving problems and acquiring competences. The PBL strategy substantially changes the activity of the teacher and the student and the way in which these actors of the didactic process interact. To successfully apply this strategy, the teacher must be open to new, have a positive attitude towards PBL and want to develop new skills for teaching and monitoring student activity. PBL requires dedication and the ability to „get out of the classroom", giving the student the opportunity to connect with the real world of the professional field.

3.2. COMPETENCES AS OUTCOMES OF THE PROFESSIONAL TRAINING PROCESS

What are the normative benchmarks in the elaboration of the competences of a programme?

The problem of the formation of professional competences becomes an essential problem, which determines the concept of contouring the specialized culture in different fields of professional activity.

The competences must be specified and described. The statements used to describe the competences are usually brief: *they indicate the area of competence, which may belong to an area of knowledge, skills, or attitudes*.

In the educational context, the concept of competence is approached from multiple perspectives:

- competence as an outcome of initial and continuous training of teachers;
- the competence of the students as an outcome of the professional action.

These two approaches are in a relationship of functional interdependence and demonstrate the role of mutual interconditioning.

In practice, the competences are developed within a specific field of studies.

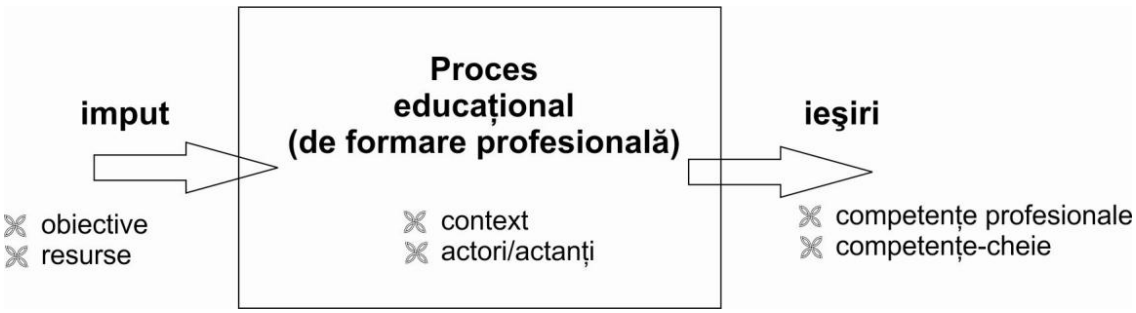
Therefore, it is very useful to correlate the competences with the context in which they will be applied / demonstrated. This will provide an indication regarding the level of development of the competence given in the study programme.

In each qualification programme, a number of professional competences are developed, in a progressive way, through various courses and training activities (projects, internships). This type of grid or matrix is widely used in different countries to show what skills are developed in what courses and at what level. Competence development occurs in different cycles.

Some skills can be developed progressively and sequentially over the three successive cycles of higher education, while the development of others may be limited to one or two cycles. When the competence is developed only at the master's or doctoral level, it is based in any case on the learning outcomes achieved in previous cycles, bachelor's and / or master's.

At the stage of designing the study programme (drawing up the study plan), we can only talk about an intention to train professional skills. These intentions projected at the entry into the teaching process are objectified in learning outcomes, expressed in professional competences in the professional training process and are demonstrated at the end of the programme by the final assessments (Fig.3.1.).

Fig. 3.1. Stages of competences training: design, training, assessment / findings



This scheme can reflect the didactic process carried out on a concrete scale:

competences training during a semester or competences training during a discipline.

So, the process of competences training, acquisition of learning outcomes is a three-dimensional one:

- programme,
- semester,
- discipline.

Also, there remains an open problem, the definition of the concept of competence, because so far there is no generally accepted acceptance, being as the most successful one.

The definitions of the concept of *competence* vary according to the theorists, who elaborated them. Most of the time they gravitate around the keywords such as:

- standard requirement,
- in-service performance,
- combination of knowledge,
- skills and behaviors / attitudes, but also articulated through:
- notions such as qualification, ability in the context of a particular function, etc.

Despite the fact that the concept remains one of the most diffuse of the theory of organizational development and of the field of psycho-pedagogy, which makes its consistent use all the more difficult, there are concepts that express quite explicitly the essence of professional competence. It is generally accepted that the structural elements of a competence are: knowledge, skills and attitudes; the cognitive, psychomotor and affective-behavioral dimensions.

NB **Professional competence** represents the ability to apply, transfer and combine knowledge and skills in different situations and working environments, to perform the required activities at the workplace, at the quality level specified in the occupational standard.

It is worth mentioning that professional life and activity are characterized by a dynamic rhythm and complexity, which is why people must be able to accommodate to permanent changes. Thus, it turns out that an education system focused on competences must focus on the formation of problem solving capacities in new or typical situations, but developed under new / changed conditions.

In the context of current realities the teachers must demonstrate their specialized culture by applying the professional competences in the conditions of the educational phenomenon, determined by the new socio-cultural parameters of the integration of the individual in his / her life environment. It matters not only the subject, the content to be studied, but also the understanding of the fact, how the student will use the knowledge acquired in the socio-professional environment.

The conceptual premises justify the necessity, the possibility of realization and the importance of:

- creating the context for the active life (*vita activa*) of the contemporary man;
- mutual modeling of the individual and the habitus (living environment);
- the functioning of the person as an integrated system in a systemic context.

What types of competences do we formulate for a study programme?

The systemic approach is imposed and conditioned by the internal logic of the educational action (the gradual intervention and the correlation of the constituent elements of the process).

At programme level we project the formation of three types of competences: transversal, general and specific. The competency system is taken from the *Qualification Standard*. According to the *Methodology of Qualification Elaboration*, the three types of competences are defined as follows:

Transversal competences (TC) - represent the competences that transcend a certain field, study programme respectively, having a transdisciplinary nature. The *transversal competences* are formulated by the working group, arising from the autonomy and responsibility; social interaction; personal and professional development that the future specialist must prove, in relation to the level of qualification.

General professional competences (GPC) - are specific to a group of professions / specialties related to an occupational field (from the same field of professional training), and the relation of general competences with a specific profession / specialty is made by formulating specific professional competences.

In the case of the lack of related specialties, professional competences without general and specific division are formulated.

Specific professional competences (SPC) - represents a system of knowledge and skills, which, by capitalizing on resources, contribute to the individual or group achievement of tasks established by the context of the professional activity. These competences are formulated in terms of requirements associated with the profession, which the person must meet in order to perform certain tasks within a profession / specialty and to integrate into the field of work.

Taking into account the need to permanently adapt the study programme to the demands of the labour market, the competences system can be upgraded / updated, as a result of the employer consultation.

Competencies are a dynamic combination of cognitive and metacognitive skills, demonstrating knowledge and understanding, interpersonal, intellectual and practical skills, as

well as ethical values.

The competences of the programme are developed through all courses / disciplines, projects, internships and evaluated at different stages of the study programme. Some competences are mainly formed through certain content units / disciplines / modules, others are formed through all disciplines. Usually the development of competences takes place in an integrated and cyclical way throughout the entire programme.

The design of the study programmes and the definition of the competences and the learning outcomes, require careful planning and teamwork by the programme managers. In the student-centered learning approach, all members of the teaching staff, who are involved in teaching the disciplines in the programme, have a shared responsibility for the results of the study programme.

The study programmes, which are based on the PBL strategy, require a paradigm shift and, therefore, a change of mentality of the teachers responsible for designing and carrying out the qualification programmes. Currently, in practice, many study programmes are traditionally designed based on available resources, being based on inputs and content. In such programmes the focus is still on the individual interests of the academic staff or on the existing traditions.

The PBL study programmes must be designed in such a way that the students develop their specific mix of competences considered useful and necessary for the academic, professional and / or vocational field. The results must be verifiable and described by the learning outcomes and ECTS credits (European Credit Transfer and Accumulation System). The number of credits allocated for individual courses or programmes as a whole reflects the time that a student needs to complete the studies. Successful achievement of these learning outcomes is verified at the end of the courses and / or study programme.

It is very important that the study process is transparent. Students must know from the beginning what each study programme requires and what results can be expected at the end of the programme. Graduates must be able to demonstrate the competences they have acquired throughout the study process.

The competences of the programme, which will be included in the qualification profile, must be the most important, which the graduate will develop as a result of the study programme. Normally, most of the competences of a programme are similar or comparable, for example, for the programmes of those two cycle in the same specialized field from different higher education institutions. However, there may also be differences, as each institution develops study programmes based on its own missions and available resources, or professional training opportunities / conditions, exploiting the scientific and academic potential. In this situation, the term „school / scientific school" is used, which defines the traditions of a professional education institution for a particular field.

From this perspective it is outlined the autonomy of each institution to carry out in its own style the professional training of the future specialists. Besides the autonomy of the institution, the autonomy of the teacher, who by virtue of his professional training, can intervene with his own style, is also manifested. The question arises: What is the degree of autonomy of the teacher in carrying out the programme? Obviously, this autonomy is manifested at the level of the study discipline, but in any case it can make its mark on the achievement of the programme. The quality of the professional training of the graduates depends on the „styles" of the entire team of teachers

involved in the programme. The style of the team can be manifested by a specific configuration of the way of forming the system of competences and their manifestation, but it is important that the core system of competences is formed, which corresponds to the qualification standard, which would mean that any team is required to reach the qualification standard, forming the system of competences in students required by the professional qualification, but each team can bring an „*added value*" by forming specific aspects assigned to the standard / competences designed based on the qualification standard.

	**Tasks** • List the types of competences to be trained in a future specialist • Analyze the relationship between the programme, the year of education / semester and the discipline in the training of the professional competences • Appreciate the need and importance of an education focused on competences training
	**Synthesis and transfer** *Try to answer a few questions, to determine the possibility of applying those learned in the professional activity.* • Based on which documents can I find out about the qualification standard my students aspire to? • What competences stipulated in the qualification standard and the educational plan can I train them through the disciplines I teach? • How would I use my right to curricular autonomy to facilitate and improve the process of training professional competences?
	**Reflection** • How justified is the approach focused on competences training? Is it something trendy, or something argued for by the circumstances in which the graduate forms and fits into the field of work? • What would change in the teaching process if I started from the analysis of the competences system from the qualification standard and the educational plan? • Why is the focus not so much on the content of the discipline, but on the training of competences? • How should I coordinate teaching activities with colleagues to create more effective conditions for competences training?
Conclusions	Under the current conditions of professional training, the training process cannot start from a content held by the teacher, or from the elaboration of a course based on an accessible textbooks or resources. Any professional training programme is conceptualized from the perspective of the formation of a system of competences, based on which the graduate is granted the professional qualification. Any teacher involved in the programme must know this system of competences and select appropriate contents, so we do not teach for the sake of teaching, or because we have taught this way for many years, but we must teach from the perspective of training the competences needed for the graduate upon employment.

3.3. FORMULATION OF LEARNING OUTCOMES

How are the learning outcomes formulated?

The *outcome* expresses the capacity to *design* education according to some „*goals*" or *intentions*, expressed in the common language through the term of *purposes*. The *outcome* ensures the value orientation of any educational action, anticipating future developments, higher, usually, those previously achieved. The *outcome* defines at the different reference levels the orientation necessary for the design, implementation, evolution of an education / training activity.

The analysis of the concept of the learning outcome is achievable from the point of view of its general *functions* (*design-capitalization* of education) and of the structures corresponding to them fixed at the level of a three-dimensional model (spatial, temporal, action) applicable in any pedagogical context (programme, semester, discipline).

In a *broad* sense, the *outcomes* represent the *teleological* dimension of education. It is a specific form of manifestation of causality, specific to the psychosocial domain, which involves awareness of the goals and motives underlying the projected activities. Unlike the *material outcome*, specific to the phenomena in nature based on the direct cause-effect relationship, the *learning outcome* involves the intervention of the subjective factor that has a „direct and regulatory role". Thus, „at any time, education is oriented and directed according to the outcomes it pursues".

In a *narrow* sense, the learning outcomes specify „**the final results**" or „the final achievable cause" in any educational action, through the *products* of the training (knowledge, skills, abilities, attitudes), acquired at a certain time, corresponding to the projected outcomes.

Designing the outcomes of higher education is based on a number of principles.

The principle of cultural selection and hierarchy aims to configure the fields of human knowledge and culture - in a broad sense - as fields of university professional training.

The application of this principle leads to:

selecting the relevant study disciplines for the knowledge areas concerned;
grouping and combining of disciplines according to the specializations established as outputs for the domestic or international labour market.

In accordance with the principle of cultural selection and hierarchy, one chooses to group the study disciplines into categories defined according to the typology of the competences concerned, taking into account the share of the various fields of human knowledge in the respective professional training, as well as the connections between these fields.

The principle of functionality aims to connect the various disciplines, as well as the categories of disciplines, to the development of the current knowledge in agreement with the dominant ones of this development. From the perspective of curricular construction, this principle leads to a functional structuring of the study plan at the level of each academic cycle: bachelor's, master's and doctoral degrees.

In accordance with this principle, the disciplines within the study plans are configured so that they correspond adequately to the set of competences of the graduate of a university cycle. At the same time, the principle of functionality relates the curricular development with the amplification and diversification of the fields of knowledge, in the context of a changing society.

The coherence principle takes into account the degree of horizontal and vertical integration of the study disciplines. This principle involves two levels of correlation:

- at the level of the plans, we refer to the correlation of the disciplines of study vertically, in order to form the specific competences of the specialization and to the horizontal coherence, in order to avoid overlaps and / or contradictions between related disciplines;
- ensuring complementarity regarding the contribution of the disciplines in building the projected competences. Specifically, this means that *disciplines not specific to a particular specialization will be configured according to the socio-professional needs characteristic of that specialization*. Thus, for example, in the foreign language curriculum for specializations outside the philological domain, the functional component and the specialized language are of interest; for the same reasons, only lexicology components are required in the Latin language curriculum for medicine; the statistics curriculum has different components in sociology, economics or mathematics.

The principle of equal opportunities aims to ensure a system of equivalent conditions regarding access, conduct and recognition of studies, as well as socio-professional orientation for all students / candidates in higher education.

The application of this principle leads to:

– implementation of regulations that guarantee equality of access opportunities; more precisely, that every person has the right to the same minimum conditions for admission to higher education;
– the existence of compulsory components that ensure the validation and recognition of the diploma; more precisely, one and the same specialization, regardless of the location of the studies, ends with the same type of diploma;
– guaranteeing a core of disciplines that provide the operating base for the training of the competences necessary for a certain specialization; more precisely, obtaining a diploma, in a certain specialization, implies the coverage of a common set of specific concepts and procedures.

The principle of flexibility and individual pathway involves university autonomy and individual training paths for students.

The application of this principle leads to:

– taking the decision on the study plan at the level of each university / faculty, taking into account the human and material resources available under an institutional strategy in the medium and long term;
– creation of mechanisms to ensure the student’s choice of different paths, but equivalent from the perspective of credits allocated and training of the competences targeted by specialization, respectively, the master’s degree;
– structuring the study plans on two components: compulsory and optional;

– considering a segment of optional disciplines that are relevant for lifelong learning.

In developing the learning outcomes we must apply the following working methods:

The design of the outcomes of higher education will take into account the socio-economic context at regional and national level, it will take into account the evolution of the labour market, the evolution of branch science and the evolution of methodological benchmarks in the field of education sciences. To achieve quality professional training, appropriate to the needs of the beneficiary, a complex approach is needed and the belief that the outcomes can be functional only if we continuously modernize them.

A study programme designs and achieves outcomes (designs and forms certain learning outcomes) of various levels of generality and complexity. Broadly speaking, we can talk about three dimensions of the outcomes of professional training: programme outcomes, discipline / project / internships outcomes and the outcomes of a concrete training activity.

Table 3.1. Three-dimensionality of the design and the accomplishment of the learning outcomes

General objectives of the study **programme**	– **System of competences** – -Qualifications – Outcomes of the study programme
Objectives of the **disciplines of study, internships, projects**	– Competences – **Outcomes of the discipline**
The concrete objectives of the **didactic activity** (of a course, seminar, laboratory)	– **Outcomes of the didactic activity,** concrete acquisitions, expressed in *knowledge, skills, attitudes*

This guide refers to the design of a study programme and to the definition of the competences and the learning outcomes at all levels and is intended for the teachers involved in the realization of the programme.

The general objectives of the programme, the system of professional competences, is taken from the *Professional Qualification Standard*, the teachers need to take into account, objectively, the changes in the labour market, the state of affairs in the respective field of study, the technologies developed.

The learning outcomes of each discipline, must contribute to the attainment of the level of competences, which must be developed by the students and verified through the learning outcomes at the programme level. All courses are, in one way or another, correlated with each other. The correlation refers not only to the courses or modules, which relate to the main trunk or the essential part of the programme, but also to the optional courses, or those to free choice. In a well-designed programme, the optional courses must enhance the profile of the programme, allowing the students to match the opportunities offered by the study programme with their own needs.

Typically, the programmes involve the progressive development of the level of competences and, therefore, of the learning outcomes. Consequently, the learning outcomes of the courses /

modules through which the competences are developed must correspond to the learning outcomes at the programme level and contribute to their formation.

 How do we correlate the outcomes of various levels of complexity?

The learning outcomes of any level must be understood, verifiable and possess the following characteristics:

- specific (to provide sufficient details, to be formulated in clear language);
- measurable (contain criteria by which the indicators / units of measurement are shown implicitly or explicitly). The outcomes of a higher degree of generality become measurable by the derived concrete outcomes (eg: the competencies designed and realized for the whole training programme are measured by evaluating the learning outcomes, obtained within some study disciplines).
- objective (to be formulated in a neutral way, without ambiguity and expression of opinions);
- achievable (can be achieved in the time provided and with the available resources);
- useful (to be perceived as relevant for studies in higher education and for civil society);

The most concrete and measurable, evaluable outcomes are the *tasks*.

The language used to describe the learning outcomes is of crucial importance. Although there are a variety of different ways to draw learning outcomes, each outcome is usually composed of five key components:

- a verb in the active voice;
- an indication of the type of learning outcome: knowledge, cognitive processes, skills or other type of competences;
- thematic field of learning outcome: it can be specific or general, or a combination of both, and refer to the field of study or to a particular mastery / skill;
- an indication of the standard or level, to be achieved within the outcome;
- the context of the learning outcome.

In the specialized literature there are lists of verbs, which indicate different levels, as sources of inspiration (although one must take into account that the classification is relative). The classification of action verbs, used in formulating outcomes, is defined as a taxonomy. There are taxonomies recognized worldwide, which serve as a methodological basis for formulating the objectives and tasks of concrete teaching activities.

For example, lists of verbs of different levels, proposed by B. Bloom, which were later modernized by other authors:

– *knowledge*: define, describe, identify, name, indicate, list;
– *understanding*: associate, explain, classify, differentiate, deduce, report;
– *analysis*: argue, discuss, analyze, compare, criticize, investigate;
– *synthesis*: combine, illustrate, lead, generalize, reorganize;
– *evaluation*: justify, interpret, resolve, issue judgments, predict.

Table 3.2. Learning outcomes broken down into components (history)

Verb	Field	Standard/level	Context
a) describe	European, world chronology, starting with 1500	in terms of synthesis	the main study approaches of European empires and of world history.
b) investigate	a research problem	in narrative, critical form	text of about 60 pages.

Tasks

- Determine the types of outcomes based on the support material and the professional experience
- Analyze the functional interdependence between the outcomes / results of the programme, the outcomes / results of the discipline and the outcomes / results of each didactic activity
- Argue the necessity of formulating by the person in charge / the disciplin holder of the outcomes with different level of complexity
- Formulate a learning outcome, using the recommendations provided in the support material

Synthesis and transfer

Try to answer a few questions, to determine the possibility of applying those learned in the professional activity.

- Based on which benchmarks will I formulate the learning outcomes for the discipline I teach?
- Who is the right person to talk to in order to design some relevant learning outcomes?
- The training of which professional competences does the discipline that I teach contribute to?
- What would be the best thing to update in the content in order to contribute more effectively to achieving learning outcomes that will outline the professional competences required by the labour market?

Reflection

- Which issues are new to me and which measures should I take to get to know the problem better?
- What is the biggest difficulty for me in the process of moving from focusing on the content / topics of a discipline, to focusing on obtaining learning outcomes?

Conclusions	Learning outcomes are an important element of the professional training process focused on competences training. Such an approach creates conditions for the active involvement of the student in his / her own professional training, because the training and demonstration of competences requires the presence of conditions and of a training context in which the student engages in practical activities and demonstrates elements of professional behavior. In order to formulate relevant outcomes, the teacher will analyze the qualification standards, discuss with the representatives of the labour market / employers and even with the graduates of the programme, who can evaluate the learning outcomes through their integration into the professional activity.

3.4. DESIGN OF THE STUDY PROGRAMME

What are the normative recommendations regarding the elaboration of a study plan?

The design of the Study Plan is elaborated taking into account several components:

a) *the time component,* which represents the way of planning in time the training process (week, semester, year, cycle), the main unit of measurement of the training process being the ECTS study credit;

b) *the formative component,* which represents the distribution of content units (course unit, course packages, modules);

c) *the accumulation component,* which reflects the allocation of ECTS study credits;

d) *the assessment component,* which represents the current and final assessment methods of the learning outcomes and the competences obtained by the student at the course unit / module.

When designing the study plan (the curriculum of the entire academic course) from the PBL perspective, we will take into account the two conceptual benchmarks presented above:

1. *Formation of professional knowledge and skills, competences;*
2. *Programme design.*

This approach offers a flexible scheme that can be used for the entire course (all years of study, semester and discipline), reflects the PBL philosophy, which is focused on active student involvement and allows them to negotiate the content elements of the study plan, especially for the optional disciplines. In addition to the students, it is necessary to consult the employers regarding the competences / learning outcomes that the students will obtain, as they are the direct beneficiaries of these outcomes.

Whatever the design of the academic course is, professional training must lead to the formation of a system of competences, which will allow the award of the qualification and ensure the employment of the graduates in the labour market.

In order to formulate the competences, the following stages / steps must follow:

Fig.3.2. The steps to be followed in the elaboration of the study plan (programme curriculum), with emphasis on determining the outcomes.

This graphical representation indicates on the following steps that must be taken by those who develop the competences system and determine the learning outcomes within a study / specialty programme:

Analyze the professional qualification and deduces from this document the system of **general and specific competences** that must be trained during the whole programme;

Identify, based on the competences, what **content units** (disciplines, modules, internships, projects) must be included in the study plan, in order to reach the projected outcomes.

Determine **in what way** the competences will be formed, by capitalizing on the content: the activity strategies of students and teachers are determined (what and how many theoretical activities, what and how many seminar activities, what projects, etc.).

From the perspective of PBL it is important to determine the learning outcomes and to identify the **problems, the solution of which facilitates the acquisition of the projected competences**. These problems are based on content support, which provides the theoretical basis, knowledge and skills training. The way of training the competences is the project.

In the process of drawing up the study plan, the beneficiaries must be consulted: **students and employers**.

What are the main aspects / benchmarks in the design of a study programme focused on the PBL strategy?

The designers of the programme will take into account the following:

- **The openness of the institution to the PBL**.

For some institutions PBL can be a philosophy of existence. All the professional training activity, all the programmes are realized through the PBL. Other universities apply PBL only in some programmes, or only in some disciplines.

- **The particularities / specificity of the professional training field.** How PBL is applied also depends on the specifics of the professional training field. The complexity and breadth of projects in relation to other didactic activities may be different, for example, within the Law programme and the Business Administration programme, or Forestry.

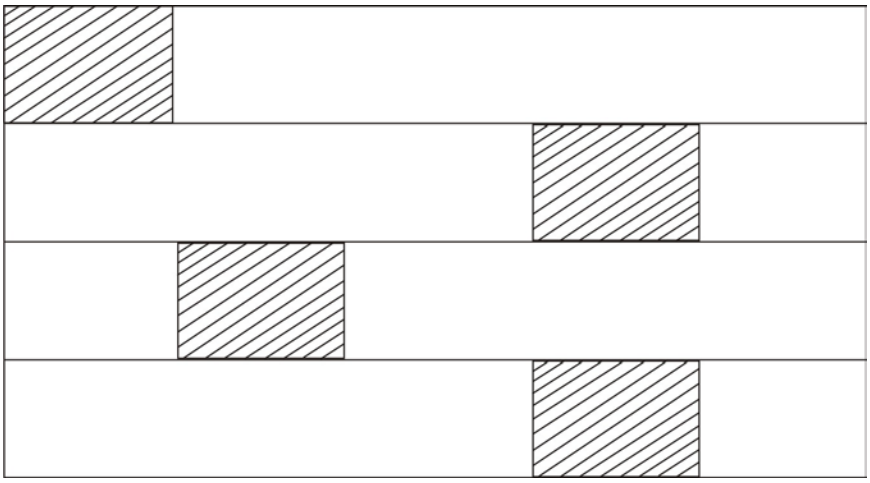
- **The model for applying the PBL strategy during the programme**. In some cases PBL is applied according to the principle of increasing the weight of the strategy, as the student accumulates more learning experience and more theoretical benchmarks in the field of professional training. In other cases, the PBL can be applied only to the disciplines with an accentuated practical aspect.
- **The availability of the involvement of the teachers**, emphasizes the use by the teachers of the PBL strategy.
- **Change of some aspects of the study process management**. The application of the PBL requires the emergence of new roles and, first of all, of the tutor of the student group. This role can also be exercised by the teacher in the discipline. Another role would be to be responsible for the semester, which can be exercised by a teacher, who will monitor the activity of the whole team of teachers within a semester and of the activities carried out by the students. It is also necessary to reflect the application of the PBL strategy in the schedule of activities. Each institution will decide how the theoretical activities alternate with the monitoring of the project realization process.
- **Introducing new criteria for calculating the teaching workload of teachers**. The need for motivation and remuneration for tutoring activities, the calculation of the hours of monitoring the individual work of the students and / or the activity of the project teams appears.

What configuration can a study programme have?

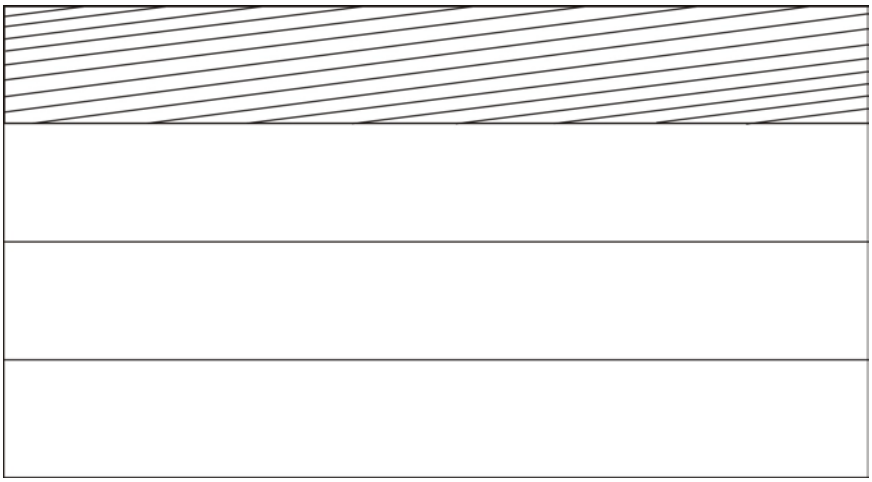
Savin-Badin (2000) identified several models of problem-based learning. Tese models are ideal types and are useful for those who want to implement PBL.

Model 1: ***Single module approach*** - a single PBL module in the final year of the programme.

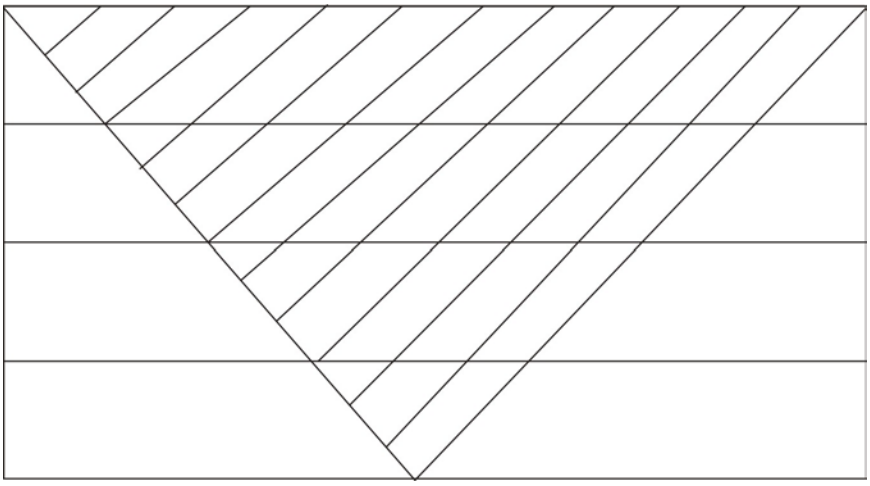
Model 2: ***Problem-based learning on a shoestring*** - only some teachers use PBL in a limited number of modules. This is done at minimal cost and there is no general approach to PBL in the programme.



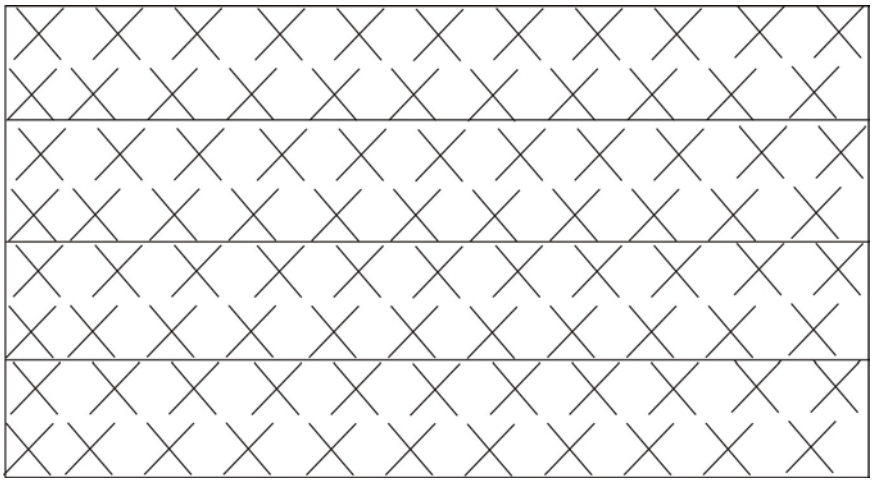
Model 3: ***Development of a path*** - PBL is applied during one year of the programme.



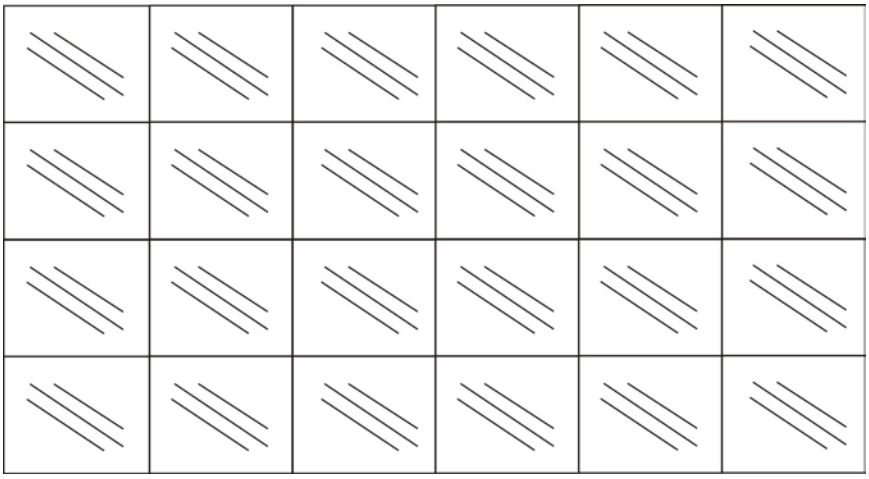
Model 4: ***Consolidating the foundation*** - students are introduced to concepts and principles in the first year and then limited aspects of PBL, followed by the use of a complete PBL approach in the final year.



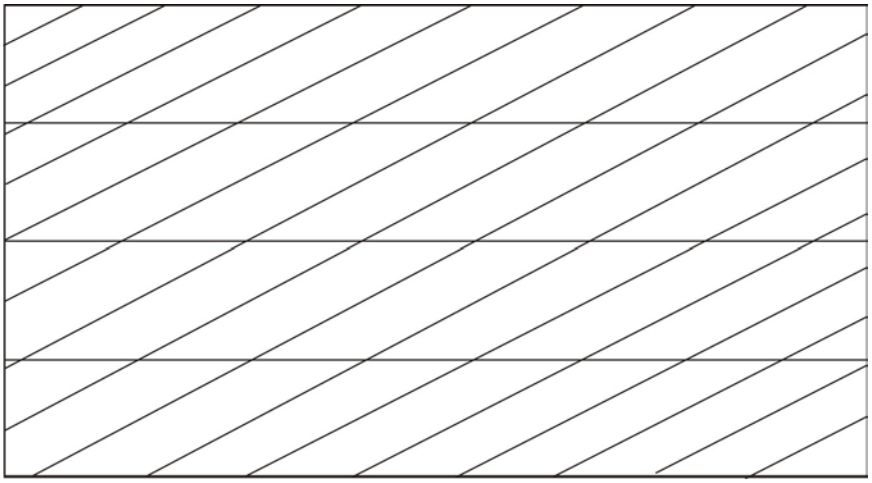
Model 5: ***Two-tiered approach*** - this approach combines a PBL approach with a mixed learning method.



Model 6: ***Problem-based learning*** - in this approach the PBL strategy is used in all modules, but there is no integrated framework for the programme.



Model 7: ***Integrated approach*** - the entire programme uses PBL in a comprehensive integrated framework.



	**Tasks** • Identify the conditions that determine how PBL is implemented in the institution / programme • Compare various models of PBL application, identifying the advantages and disadvantages • Establish the relationship between the implementation model of the PBl and the necessary resources, the changes that must take place in the institution / programme • Argue the need to correlate the resources and logistical possibilities with the choice of a certain model of PBL implementation.
	**Synthesis and transfer** *Try to answer some questions, to determine the possibility of applying those learned in the professional activity*: • What would be the advantages and difficulties in adapting the educational plan of the programme in which I am involved, to implement the PBL strategy? • What could be the motivated reserves of the institution in which I work for PBL implementation? • Which of the presented models would be most welcome for the programme I am working on and why? • With whom from the institution should I coordinate my activities for the purpose of applying PBL?
	**Reflection** • What should I know and study more in order to apply the PBL strategy? • How could I personally contribute to: a) strengthen the institutional management's conviction regarding the implementation of the PBL; b) motivate my colleagues to get involved in implementing PBL? • What should I take into account when choosing the PBL implementation model? • How will my students respond to the change of strategy and what should I do to form and strengthen a positive attitude by also involving students in the activities?
Conclusions	The implementation of the PBL strategy at the programme level depends on a number of conditions and factors. First of all, it is necessary an opening from the institutional management, which must create an atmosphere of acceptance and implementation of this educational endeavor, to provide the necessary resources and the mechanisms of coordination of the activities. Last but not least, the openness and attitude of the teachers, which is the main factor, is important because they are the ones who conceptualize the activity and create the context of student involvement. The PBL implementation models are different. There are no ideal models, well-conceptualized and realized ones are welcome.

3.5. DESIGN OF A SEMESTER

What are the criteria for structuring the semester based on the PBL strategy?

Savin-Baden (2000) identifies five models, which emphasize **the approach to training**, as follows:

Model 1: PBL for epistemological competence (focused on knowledge);
Model 2: PBL for professional actions (focused on relationships with the professional environment);
Model 3: PBL for interdisciplinary learning;
Model 4: PBL for transdisciplinary learning;
Model 5: PBL for critical approach.

The structure of a semester also depends on the **conditions offered by the training context**:

- the implementation of the PBL at the programme level;
- the particularities of the professional training field and the possibilities / limits of the application of the PBL, the possibilities of simulation, or solving the practical problems;
- the place of the semester within the programme (eg in the first year of studies, the weight of the PBL may be lower than in the last year of studies);
- openness and competence of teachers;
- the available resources;
- management of the teaching process: timetable, people involved, etc.

What configuration can a semester based on the PBL strategy have?

Basically, the semester can take over the programme configuration only in the dimensions of a smaller semester academic course (*see the programme configuration models*). For these reasons we can use:

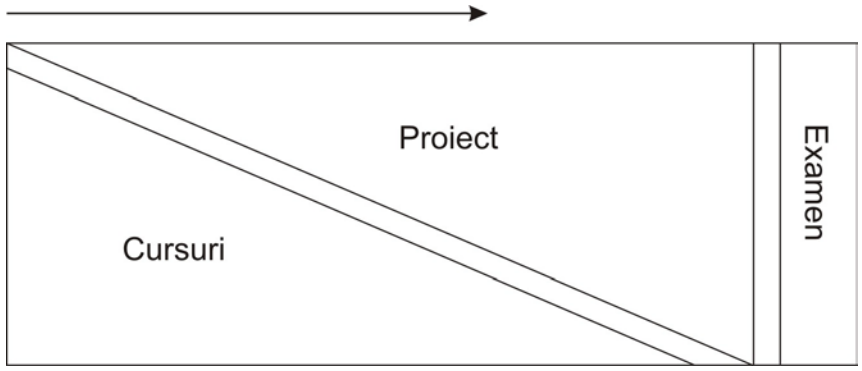
Model 1: ***Single module approach*** - a single PBL module within the semester;
Model 2: ***Problem-based learning in a shoestring*** - only some teachers use PBL in some modules;
Model 4: ***Consolidating the foundation*** - students are introduced to concepts and principles at the beginning of all semester modules, but towards their completion the PBL aspects are consolidated;
Model 5: ***Two-tiered approach*** - this approach combines a PBL approach with a mixed learning method
Model 6***: Problem-based learning*** - in this approach the PBL strategy is used in all semester modules, but there is no integrated framework;

Model 7: ***Integrated approach*** - the whole semester uses PBL in a comprehensive integrated framework, either by developing a single project, or by correlating projects in all modules.

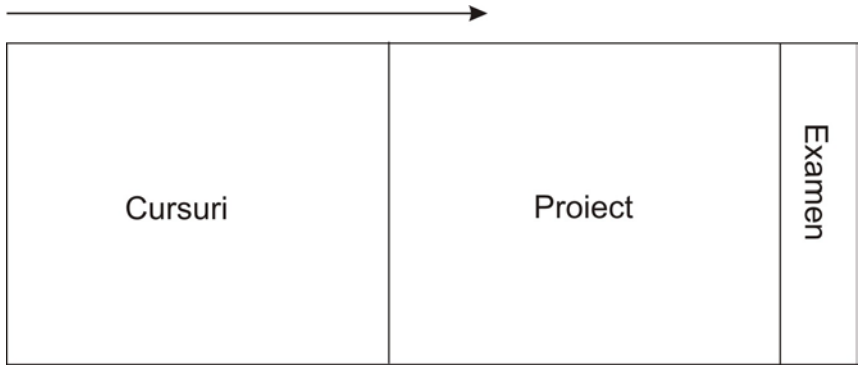
The semester configuration can be presented through the graphical representations below.

Fig. 3.3. Semester configuration variants

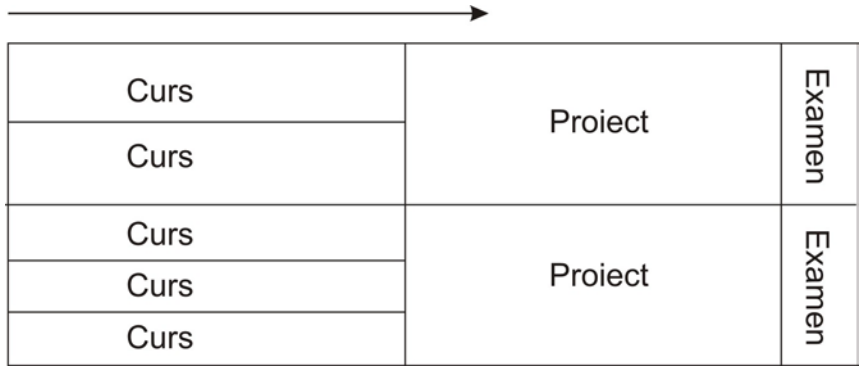
a)



b)



c)



NB When applying the PBL strategy, it is recommended to include a small number of modules in the semester.

How are the activities carried out during the semester?

The drive of learning is the tutor, who monitors group projects of seven to nine students. In principle, the number of students in the group is determined depending on the specificity of the activity and the objectives of the project. Too small and too large groups are not effective. The tutor role is performed by the teacher.

Problem-based learning provides conditions for structuring and facilitating group learning processes, based on problem solving. Well-designed work problems create a solid basis for learning (Poikela, 2003). The teacher facilitates the problem solving process during the tutorials (consultation sessions / communication with the tutor), which last for different periods of time depending on the context.

The training process contains the following activities:

- ***theoretical (courses / lectures);***
- ***current assessments;***
- ***tutoring sessions (consultations / communication between tutor and groups of 7-9 students);***
- ***the individual activity of the students in the project;***
- ***presentation of project results and final assessment***.

The study process may have a certain configuration throughout the week or semester. This configuration depends on the approach and strategy of the specialized department, or the dean's office. In the experience of universities, which practice PBL, we can meet the following programme of the week:

- problem-based learning activities;
- self-directed learning;
- lectures in large groups;
- competence workshops (group work of students).

	**Tasks** • Determine how to configure a semester in the context of applying the PBL strategy • Analyze the advantages and limitations of the various semester configuration models • Propose a model of semester configuration, based on the combination of the constituent elements: theoretical courses, current assessments, sessions for monitoring individual and group activity within the project, presentation of the project results, final assessment.
	**Synthesis and transfer** *Try to answer some questions, to determine the possibility of applying those learned in the professional activity*: • Which of the models presented is welcome for the programme I am

	working on? • What do I need to understand at the faculty management and department level to implement this model? • How could I mobilize colleagues who are teaching in the same semester to implement the PBL strategy? • What difficulties would students face and how could we overcome them?
	**Reflection** • What do I have to change in my activity to do the didactic activity in a semester configured in the PBL form? • What kind of resources would I and my colleagues need to carry out the teaching process through PBL? • What should I study more in order to get involved in PBL?
Conclusions	The PBL strategy generates a systemic change in the training process. The conditions for carrying out the activity and the context in which the professional training takes place are important. Changing the types of activity contributes to changing the configuration of the semester. In particular, the contents, the theoretical and practical activities are configured. A particular role in the semester is the activity under the project. Depending on the specificity of the problem solved through the project, its complexity, the product obtained at the end, the need for the support content, the programme designers will establish the number of disciplines, the number of hours and credits allocated to their study and the amount of time allocated to the project.

3.6. DESIGN OF THE MODULE / DISCIPLINE

What conceptual benchmarks do we base on when designing a curriculum for a discipline focused on the PBL strategy?

The use of PBL is different depending on the discipline.

There are still no practices to prove that problem-based learning looks the same and is used in the same way across all disciplines. However, disciplinary differences have an impact on problem-based learning, as they are affected by the discipline specificity. It is important to consider the impact of using problem-based learning, the impact of harnessing the training potential of the discipline and vice versa.

As mentioned, professional training is oriented towards the student's acquisition of a system of **competences**. Therefore, designing the curriculum in the discipline takes into account the contribution of the discipline on the training of professional competences. In order to form the necessary competences, the basic components and the processing components are used in the curriculum design.

The basic components, including ***content, context and connections (model 3C)***, focus more on learning the content / concept, while ***processing*** components refer to the student's cognitive processes, ie problem solving.

The content, one of the 3C components of this model, refers to the importance of facilitating students to interconnect concepts and information within the discipline knowledge, by properly designing the PBL curriculum[5] (for more information on the 3C3R model, please see Hung, 2006). Depending on the type and stage of concept integration (for example, the individual acquisition of concepts at the initial stage or the formation of a conceptual framework in the next stage), the **connection** component of PBL problems can be divided into two categories: *interconnection* and *holistic*. The interconnection in the PBL problems helps students to develop the interconnections between the concepts, principles, procedures and individual information from the sub-topics of the knowledge in the field; while the holistic connection helps students establish a holistic vision or conceptual framework of knowledge of the discipline.

The basic components - including content, context, represent the *support for connections and conceptual learning*, while ***component processing*** - consists of *research, reasoning and reflection* and refers to students cognitive processes and problem solving skills.

The content.

– *Amount and depth of the content*.

In the PBL research, over the last few decades, Hung, Bailey, and Jonassen (2003) identified a number of dilemmas related to strategy implementation. Among them, they found that teachers and students were primarily concerned with the depth and amount of factual knowledge, to the detriment of higher-order thinking skills.

Often, this situation tries to be explained by the lack of time. In the problem-solving process, students are asked to acquire and process excessive amounts of information, indirectly related to the content they wish to acquire. For example, a PBL problem on „global warming" intended to address the basic knowledge and concepts of the atmosphere of the earth, inherently involves more concepts than the „basal" atmosphere of the Earth.

The students acquire the knowledge of the field, going through the processes of solving the problems that, in part, require them to engage in activities of acquiring the knowledge. Because acquiring domain knowledge is the prerequisite for reasoning and searching for solutions to the problem, both elements are equally important in PBL. Thus, when designing PBL problems, several aspects of the content component must be considered.

– *The scope of problems.*

The second element is the actual provision of the scope of the PBL problems, which refers to the breadth and depth of the problem. The design of the amplitude and complexity of the problem, can be determined based on the analysis of the objectives and outcomes of the module / discipline and the analysis of the level of student development, to determine the degree of correspondence between these two aspects. Based on this analysis / information, the subject / module provider can

[5] modelul 3C3R - Hung, 2006

adjust the breadth and complexity of the problem, to facilitate the students' learning, insofar as the content area and their intellectual competences contribute to achieving the learning objective / outcomes of the module / discipline.

Context

The second important component is the context. Cognitivists such as Godden and Baddeley (1975) have suggested that when content is taught in the same context or in a similar context as the scope, knowledge and skills, it will be more easily retrieved and learned. Furthermore, in order to structure their knowledge for more efficient use, their learning should occur around problems (Gallagher, 1997) and in a ready-to-use form in practical activity contexts (Barrows, 1986). In order to become a specific professional problem solver, the student must acquire not only sufficient knowledge of the field, but also *specific situational / contextual* issues that are essential for effective problem solving. The contextual information of the problems helps the students to link the built knowledge and the skills acquired in the real life related situations.

The lack of situational / contextual knowledge may explain the students' difficulties in transferring knowledge into real situations because this particular type of knowledge helps students become more aware of how knowledge in the field can be used.

The connection

The third major component of the 3C3R is the connection. If students possess knowledge that is „packaged" as a collection of cases or problems, they may gain relevant knowledge when solving the same, or similar, problems in real-life settings (Gentner, Loewenstein, & Thompson, 2003). However, there is a trap if the problem cases are independent of each other in the students' knowledge bases.

The connection component works to interconnect:

- concepts and information within the conceptual framework
- content in contexts.

The connection component can also help students understand how concepts or variables may manifest differently in different contexts.

 **How do we conceptualize the discipline curriculum depending on the approach to the problems?**

Previously, we presented the conceptual benchmarks of designing a curriculum, but let's not forget that the strategy for curriculum implementation is problem-based learning. Therefore, the design of the curriculum will be influenced by the way of framing the problems / projects.

We can use several approaches in designing interconnections between the problems through which the outcomes of a discipline are achieved. The choice of a specific approach is also influenced by the specificity of the discipline.

– **Prior approach**

Prior approach helps students establish these connections in a logical conceptual order from simple / simple to complex / advanced.

Problems at a more complex level should be based on the concepts and prior information that appear in previous problems. This approach should help guide students to see the interconnected relationships between concepts of different levels, involving them in a sequential way in problem solving activities. Prior approach is a particularly appropriate design choice for learning sequential or hierarchical concepts, for example, learning mathematical operations.

– **Overlapping aproach**

Another approach is to overlap the concepts of the various themes / problems. Within a discipline, there is not necessarily a hierarchical relationship. Through this approach, identifying and solving the problem is based on the concepts of different topics, so that students can study each concept in relation to other concepts.

By understanding several sets of concepts involved in many problems, students can connect these sub-networks into a larger and more complete network. The overlapping approach would correspond to disciplines in the field of history or literature.

– **Multi-faceted approach**

The characteristics or nature of the concepts may change from one context to another or over time. Framing a given concept into several problems with different contexts helps students understand the multilateral effect of variables, for example, the difference between the concept of „ethical behavior" in class, business or clinical placement.

– **Holistic approach**

In the holistic approach, the connection component is usually used in a single problem, which requires students to study the field holistically.

The „top-down and bottom-up" approaches are two approaches that you could use in a global problem.

– **Top-down approach**

The top-down approach allows the problem to serve as an organizer in advance [6] (Ausubel, Novak, & Hanesian, 1978). The PBL curriculum that uses this approach should begin the PBL curriculum or module, giving students a problem that requires them to focus on the overall image of the field (for example, a problem that requires students to study contemporary marketing topics in an introduction to the marketing course). This first problem would function as an overview of the PBL curriculum or module. In addition, the top-down approach will provide students with a general conceptual map of the field as a first step in their studies.

– **Bottom-up approach**

The PBL curriculum that uses the bottom-up approach would provide students with a problem that functions as a general review and a summary of the field. This approach helps students organize, integrate and summarize what they have learned from all PBL problems through the curriculum or module, including individual concepts and interconnections. For example,

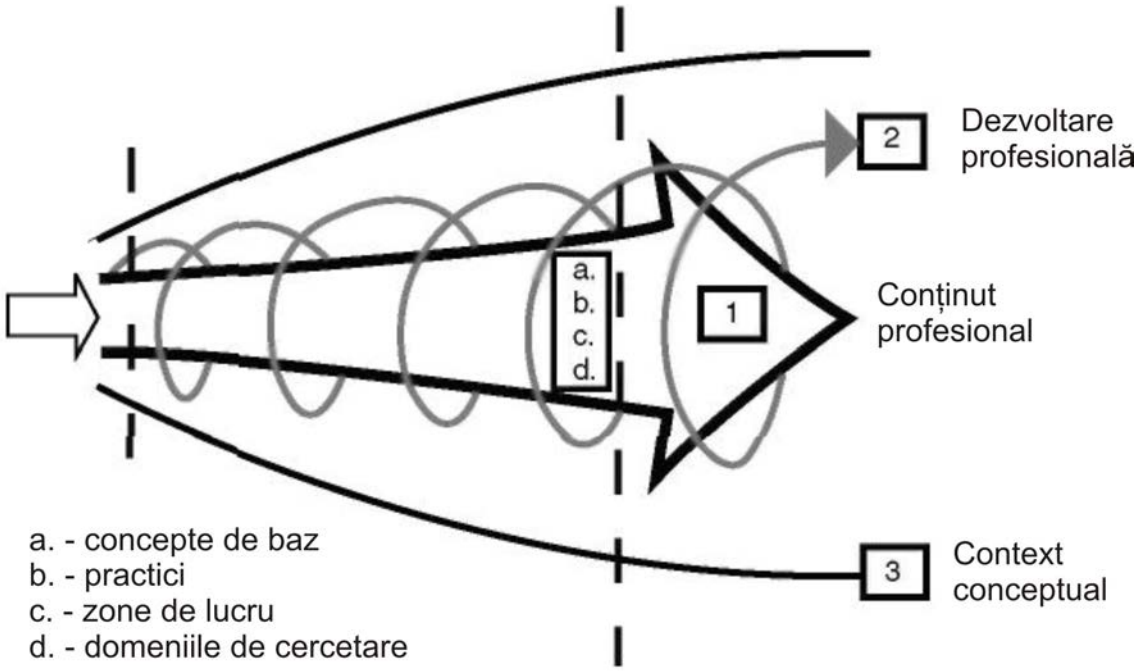
[6] Ausubel, Novak, & Hanesian, 1978

students were asked to make a presentation of a group of new academic schools, connecting educational theories to teaching practice.

Using a combination of holistic and / or interconnected approaches to design PBL problems, learners can be guided to become naturally (implicitly) involved in the concept integration processes.

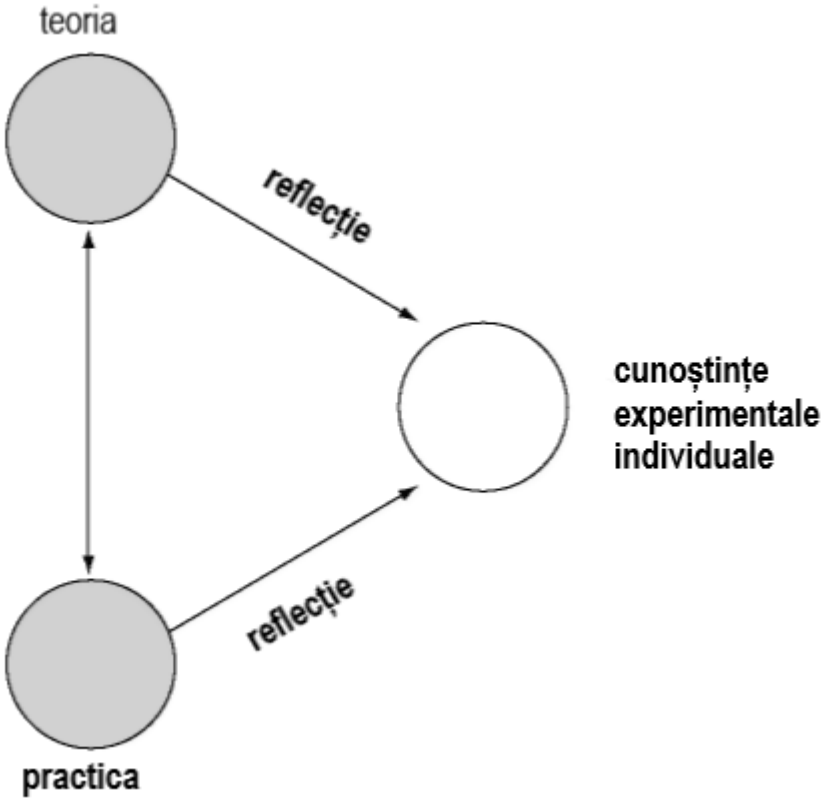
Whatever the approach, the designer of the discipline curriculum will have to take into account the conceptual context, the content of the field of studies and the possibilities of personal development of the student.

Fig. 3.4. A conceptual framework for curriculum design (Broberg et al., 2003)



The PBL strategy, appreciates the student as an active subject of the study process. He, the student must create his own knowledge, being connected to the theory of the field of studies and to the professional practice by solving problems.

Fig. 3.5. Learning as a process of creating knowledge through reflection (adapted from Poikela, 2006)



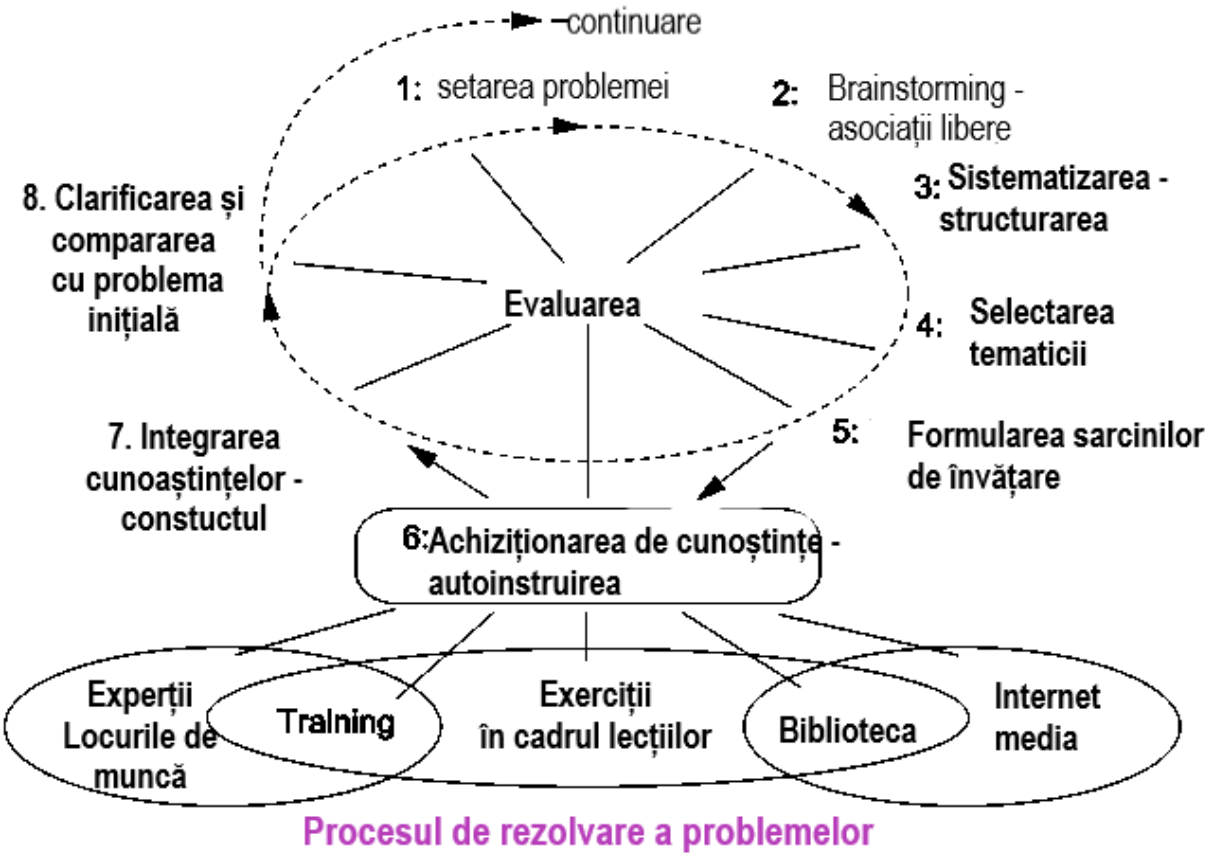
When designing the module / discipline curriculum, the teacher will answer the following questions:

- What is the important theory for your students?
- What is praxis, learning from professional practice (situations), for your students?
- How do you support your students in integrating theory and praxis?
- How will the educational system support the process of individual student learning over time?

What configurations can the design of the teaching-learning-assessment process based on the PBL strategy have?

The teaching process is a complex one and includes multiple activities, which must be in a certain connection. The design of the study process within a module depends on the way the module holder designs the teaching-learning-assessment activities.

Fig. 3.6. Problem-based learning cycle and knowledge acquisition (Poikela & Poikela, 2006, p. 78)



Through the curricular design of a module / discipline, the teacher capitalizes on the following variables:

- learning outcomes / results (the goals we aim for) - ***What results will the student have? What will he acquire? What skills will he or she develop?***
- content (educational message) - ***By what content will we reach the result?***
- time available - ***What time do we have? How long will we carry out the activities?***
- the forms of activity in their diversity - ***How will we achieve the learning? How will the teacher and the student interact?***
- teacher-student communication: the way of communication and the frequency of communication - ***How will we communicate with students: directly, or indirectly / online? How often and how long will we communicate with students during the day, the week, the semester?***

The design of the discipline depends on the management of time and available resources; on how the teacher / holder of the discipline shares over time the main stages / phases of the didactic process: teaching the theoretical benchmark (theoretical courses); formulates the problem and sets up working groups; current assessments of the theoretical support; monitors the projects carried out by the group; presentation of project results and final assessment. Due to these considerations, different configurations of the didactic path realized within the discipline can appear. We propose

an example, taking into account the amount of time distributed to the disciline, starting from the fact that in the education system in the Republic of Moldova, as a rule, a discipline is carried out during fifteen weeks. Fig. 3.7

Fig. 3.7 Distribution of didactic activities over time

Prezentarea reperelor teoretice, formularea problemei, crearea grupurilor de lucru	Evaluarea curentă a reperelor teoretice. Monitorizarea activității în proiect	Evaluarea intermediară a cunoștințelor și abilităților	Evaluarea curentă, monitorizarea activității în proiect, oferire de feedback	Prezentarea rezultatelor proiectelor. Evaluarea finală
4-5 săptămâni	4 săptămâni	1 săptămână	3-4 săptămâni	2 săptămâni

The amount of time available to complete the curriculum of a discipline is also quantified in hours. In the discipline curriculum, under the heading *Administration of the discipline*, the hours will be distributed, depending on the general design of the discipline.

The implementation of the PBL strategy requires a new approach to the content. If, in the case of using a traditional strategy, the teacher records the amount of time, hours of direct contact and hours for the individual work in relation to the topic / number of topics addressed and these are taught in stages and with a certain extension and depth, in the case of PBL application, firstly, there is a need to reconceptualize the theoretical course. The teacher will determine what number of hours he / she provides for one content or another. Which contents are distributed for the independent study of the student, or are studied implicitly during the project activities, by solving the formulated problem. It is advisable that in the few weeks in which the theoretical benchmarks / theoretical courses are taught, the teacher will present a synthesis of the topics within the discipline, its conceptual benchmarks, the notions under which the student will understand the essence of the presented content and will be able to solve the formulated problem, through independent learning, or mutual learning in groups.

Tasks

- Describe the possible variants of conceptualization of the curriculum in the discipline depending on the approach to the problem
- Analyze the components of the teaching process that the teacher must take into account in order to design the curriculum in the discipline
- Establish the functional relationship between the approach to the problem and the configuration of the teaching route to the discipline
- Appreciate the importance of the flexible attitude and the competent involvement of the teacher in the elaboration of the discipline design.

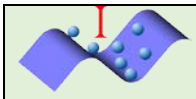
Synthesis and transfer

Try to answer some questions, to determine the possibility of applying those learned in the professional activity:

- Which of the types of approach to the problem is most welcome for the field of professional training and the discipline I teach?
- How will I use the time amount allocated to my discipline to implement the PBL?

	• What do I have to change in teaching the theoretical content to implement the PBL? • What final product should students present as a result of the project activity?
	**Reflection** • What changes must occur in my professional activity to implement PBL? • What idea do I have at the moment regarding the organization of the process of studies in the discipline by applying PBL? • What conditions and context of my professional activity can influence the success of PBL implementation? • Which aspects of the PBL strategy do I enjoy the most and why? • What aspects of the PBL strategy cause my concern and why?
Conclusions	The success of the study process depends on a number of factors, including: conceptualization of the programme, logistic resources, etc. but in fact success is ensured at the operational level by the teacher and students in a concrete teaching context. The way of implementing the PBL strategy within a module / discipline, depends on the approach to the problem, which configures the entire didactic process by combining in a certain way the theoretical content, monitoring the work in teams and offering feedback, assessing the results. The discipline holder decides, depending on the specific area of the professional training and the available resources, how he organizes the educational activity during a semester, how he presents the theoretical content, how and when he monitors the individual work and in teams, how he performs the assessment. In developing the discipline design, the teacher will show creativity and involvement, taking into account the principles and characteristics specific to the PBL strategy.

4 MODULE IV. DIDACTIC STRATEGIES



INTRODUCTION

Motto: „Being active does not mean that the student does everything he wants and no matter what; even in the most active methods it is a pedagogical action"

(Pierre Goguelin)

This module aims to present the action aspect of the teaching activity, by answering **HOW** the teacher and the student interact.

The presentation of the forms of organization of the educational process and of the methods in their diversity, come to the aid of the university teacher, who in the last years is put in the situation to leave the stereotype of a traditional university teaching style.

The multitude of didactic strategies is a proof of the fact that the educational process is looking for the most efficient ways of educational intervention to meet the needs of training the disciples. The PBL strategy is an interaction strategy of all those interested in quality professional training. By virtue of his professional functions, even in the context of a genuine educational partnership (with the involvement of the student and the employer), the teacher has the task of creating the favorable learning context.

OUTCOMES

At the end of the module the trainees will be able to:

- report on various forms of organization of the didactic process
- describe ways to consolidate teams
- identify methods, techniques and processes to make learning more efficient
- apply methods relevant to the field of professional training
- establish relationships between teamwork efficiency and learning efficiency
- argue the need to apply new teaching methods
- argue the importance of leadership in team building and development
- appreciate the role of group work in achieving the objectives of a project
- develop teaching strategies relevant to the field of professional training and the training context

4.1. METHODS OF CARRYING OUT THE EDUCATION PROCESS

The educational process is carried out using different forms, methods, techniques and teaching means. Their choice is made according to the objectives pursued, the contents they work with, the age and individual particularities of the subjects, the degree of endowment with educational means, the way in which the activity will be evaluated, the pedagogical tact of the didactic staff etc.

What are and how are various forms of organization of the teaching-learning process applied?

The meaning of the concept of „teaching" evolved with the development of psychology and pedagogy. Olivier Reboul (1991) characterizes teaching as „the intention to make others learn", explaining that training someone can mean making them know, act, understand. He considers that „those who reduce teaching to a knowledge transfer / transmission completely ignore it."

Olivier Reboul concludes that: „Teaching is, therefore, a long-term activity, which takes place in a certain institution, entrusted to competent people, whose express purpose is to allow students to acquire skills, knowledge and competences, by developing their critical spirit."

The forms of organization of the didactic activities mentioned in the specialty literature are presented in table 4.1.1.

Table 4.1.1. Ways of organizing the didactic activity (depending on the manner of conduct)

	Teacher	**Students**
FACE-TO-FACE ACTIVITIES: lessons, seminars, university courses, activities in laboratories, in workshops, didactic visits, trips, the laboratory, activities in the specialized offices, visit, excursion	- plays the leading role - carries out a predominant activity - organizes, leads and conducts the activity with the students; - presents fundamental notions, - performs demonstrations; - bases on retelling, on the transmission of knowledge to a whole group / series of students;	- passively acquire knowledge - are very limited to the collective activity itself; - perform at the same time and in the same system the same tasks, but each works strictly individually, without establishing interdependent links between them; - communication between colleagues and possible learning through cooperation are reduced to the maximum, taking place only outside teaching, during breaks

		and during free time
GROUP ACTIVITIES: consultations, meditations, exercises in small groups, visit, revision meditations, experiments with scientific research character, meetings with specialists (scientists, writers), contests and debates, communications and reports sessions, magazines.	- guides and leads the activity of subdivisions / micro-collectivities (called groups) made up of students from an academic group and pursuing certain educational objectives, identical or different from one group to another. These groups (3-8 students) can be homogeneous - formal micro-collectivities, respectively formed according to well-established criteria and with a precise structure (for example, students with the same level of preparation in the respective discipline, with the same educational needs, with the same interests or motivations) or inhomogeneous / heterogeneous - informal micro-collectivities, respectively constituted by spontaneous, individual initiatives, according to the students' preferences and which have a coordinator	- Students are everywhere in the classroom. - They group / are grouped according to the study options and resources provided by the teacher. - Students look at each other, face to face. - They communicate. Everyone has the chance for effective dialogue. - In partnership with the teacher, they will find the answers
INDIVIDUAL ACTIVITIES individual study, independent activities by doing exercises and solving problems, doing homework, studying in libraries, reading additional literature, preparing for exams or competitions, researching, experimenting, drafting projects, essays, articles, drawings, schemes, other written works, scientific communications.	- involves common training tasks for all students, with different topics by level groups, with different topics for each student. - individualized or personalized, because takes into account the physical and mental particularities of each student, the level of his preparation, his aptitudes, his educational needs; - the teacher will organize the didactic activities in such a way as to increase the chances of achieving the proposed objectives, adopting a variety of activities to the specific and potential of his students.	- focus on independent work, without direct supervision and consultancy from the teacher;

NB *The harmonious combination of the three forms of activity is the key to success in the educational-training process!*

What is an educational method?

Under the existing learning conditions, the ***training process*** is considered as an interaction between the teacher and the student and aims at the transfer of common knowledge, skills and values to the learner.

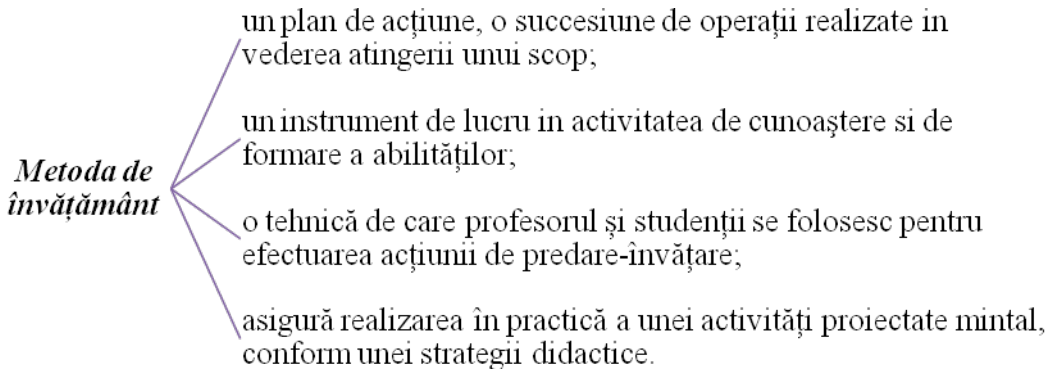
The educational methods (”odos” = path, road; „metha” = towards) are a common way of action of the teacher and of the trainees in order to achieve the pedagogical objectives; students under the tutelage of the teacher or independently can assimilate their knowledge, form and develop abilities, skills, attitudes.

We will recognize the educational methods according to the following characteristics*:*

- are executive theoretical-action approaches of teaching-learning that ensure the efficient development and completion of the instructional-educational process
- are at the same time investigative (scientific knowledge), documentation and experimental-applicative approaches contributing to the development of pedagogical theory and practice
- include and invigorate theoretical pedagogical elements
- are elaborated and implemented in correlation with:
    - the degree and profile of education
    - the specific of the educational discipline
    - the nature and specificity of the didactic activities
    - the level of training of those who learn
- are elaborated and applied in close connection with the other components of the education process
- are elaborated and applied according to the age and individual particularities of the agents of the pedagogical act;
- contribute to the achievement of the teaching objectives
- have a dynamic character (eliminates „moral usage” and adopts the new, are open to perfectionists)
- contribute to the efficient achievement of teaching-learning (some serve to a greater extent the teacher’s work, in teaching; others serve especially the student, in learning)

In figure 4.1.1. the meanings of the educational method are exemplified:

Figure 4.1.1. Conceptualization of the educational method



NB ***Educational methods*** *are effective if the teacher combines them and uses them properly and creatively*

How are educational methods *classified*?

The classification of educational methods can be done according to different criteria. In the Romanian specialized literature, one of the most popular classifications of the methods is realized by I. Cerghit (1997,2006):

- *Communication methods:*
  - *a) oral: expositive* (description, explanation, lecture, instruction);
    conversational (conversation, discussion, problematization);
  - *b) in writing* (reading, working with the manual, the book);
  - *c) oral-visual* (training using video techniques);
  - *d) interior* (personal reflection);
- *Exploration methods:*
  - *a) direct (observation, experimental work, case study);*
  - *b) indirect (demonstration*, modeling);
- *Action methods:*
  - a) *real* (the exercise, the practical works, the technical applications, the elaboration of projects, creative activities);
  - b) *simulated* (simulation games - assuming roles, learning on simulators);
- *Rationalization methods:*
  - *a) algorithmic methods;*
  - *b) the scheduled training;*
  - c) *computer-aided training.*

What is an *active / interactive method*?

An ***interactive method*** involves interaction in the way of a dialogue („int" - reciprocal, „act" - do, perform). In other words, an interactive teaching method is a system oriented to the learner, a

form of learning and communication activity in which the subjects are involved in the learning process and reflect on what they know and think.

Recent studies show that ***interactive learning*** helps subjects gain maximum involvement in the training process. The student changes his role, from the beneficiary or the passive recipient of knowledge, in an active subject involved in this learning process, obtaining the maximum knowledge from this implication: developing an active and independent personality, with well-thought out critical, creative, and analytical thinking, to form argumentation skills. The teacher becomes a supervisor, giving the student the opportunity to become an actor, a participant who is actively involved in the learning process and becomes the center of the lesson, to participate actively in his own training.

Interactive learning involves the activities undertaken by subjects following the reception of the information presented by the teacher in the classroom. These activities are intended to facilitate and increase the understanding of the subject with reference to the content of the course presented by the teacher. Some activities within the lesson that encourage active learning are: discussions / debates, online interventions, group projects, conceptual map, role plays related to content, problem solving etc.

Thus, *interactive learning*:

- takes place through discussions and collaboration, critical thinking, problem solving, connecting learning with one's own world;
- facilitates the development of *divergent thinking* (thinking in general images, where students develop many creative ideas or solutions to a topic) over *convergent thinking* (there is only one answer or a correct solution);
- promotes a conceptual understanding of a subject that is the distinguishing sign of deep learning, as opposed to passive listening to a lecture to pass the exam at the end;
- offers an active learning environment where the student is involved and motivated to learn;
- provides a perfect platform for students to learn the concepts deeply, as they become relevant and meaningful to their current life, which reinforces their *intrinsic motivation* („I want to learn this topic because I am interested and involved!"), as opposed to *extrinsic motivation* („I want to learn this topic because I will get a grade at the end").

Interactivity involves learning through communication, through collaboration, it produces a confrontation of ideas, opinions and arguments, it creates learning situations centered on the availability and the willingness to cooperate of the subjects, on their direct and active involvement, on the mutual influence within the micro-groups and the social interaction of the members of a group.

Interactive group methods are modern ways to stimulate personal learning and development, are didactic tools that favor the exchange of ideas, experiences, and knowledge. In Table 4.1.2. we present the classification of group interactive methods and techniques according to the main didactic function.

Table 4.1.2. Classification of interactive methods and techniques

Type of method	o Example
Methods of interactive teaching-learning in the group favor the understanding of concepts and ideas, capitalize on the students' own experience, develop communication and relational skills, mental deliberating and form active attitudes:	• The Mosaic Method (Jigsaw); • Comprehensive reading; • Cascade; • Small group learning method; • The method of tournaments between teams; • The pair change method (Share-PairCircles); • Pyramid method; • Dramatic learning; • Comprehensive reading; • Debate • Discussion • Role play • Pyramid method;
Methods of fixation and systematization of knowledge and verification:	• The bright cards; • The cause and effect diagram; • Fishbone maps (fish skeleton); • Cognitive chains; • Matrices; • Method R.A.I. ; • Spider map – Webs; • Lotus Blossom Technique; • Cognitive /Conceptual map;
Methods of solving problems by stimulating creativity: determine students to seek and develop solutions for different problems / situations, to make critical reflections, value judgments, to compare and analyze given situations:	• Brainstorming; • Carousel; • Creative controversy; • The exercise; • Fishbowl (aquarium technique); • The critical incident; • Group interview; • The round table; • Delphi method; • Frisco Method; • SixThinking Hats; • Four corners; • Phillips 6/6; • Synectics; • Starbursting; • Case study; • Technique 6/3/5; • Focus group technique; • The didactic game

	• Problem solving
Group research methods: facilitates interaction learning, where subjects are taught to work productively with others and to develop communication and collaboration skills	• Group research topic or project; • The team experiment; • Group portfolio;

**** The description of these techniques and methods are presented in annex 4.1.1***

What is the role of the teacher in the interactive learning?

Interactive teaching becomes, in the first instance, a great challenge for the teacher, because he is obliged to change the way of working and at the same time to possess a high level of professional training.

That is why, the role of the teacher remains a crucial one, trying to give up the old authoritarian and rigid patterns, in favor of organizing a learning environment adapted to the particularities and needs of the beneficiaries, facilitating the learning process.

The traditional teaching, being dominated by a verbal approach and the memorization of the didactic material, is completely replaced by other activities, both in the teaching process and in the learning process of the material.

Thus, the educator will not only require the knowledge of scientific information, but will build learning devices, practicing a differentiated and individualized pedagogy.

In this didactic approach, the teacher fulfills a multitude of roles, depending on the moments of the activity, the proposed objectives, forms of organization shown in figure 4.1.2.:

Figure 4.1.2. The roles of the teacher

Proiectant	al activităţilor şi experienţelor de formare;
Mediator	al învăţării studentului;
Consilier	pentru studentul care are nevoie de ajutor în învăţare;
Facilitator	al învăţării şi autoinformării;
Partener	al studentului intr-o relaţie educaţională interactivă;
Coordonator	al muncii studentului;
Animator	ce catalizează activităţilei de formare şi de comunicarei;
Scenograf	ce pregăteşte contextul desfăşurării activităţii didactice;
Actor	al demersurilor instructiv-educative;
Strateg	orientează studentul pe drumul cunoaşterii;
Evaluator	al procesului şi produsului învăţării.

- **Designer** - of training activities and experiences;
- **Mediator** - of student learning;

- **Counselor** - for the student who needs help in learning;
- **Facilitator** - of learning and self-information;
- **Partner** - of the student in an interactive educational relationship;
- **Coordinator** - of the student's work;
- **Animator** - catalyst of the training and communication activities;
- **Scenographer** - prepares the context of the teaching activity;
- **Actor** - of the instructive-educational approaches;
- **Strategist** - guides the student on the path of knowledge;
- **Evaluator** - of the learning process and product.

Creating interactive teaching opportunities requires teachers to know and apply as many strategies as possible to facilitate and support communication between learners. This implies that teachers should use interactive models in which subjects are frequently involved in smaller or larger group activities.

What are the didactic strategies?

The general meaning of the strategy concept includes „the way of conception, the guideline in systemic vision and in the medium or short term of the educational processes" (M. Ionescu, 2003).

In a narrow pedagogical sense, strategies can be defined as systems of methods, procedures, means and forms of organizing the educational activity, integrated systemically and operationally, which aim at building learning experiences, training skills, capacities, etc.

A didactic strategy prescribes how the student is put in contact with the learning content, that is, the trajectory on which the learning effort is to be led. It provides structural, procedural solutions regarding the design and combination of different methods, means, forms and resources of teaching-learning, so that the students reach the desired acquisitions, and the educational objectives are achieved.

Here are some examples of strategies, namely:

- *Teaching through content exposure* involves retelling, lecture, reading in front of the colleagues, report, exposition, presentation, teaching through examples, demonstration where the teacher can teach the discipline directly, according to the situation in the classroom, and the students' reactions are immediately evident.
- In this approach, students must achieve the same goal - in the same time, in the same class and in the same framework, by the same method and by the same means.
- *Guided learning (classroom discussions)* involves a dialogue, questions, incentive, encouragement, guidance, support. In involves interaction between exposures and stimuli coming from the teacher and from the students' involvement.
- *Open learning* is the strategy in which the teacher will offer recommendation, mediation, support while the students carry out activities of selection, planning, discovery, elaboration, design, analysis, judgment, verification, control and questioning.

- This learning environment encourages the activities of the students (flexible distribution of the room and space, a large variety of learning materials, a special place for experiments, etc.).
- The students can participate in the decision making, they are offered a variety of topics and materials of their choice, their interests, needs and initiatives having high priority.
- The open learning process involves and encourages self-determination, personal responsibility, research, spontaneity, contextual orientation.
- *Individual teaching*. In this approach, the teacher will offer diagnosis, guidance, training, support, recommendation, information, control, observation and motivation, while the student will carry out activities of selection, modification and development of the study programme, will carry out, revise and will evaluate his progress.

The environment for teaching and learning satisfies the needs of the student (defined by the knowledge, previous competences - skills and talents, interests, the social and family context of the students, etc.). This strategy leads to the optimal adaptation of all the elements in the learning process to the needs and abilities of the students, that is to say, the requirements, the objectives, the procedures, the methods, the time, the media devices and the auxiliary means (multi-dimensional specification).

Individual learning encourages efficiency, saving time and effort, a systematic approach, independence of mind and personal responsibility.

➢ *Learning based on projects*

The teacher's activity involves mediation, observation, recommendation, stimulation, support, organization, coordination.

Students will contribute to goal setting, cooperation, planning, discussions, mutual help, data and information collection, questions, application, studies, experiments, tests, modifications, design, creativity, achievement, control, evaluation.

The interests, concerns and objectives of the students are decisive in choosing and approaching the topic, accomplishing the tasks. A real (complex) problem in real life perceived by students, serves as a starting point, giving priority to obtaining results and an interdisciplinary (cross-curricular) approach.

In this context, students are encouraged to draw inspiration from their personal experience, learning being very effective, because it is inspired by real life situations. After the division and assignment of tasks, the stages of project development, planning, implementation, analysis of results and establishing prospects for future post-project activities, control, completion and evaluation will be completed.

Cooperative activity is crucial in such an approach, encouraging mental independence and learning through discovery, personal and practical experience, social interaction with others, consulting experts. Teaching and learning encourages students to act!

➢ *Cooperative learning* is a set of strategies that employ small teams of students to promote collegial interaction and collaboration. This is achieved when students work together, as

a team, to explore a new topic, to solve a problem, to create new ideas, to reach a common goal. In order for this type of activity to bear fruit, competition in favor of collaboration must be eliminated, and the teacher must have skills and competences whereby these learning methods through cooperation are promoted and applied within the classes.

Key elements of this strategy are: positive interdependence between group members, direct, face to face interaction, practice of learning in group, individual responsibility of each member of the group, the role of tutor and coordinator of the teacher.

In order to encourage cooperative learning, within a larger group, the same role should be divided between two or three students, and finally each group learns from the other about those studied, the members of each group play their roles, teaching the other colleagues from the other groups on the information studied, stimulating discussions around this topic.

By working together, students maximize their own learning as well as that of other colleagues. Research shows that students who carry out learning tasks through group co-operation tend to have better academic performance, greater positive social skills, better understanding of the content and skills that they form.

- *Peer instruction* is a teaching and learning strategy based on analysis and investigation and calls for social interaction to produce and enhance learning.

Such an activity can be carried out in both small and large groups and allows all students to experience the role of teacher, thus developing the student-student dialogue. Usually, this approach is a learning of the techniques of studying an informative text (broad information on a topic). In groups of 4 to 7 people, students work with the same text and play the role of the teacher in five steps, after reading, individually, a paragraph.

Mutual learning is centered on four learning modalities used by the one doing a text study on scientific, social topics or a narrative text (stories, novels, legends). These strategies are:

- *Summary* - presentation of what is most important, relevant from what has been read; a summary will be made;
- *Asking questions* refers to the listing of a series of questions about the information read; the one who asks the questions must of course know the answer;
- *Data clarification* consists of discussing the unknown terms, more difficult to understand, the appeal to various sources, solving the misunderstandings;
- *Prediction (prognosis)* refers to the expression of what the students believe will happen next, based on what they have read.

This strategy may be approached differently for larger texts. The text / information is divided into logical parts, the group is organized into groups of four students, each having a role: to make the summary, to ask questions, to clarify things, to predict what will happen, and then the text parts are distributed to each group separately. Subsequently, the teams work on the text, each member focusing on the role received.

Finally, each group learns from the other what they read; the members of each group play their roles, teaching the other colleagues in the other groups about the text they read, stimulating the discussion on the topics studied.

Reciprocal teaching and learning is a group learning strategy, which stimulates and motivates, helps students in learning the methods and techniques of working with the text, intellectual work techniques that they can then use independently, develops the ability to express themselves, attention, thinking with its operations: analysis, synthesis, concretization, generalization, abstraction and active listening ability stimulates the focus on the text and the ability to select the essential. Achieving mutual learning occurs through assessments, completions, comments.

- *Flipped classroom*

A flipped classroom is a training strategy and a type of blended learning that reverses the traditional learning environment by providing training content, often online, outside the classroom. In fact, there is a transfer of topics, activities (those that could be considered as homework) in the classroom. In a flipped classroom, students attend online courses, collaborate in online discussions or conduct research outside the lesson, while engaging in discussions under the guidance of a mentor.

- *Blended learning*

Blended learning is an approach to education that combines online educational materials and opportunities for online interaction with traditional methods and face-to-face interaction. It is also used in professional training.

The teaching strategies are realized with the help of teaching and learning methods (informative and active-participative, of individual study, of verification and assessment).

The strategy shoud be not confused with the method or the didactic methodology. The method aims at a teaching-learning-assessment activity. The strategy aims at the training process as a whole and not a training sequence.

Interactive didactic strategies become the ideal platform where the teacher provides students with multiple opportunities to get involved in their own training process, to freely express their ideas, opinions and to confront those of their colleagues, to develop their skills. communication, leadership, conflict management, time management etc.

	**Tasks** • Identify a system of methods specific to the discipline you teach; • Describe how you can use the case study method for your field of activity; • Propose a didactic situation in which to use the conversation, specifying its advantages and disadvantages;
	**Synthesis and transfer** • Propose some activities that will increase the motivation of the students in your classes • What would be the most appropriate ways to engage / involve students in approaching the proposed topic? • Which topics within your discipline will stimulate interest and discussion among students?

	• What methods and techniques place the *student* at the center of learning?
	**Reflection** • Which of the activities you carry out causes students to think critically and synthesize their knowledge on a topic (divergent thinking)? • Which of the methods / techniques / strategies do you consider only an exercise of understanding (convergent thinking)? • What modalities do you offer students to reflect on their own learning process?

4.2. TEAMWORK

Motto: "If you want to get there fast, go alone,
if you want to go far, go together!"
(African proverb)

What is a *team*?

The team represents a group whose members influence each other to achieve a common goal. The concept of team has evolved considerably over time. If yesterday, the goal of a team was to focus on analyzing the elements considered fixed: objectives, roles and tasks, then today, this environment is much more fluid, more dynamic and more complex: the team members will be constantly adapting, and objectives, roles and tasks will evolve permanently.

The members of a team will contribute not only through their knowledge and skills, but will relate to others through their personal attributes, behavior, attitudes. People who are not compatible with each other can never form a team. A commonly held idea is that these characteristics should be taken into account when building a team.

A person who is known to be confident and enthusiastic will probably approach the same type of behavior when becoming part of a team. If all team members behave in the same way, then there will certainly be conflicts and the quality of tasks will decrease.

Team spirit calls for unity, cohesion and solidarity among its members. A team is a moving force, alive and dynamic. The members of a team are all different, but working together they will create a new entity that has its own characteristics. In other words, the quality of the work of a team depends on the quality of the individual work performed by each member.

One of the best ways to develop team spirit is to get those involved to commit to achieving the group's collective goals. These goals should stimulate the participation of all, but above all, enthusiasm and positive energy.

Teamwork represents all the tasks performed in a group, with a common purpose. The participation of all in the collective tasks contributes to the achievement of this objective.

Working in a group means working in harmony to make actions more efficient. Each member must show involvement and cooperation, always seeking consensus for decision making. In solving problems, effective communication is crucial, which is why it will be insisted on dialogue, insisting from the beginning on a two-way, positive and open communication.

NB Heterogeneous teams are effective, whose members differ by: work pace, style of communication and learning, personality traits and character. However, we should mention that the heterogeneity of the group must be moderate. The too big differences are also a hindrance in the group's activity.

What is the role of teamwork in PBL and why are teams important in an academic environment?

Teamwork is essential to being successful in the century of speed and big changes. Today very few people work in isolation, having no help or contribution from others. And to cope with these changes it is necessary to acquire the ability to work with people, for the success of the whole team, companies, institutions.

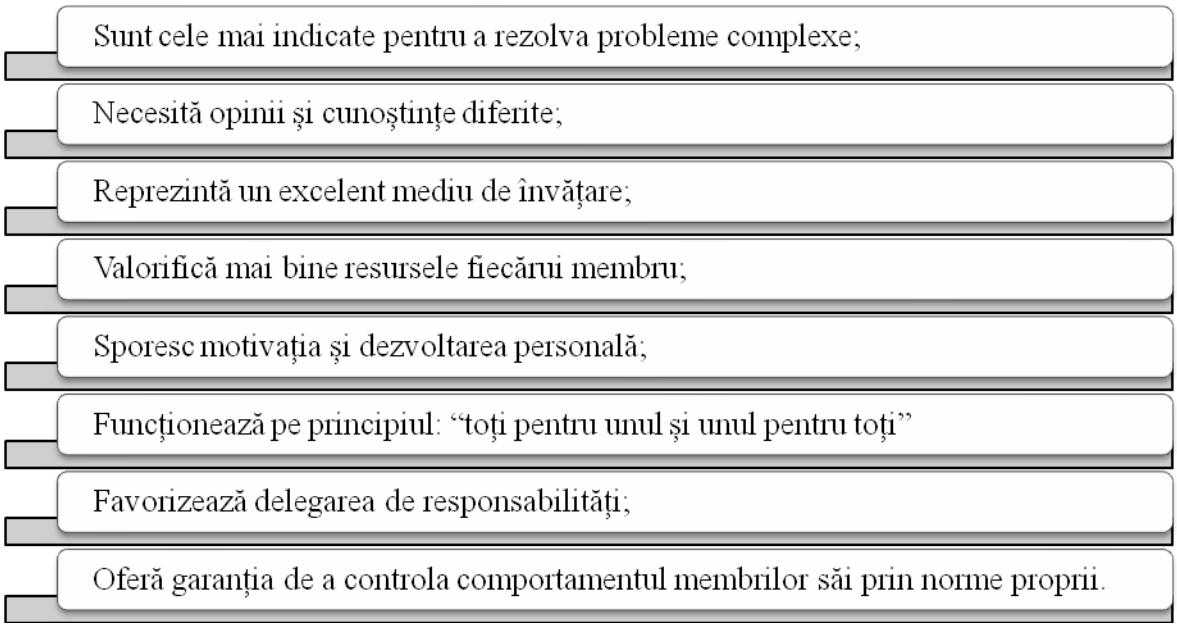
In this context, the academic environment offers immense opportunities for students to develop this ability to work as a team. The *problem-based learning approach (PBL)* comes to facilitate this process by introducing teamwork at the study plan level.

To work together, group members must demonstrate a sense of cohesion. When a group of people will work together for a certain period of time, personal clashes and conflicts will surely occur. If they are not managed properly, then teamwork may not provide the expected benefits. For students to get a comprehensive education, teamwork integrated into the classes is vital. Teamwork is needed between trainees, between trainees and teachers, and between parents and teachers. The more team-based platforms are offered, the more opportunities there are for students to learn the vital skills of compromise and collaboration, communication and negotiation.

It is extremely important for students to learn how to operate in a team environment so that they have well-defined teamwork skills when entering the labour market. Also, research confirms that trainees learn best from performing tasks that involve social interactions.

Team or group work teaches students the fundamental skills associated with working as a collective unit for a common purpose. This type of teamwork introduces a variety of skills that will be valuable to students later in the workforce, such as communication, compromise and collective effort. In any type of group work, students must agree on who will manage various components of a project and work in tandem using the benefits of the other to accomplish the assigned tasks. This teaches time management, resource allocation and communication skills. In Figure 4.2.1. we present some advantages of the teams.

Figure 4.2.1. Why team?



Therefore, it is essential for everyone to be listened to and understood, so that each member adopts the roles of receiver and transmitter at the right time. We will present, in summary, some advantages and disadvantages of teamwork versus individual work in table 4.2.1.

Table 4.2.1. Group work versus individual work

	ADVANTAGES	DISADVANTAGES
Teamwork	• Enhances collaboration and enables brainstorming. As a result, more ideas are developed and productivity is improved. • Two or more people are always better than one for problem solving, completing difficult tasks and increasing creativity. • Each person is unique and has different skills, experiences and areas of expertise. Therefore, team members can help each other to see things from different perspectives. • Encourages communication between team members. For this reason, the relationships between teammates tend to improve because they learn to communicate better.	• In some teams, there may be members who parasitize and let others do all the work. Conflicts can occur in these types of teams and this can affect the mood of other people in the team. • Requires many meetings, and if not well managed, they can reduce the efficiency of the team. • The decision-making process may take longer to reach a consensus, which is why the presentation of deliverables may be delayed.

Individual work	• Each one works at its own pace, without depending on someone else. • One person can concentrate more easily and could work faster because there are no additional interactions and meetings. • The entire responsibility for the work done by one is held. • Responsible for their own decisions.	• There is only one person in charge of the project, and in case of failure, he will take the blame for himself. • Self-motivation is necessary because there is no other person responsible for carrying out the tasks or the project. • Boredom can occur when there is no communication or sharing of ideas. • If outside distractors appear, it is very likely that they will not succeed in time with the completion of tasks.

Each member of the team is important through their personal contribution. However, the group atmosphere should lead to effective and honest communication. All teammates should feel the opportunity to express themselves freely and confidently. Instead, listening is just as important.

Regular open communication, in which group members share their thoughts, ideas and feelings, is a must for a successful team. Teamwork involves building relationships and collaborating with other people who use an important set of skills and habits such as: cooperation, communication, responsibility, respecting different opinions, individual habits and preferences, contributing with ideas, suggestions and efforts, the ability to participate when making group decisions.

The ability to work as a team has proven to be one of the most important skills required by the current labour market. As team members work together to reach a goal, the benefits will be major for everyone involved in the process. That is why employers are looking not just for employees who easily master the technical skills, but also people who can contribute with their own ideas, who can work with others to create and develop team projects and plans. This is why we, the academic environment, have the task of developing and insisting on the formation of these skills of collaboration and cooperation.

Guiding students in working on group projects can be one of the most challenging aspects of our work. When groups work well, they represent a wonderful experience for both students and teachers, especially when projects have applications in real professional activity. Efficiently directing a project involves capitalizing on the individual and group activity of the students, with an emphasis on group work.

What is the *optimal number* of people in the team?

The size of the team is a very studied and debated topic. The number of people in the team is an important aspect to address. The larger the team, the greater the variety of skills and knowledge, but as the size of the team grows, each member has fewer opportunities to assert, participate, engage and influence decision making.

You have to consider a number of factors when determining the optimal size of the team.

Factors that affect the optimal size of the team include:

– the purpose for which you formed the team;

- the expectations you have from its members;
- the roles assigned to each member;
- the interaction necessary to obtain the performance;
- the function, activities and objectives of the team;

Research shows that the best teams are between five and nine members. Dr. Meredith Belbin has done extensive team research, suggesting that the optimal size of the team is eight roles, plus a specialist at will. Some researchers, however, have suggested that smaller teams perform better, yet it is surprising to find that many organizations employ teams of 10 and more members.

In the team of 5-6 people, in the view of other researchers, the interactions are the most efficient and productive. Everyone has a chance to express themselves, and the division of labour is made without losing the general perception of the goals to be achieved. Internal, relational and structural issues are also more easily solved. Researchers like Slater, in 1958, as well as Hare, in 1962, concluded that „5 is really the ideal number for a team", but Holloman and Hendrick (1971) opt for 6 people.

Less than five members resulted in reduced prospects and diminished creativity. A team of five or seven people is considered optimal for the effective participation of all members, but to achieve the high level of expertise and skills needed, the team can be even bigger.

Teams that have exceeded twelve people have increased the conflict and also increased the potential of forming subgroups that can affect team cohesion. The larger the group, the less satisfied the members are, as communication difficulties increase. Participants are less likely to express their views equally. (see Golembiewski, 1962: Thomas and Fink, 1963).

In most cases, large teams form sub-teams and working groups within the team to perform the real work of the project. For example, these larger groups are effective for contributing to strategic planning, for general project communication, for building an idea, and so on.

The size of a team is therefore a compromise or a balance between variety and individual contribution.

NB Team size affects team processes and results. The optimum size and composition of the teams depend on the purpose and objectives of the team.

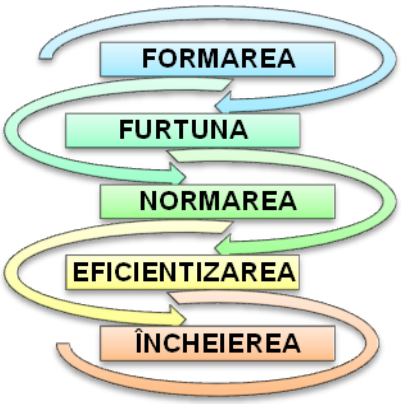
What is the life cycle of a team?

Managing a team involves monitoring both progress and failures over the entire period of the existence of a team, from start to finish.

These stages, identified by Bruce Tuckman in 1965 and completed in 1977 with Mary Ann Jensen, are considered necessary and unavoidable for the team to develop, to face all challenges, to tackle various problems and to find effective solutions, to solve their problems, to plan the activity and bring results.

Throughout its evolution, a team goes through several stages of development: *Forming, Storming / Transition, Norming / Performance, Efficiency (Performing) and Closing / Suspending (Adjourning)* and are represented in Figure 4.2.2.

Fig.4.2.2. The Tuckman team development model



The idea of the different stages of a team's operation is useful for understanding what a team needs and what is the optimal way to provide the right support.

Stage 1. *Formation*

This stage is considered an orientation moment where the team has just been set up, and the members are excited to start something new and get to know the other team members. There are also discussions about each one's skills and experience. They will try to outline the objective of the project, establish basic rules and the role of each member.

In Figure 4.2.3. we have displayed the most important moments that take place during the team formation stage.

Fig.4.2.3. Team formation stage

ETAPA 1 *FORMAREA* *(Echipa Imatură)*	*Are loc cunoașterea interpersonală*
	Membrii sunt entuziaști și optimiști
	Membrii doresc să fie acceptați
	Membrii au nevoie de siguranță
	Membri așteaptă o implicare intensă de la lider
	Membri manifestă teamă față de sarcini
	Se încearcă definirea domeniului sarcinii
	Nivelul de productivitate este unul scăzut

It is important for team members to develop relationships at this stage and to understand the importance of being involved in achieving the goals. The team will probably not be a very productive one, given that the members will focus more on getting to know people, than on achieving tasks.

Stage 2. *The storm*

The initial feelings of enthusiasm and the need to be polite are already consumed at this

time. It is crucial to understand that most teams face conflicts, and disagreements are normal. Some teams try to avoid either the storm stage or conflicts at any cost. Conflict avoidance will lead directly to exacerbating problems within the team. Thus, at this stage we observe multiple processes presented in figure 4.2.4

Fig.4.2.4. CONFUSION and CONFLICT stage

ETAPA 2 *FURTUNA* *(Echipa Fracționată, Agitarea)*	*Se atestă nemulțumire şi competiție.*
	Colegii întâmpină dificultăți de comunicare.
	Au loc conflicte şi dispute la nivelul relațiilor personale.
	Persistă haosul şi confuzia.
	Membrii devin frustrați.
	Se observă frica de a se expune.
	Creşte dorința de a structura şi a clarifica.

The intervention of the leader in conflict resolution is inevitable, and he will be the one who will try to coagulate the team by recognizing and remedying conflicts from the beginning.

Stage 3. *Normal atmosphere*

The biggest danger at this stage is that members may begin to fear the inevitable disintegration of the group in the future, then they may oppose any change. At this stage, the subjects begin to observe and appreciate the strengths of the team members. Unification of forces and cohesion of the group takes place, but with the emergence of new tasks, the groups may face some conflicts.

With the experience of the conflicts of the second stage, the subjects can feel restrained in asking critical questions related to aspects of the team's activity, its objectives, etc. This is why the *Storm* sometimes overlaps, or is confused with the *Normal atmosphere*. If the disagreement has been successfully resolved previously, it will probably be easier to address this moment. In the process of normalizing the previous phenomena, the information flow between the group members is already intensifying. We present in Figure 4.2.5.a series of interaction improvements, namely:

Fig.4.2.5.The team UNIFICATION stage

ETAPA 3 *NORMAREA* *(Echipa Unită)*	*Încrederea duce la coeziunea grupului.*
	Se identifică consens în rezolvarea problemelor.
	Dispare fragmentarea grupului.
	Se rezolvă problemele interpersonale.
	Membrii simt siguranță și confort.
	Membrii împărtășesc sentimente și idei.
	Colegii solicită și oferă feedback.
	Creativitatea atinge cote înalte.

Stage 4. *Efficiency/improvement*

At this stage, the team uses a lot of time to systematically evaluate its objectives, organization, methods and external relations. Individuals give each other constructive feedback and the team seeks to receive feedback from other teams. Compared to the second stage, this stage is full of resources, the team's energy is oriented towards the achievement of the objectives and is not wasted on the opposition of resistance and dissatisfaction. In figure 4.2.6 we already see processes that already indicate a certain progress:

Fig.4.2.6. Stage of group activity efficiency

ETAPA 4 *EFICIENTIZAREA* *(Etapa Funcțională)*	*Interacțiunea între membri devine mai flexibilă.*
	Se observă îmbunătățirea relațiilor interpersonale.
	Membrii cooperează cu ușurință.
	Membrii vor soluționa cu ușurință sarcinile complexe.
	Echipa devine foarte productivă.

Efficiency is the stage where all teams strive to reach. However, some fail to overcome the conflicts, even some previous ones, they can collaborate with the other members and the most unpleasant moment comes out, the one to give up further collaboration.

Stage 5. *Separation*

Once a project is completed, the team splits / dissolves. Team members may feel anxiety because they will have to give up the group. The dissolution of the team could be marked by the planning of a future activity. Figure 4.2.7 shows the phenomena that occur when the team dissolves.

Fig.4.2.7. SEPARATION stage of team members

ETAPA 5 *SEPARAREA* *(Încheierea)*	*Se finalizează sarcinile* *Se recunoaște paricipărea* *Apar crize minore* *Se dizolvă echipa*

What are the *roles* assigned to a team?

In his research, Dr. Meredith Belbin and his team mention nine patterns of behavior that they called „*Team Roles*" identified as „*a specific tendency of a person to behave, contribute and interact with others*."

Dr. Meredith Belbin has shown that balanced teams, made up of people with different abilities, perform better than those of unbalanced teams.

Each team member making distinct contributions to the team will assume, at a certain stage, 2-3 favorite, main roles, which is why the presence of 9 people will not be required to form a team. M.Belbin grouped these roles into: action-oriented roles, human-oriented roles, and brain roles. Assuming a certain role at a certain stage, involves providing and receiving feedback within the team to increase its efficiency. The figure below shows Belbin's model of assuming team roles:

Fig.4.2.8 Team roles after M.Belbin

(https://dotnetsharing.wordpress.com/2017/09/19/learn-belbin-team-roles-through-reflection/)

Following Belbin's model, each member will be aware of the responsibility for the tasks proposed for accomplishment, and this will lead to more effective communication between colleagues and supervisor. Being different and having a different attitude towards work, we achieve goals in different ways, thus having different roles in the team. Some people like to lead the team, others create ideas, others tend towards practical solutions, etc.

NB *There is no good or bad role; each role is important for the success of the whole team.*

Belbin mentions that some roles have a more extroverted connotation (coordinator, trainer and resource researcher), and others are more introverted, although today this dimension is not important. Each role has both positive and negative aspects. The following table 4.2.2. describes the profiles of each role identified by Belbin:

Table 4.2.2. Characteristics of the roles played in the team
(https://www.belbin.com/about/belbin-team-roles/)

ROLE	PROFILE
Shaper / Trainer *has the strength and the courage to overcome the obstacles !!!*  **(Shaper)**	Strengths: – is curious, sociable, direct and energetic – imposes a certain image of the team. – gives the form of team effort – seeks practical aspects regarding the implementation of the project. – draws attention to the objectives and priorities – is provocative, resistant to stress, – knows how to overcome obstacles, – develops relationships – aims to win at any price. Weaknesses: – can hurt feelings – can be aggressive, provoking others – can lose interest very quickly ! The presence of several shapers / trainers in a team can lead to conflicts.
Implementer / Practitioner / *transform ideas into practical actions !!!*  **(Implementer)**	Strengths: – good organizer, knows how to plan – transforms ideas and concepts into practical actions – completes the plans – is trustworthy – transforms colleagues' decisions and strategies into positive actions – does not deviate from objectives and priorities – has a developed sense of self-control and discipline. – respects the existing principles Weaknesses: – does not accept changes and new ideas easily
Finisher *looks for errors and finishes on time !!!*	Strengths: – is a perfectionist – permanently looks for the aspects that need increased attention – maintains team activism – is careful about the details – respects the deadlines – is responsible for error handling and quality control – tends to work too much

 **(Completer/Finisher)**	– is self-motivated – has high standards Weaknesses: – dominates the others – refuses to share tasks with someone else – rejects the novelty – sometimes is an exaggerated perfectionist – often does not trust others
The leader/ **Co-ordinator** *leads a team and promotes decision making !!!*  **(Co-ordinator)**	Strengths: – clarifies team goals – sets priorities – chooses the problems, but does not dominate the discussions – organizes the team – establishes its activities – assigns responsibilities – controls the achievement of the objectives – capitalizes on the potential of each member – knows how to delegate effectively Weaknesses: – can dominate and manipulate. – can delegate too large tasks to others – can perform less tasks than others
Researcher / **Resource Investigator /** *explores opportunities, looks for resources and develosp contacts !!!*  **(Resource Investigator)**	Strengths: – creates a system of contacts and relationships – is a good communicator, negotiator, open and fast – brings ideas and information from outside – gives the team the necessary enthusiasm – holds analytical and tactical thinking Weaknesses: – can lose enthusiasm too quickly – has a tendency to lose momentum towards the end of the project – forgets small details. – is perceived as a boring and critical team member
Teammate / **The basic player** *listens, builds relationships and tries to avoid or reduce conflict between team members.*	Strengths: – is a good partner, sociable, flexible, adaptable, mediator – facilitates communication – maintains team spirit – knows how to resolve conflicts – stimulates team collaboration, – helps team members – has developed social skills – knows how to listen

 **(Team Worker)**	– has a good spirit of observation – is the most popular member of the team Weaknesses: – feels insecurity in decision making – sometimes is unable to make quick decisions – becomes vulnerable when influenced by other members ! His role is not generally appreciated until his absence when conflicts arise and things do not work normally.
The expert / specialist *offers knowledge and skills!*  **(Specialist)**	Strengths: – provides technical information, – in a discussion - is in the position of the professional. – contributes in a small area of activity, very specialized. – is dedicated to work – is an „endless source of knowledge” Weaknesses: – does not socialize much with the team ! Few people in a company can be specialists.
Idea generator / Strategist *solves difficult problems !!!*  **(Plant)**	Strengths: – advances original but also radical ideas and strategies – has an overview – can discover unusual solutions. – is innovative, inventive, creative, original, Weaknesses: – ignores details – does not communicate effectively – sometimes imposes his ideas on the team – gets upset quickly – has difficulty communicating his ideas ! The presence of more people with this role in a team can lead to conflicts, because there are more ideas, but without the will to implement them.
Monitor - Evaluator *observes and evaluates what is happening !!!*	Strengths: – analyzes problems – evaluates the solutions so that the team makes the best decisions. – is a critical and analytical thinker, rational, serious, prudent – contributes to the logical and impartial analysis, – manages to see most clearly all the available options Weaknesses: – does not get excited – does not know how to motivate.

 **(Monitor Evaluator)**	– can become hypercritical

Belbin's nine roles are a useful tool for identifying one's personal traits and contribution of each to becoming a high-performing team.

By knowing the characteristics of the roles in a team, we will be able to easily recognize the missing ones or if some roles are too many or too few. We can use the advantages of a certain role, so that we can manage its weaknesses. Also, knowing the role of each in the team, the team members can develop their qualities and manage their flaws more easily, thus increasing their contribution to the efficiency of the team. Belbin's framework influenced the process of organizing and managing the team. Such recommendations become useful in guiding the formation of a balanced team.

When deciding on team building it is important to discuss with all members what their strengths and weaknesses and favorite work styles are, because by ensuring a balance of behaviors or „roles" there is a greater likelihood that the team will work more effectively, if each member assumes the role in which he or she feels the most qualified.

 *Weak points identified by Belbin come from the behavior of people and the interpersonal styles that are influenced by the context: the other people in the team, the relationship with them and the task to be fulfilled. In addition, research into the validity of Belbin's nine roles has shown that some are not easily distinguishable from each other and that the roles fit more easily with the conventional framework of character traits* (Fisher et al. 2001 Fisher, S.G., Hunter, T.A. andMacrosson, W.D.K. (2001) 'A validationstudy of Belbin's team roles', European Journal of WorkandOrganizationalPsychology, vol. 10, issue 2, pp. 121–44.).

To achieve a successful project in the team, it is necessary to consider the knowledge and proposals of each member. The process of making the right decisions at the right time will be followed by the collective validation of the solutions that will be instantly justified, appreciated and evaluated at each stage of the project. By a simple vote of the members on an issue, this validation must be the result of a „yes" of the majority. This collective decision comes after a constructive debate and a clear and well-built argument. This consensus places each person in the team in a real decision-making role, thus satisfying the need for active integration and participation of each member.

Tasks

a) Analyze a team or group you recently joined.
b) Answer the proposed questions (20 min.).

Care a fost scopul grupului sau al echipei?

Cât de bine şi-a atins scopul şi obiectivele?

Cine a fost implicat în acest proces?

Cum au fost selectați membrii?

Membrii au avut abilități şi experiențe diferite?

Ce procese şi activități au funcționat bine?

Ce procese şi activități nu au funcționat atât de bine?

Care sunt momentele pozitive pe care vi le amintiți?

Care sunt momentele negative pe care vi le amintiți?

Alte ganduri, idei, reflecții…Discuții…

Synthesis and transfer

- Identify the best collaboration tools for teamwork?
- How can you better support and encourage teammates in future projects?
- Suggest some ideas that can make meetings work better for any team member.
- Suggest a few benchmarks for effective team communication.

Reflection

- Justify whether it is better to work alone or as a team?
- What have you learned from your teammates?
- What solutions do you propose for those who are not involved in group activities (free-riders)?

4.3. CONFLICT MANAGEMENT

Motto: ,,A conflict cannot live without your participation!''

(Dr. W.Dyer)

What are the *conflicts* and what *causes* them?

We all know: conflicts arise in all areas of life, but especially when people spend a lot of time with each other, including in academic settings. Each person has his or her own tasks, roles, goals and priorities. We do not try to mention the different character traits, because teammates often cannot work as well together as we would like, causing frustration. The frustration being suppressed obviously triggers conflict.

The term „conflict" comes from the Latin verb „confligo" = to fight, to clash, shock, to quarrel, to fight against someone. In Figure 4.3.1 we present some ways of perceiving the conflict.

Fig.4.3.1. Ways of perceiving the conflict

Every conflict starts from a problem, a state of discomfort, tension between two people, who have different, incompatible values, goals, needs and interests.

Broadly speaking, conflict occurs when two or more people want different things. Team conflict is a disagreement between people working together. „Conflict in a group does not mean that the group cannot work. In fact, if the conflict is well managed, it could help the group to function. People can grow and learn from the conflict, especially if it can be resolved in a way that makes the group a winner, not in a way that makes an individual lose. If the resolution involves all the members of the group, regarding the conflict as a problem of the whole group, rather than as a problem of a person, the cohesion of the group may increase. Group conflicts should be resolved because they can become destructive and divide, or destroy the group" (Hadad & Reed, p. 268).

Kolt (1992) stated: „A conflict is a situation in which people present differences in terms of meeting individual needs and interests.", And in 2000 he defines this concept as „a divergence of interests." Researchers Hadad & Reed identify the most **common causes** of conflicts within groups as follows:

- **Bad communication**: criticism intervenes, feelings of group members are hurt and they feel devalued
- **Attribution errors**: members commit errors in determining the causes of other members' behavior. This can happen, for example, when one member has not completed his or her task, and the other members consider this approach irresponsible, without taking into account the existence of a well-grounded reason for that member's failure.
- **Mistrust:** members do not trust each other, due to poor communication, non-compliance of obligations.
- **Grudge:** The team members are harmed when they consider that they have been treated incorrectly, when they have been unfairly criticized, when they have been assigned unfair tasks or for other reasons; they become angry and remain hostile rather than overcome the situation or resolve the conflict that will facilitate the progress of the project
- **Personality clashes / conflicts:** this can occur when people are randomly grouped. Work styles differ, and in some cases there may be mismatch between members.

Conflicts are inevitable. Although at the beginning they are not yet perceived, but conflicts are factors of progress. These should not be avoided or eliminated, but it is necessary to learn how to cope with them in a constructive manner. Collaboration with each member strengthens the purpose in trying to reach a common denominator, and a problem or conflict resolution.

What are the conflict *resolution* strategies?

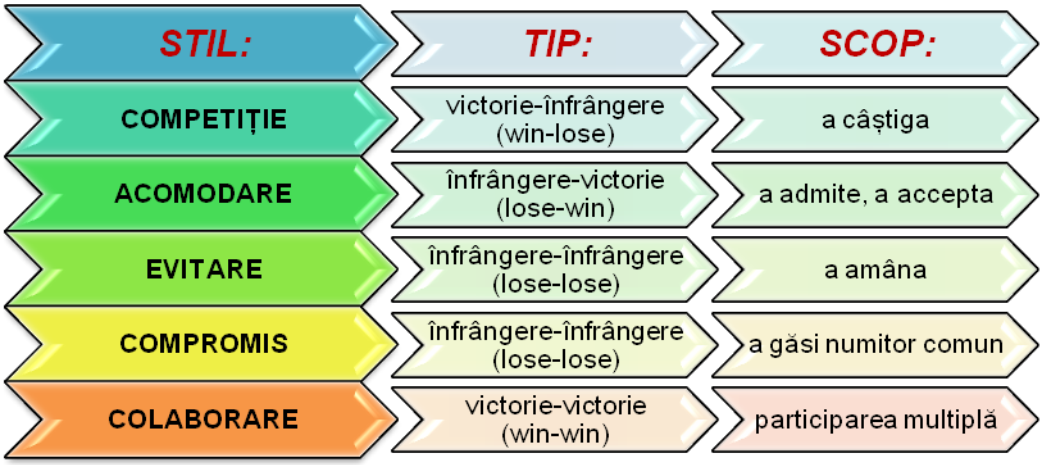
Maintaining positive relationships in a team should be the first priority in conflict resolution. Everyone involved should approach the issue with due respect and be kind enough to discuss the issues constructively.

As people face different conflicts, it is necessary to know different conflict resolution strategies.

Kenneth Thomas and Ralph Kilmann created the Thomas-Kilmann Measurement Tool (TKI) and the five conflict resolution strategies that people use to resolve conflicts, namely, *competition, accommodation, avoidance, compromise* and *collaboration.*

This tool is based on the assumption that people choose how cooperative and assertive they are in a conflict and suggests that each of us prefers different ways of responding to the conflict. Most of us use all these methods in different circumstances and it is extremely useful to understand how they work and how to apply them, especially when working in a team and we want to achieve the goals. Figure 4.3.2 shows the conflict resolution strategies according to the TKI model.

Fig.4.3.2. Ways to approach / resolve conflicts, adapted according to the Thomas-Kilmann model for conflict resolution (https://www.mededportal.org/publication/10672/)



Therefore, it is important to understand how these conflict management modalities work and how to approach them. However, each member of a team has a different approach to the same situation, so it is important to give time and space to each person involved, analyzing the situation to identify the right solutions. We will present and describe in table 4.3.1.the approaches to conflict management strategies.

Table 4.3.1. Approaches to conflict management strategies

	Description	**Approach** *It is best to use when:*
COMPETITION	One party will concentrate its ideas and actions only in pursuit of its own interests, completely neglects the interests of others and is always ready to win at any cost, even if it means destroying relationships with the other party. In the short term, the force may reduce the conflict, but the effects are not favorable in the long term. Competition may work in sports or war, but it is rarely a good strategy to solve group problems!	• quick and decisive actions are needed in emergency situations; • you have the main responsibility or expertise to solve some problems; • immediate decisions must be implemented.

MITIGATION / ACCOMMODATION	This style is the opposite of the competitive style, one of the parties will focus their ideas and actions only to help the other party reach their goals, their own interests being totally neglected. Accepting the other, maintaining harmony, maintaining good relationships with the other party is much more important than winning. For this purpose, at any price, the identification of the common denominator will be sought through countless concessions from both parties. Too much accomodation leads to the takeover of the control and conversations by the assertives!	• maintaining relationships is more important than reaching the goal; • the issue under discussion is much more important to the other party than to you; • neglecting your own interests is based on your value system; • use style as a strategy: you will lose a battle, in the hope of winning the war; • you want others to learn, even from mistakes, and you encourage them to express themselves.
AVOIDANCE	Conflict will be avoided or it will be preferred to believe that there is no conflict, even if the goals will not be reached or relations with the other party will be worsened. Maintaining neutrality by delaying the approach of the problem will lead to withdrawal from an unpleasant or even threatening situation. When conflict is avoided, nothing is resolved!	• you will ask yourself: „What happens if I do nothing?", And you will answer: „Nothing!", Then it is probably worth avoiding the conflict; • consider that you will lose more by confrontation than by avoidance; • decide to postpone the conflict, because you want to gain time (to gather more information to better prepare for conflict or to let strong emotions to further appease).
COMPROMISE	Through this approach, the parties seek balance, trying to get some of what they wanted to gain and will give up something else, either through sharing or sharing the resource in conflict. The limits of this compromise will be agreed mutually. This approach is acceptable for all parties involved, as interpersonal relationships remain undamaged. The compromise is in fact a superficial solution of reconciliation which involves sacrificing beliefs and sometimes rationality. The compromise is perceived as a fair trial, even if no one is particularly pleased with the end result!	• both parties have equal power; • you want to reach temporary agreements on complex issues, as an intermediate step towards a sustainable agreement, developed through cooperation; • the conflict situation is in a crisis caused by limited resources, such as time, energy or other material resources, and the problem to be solved is important and urgent.

COLLABORATION	In this style, at the same time, it will be given as great importance to achieving one's own goals as to maintaining the relationship. The style of cooperation implies an open and total communication: you are attentive to the other, expect him to respond and make useful suggestions. It is the most difficult style and it takes the most time, but it has the best results, if both parties use this style. Giving up the pride will increase collaboration and lead to achievement of goals. Collaboration is the only way to definitively resolve the conflict!	• it is essential to achieve important goals without compromising, while maintaining the relationship; • it is important to reach the source of unresolved issues that have been around for a long time; • you have to solve a complex problem, in which many interests and many parties are involved.

Conflict is characterized by the perception of differences at different levels. Collaboration and compromise are usually the alternative solutions in a conflict situation. The pursuit of these conflicting approaches is called conflict resolution. Negotiation is probably the most effective and humane human relations strategy for resolving conflict situations.

What are the *methods of* conflict *resolution*?

Conflict must be appreciated not only as a negative phenomenon. Conflict also has constructive properties, it is a part of life, an instrument of growth. It is extremely important that any conflict is addressed as quickly and efficiently as possible, minimizing any negative impact on the parties involved.

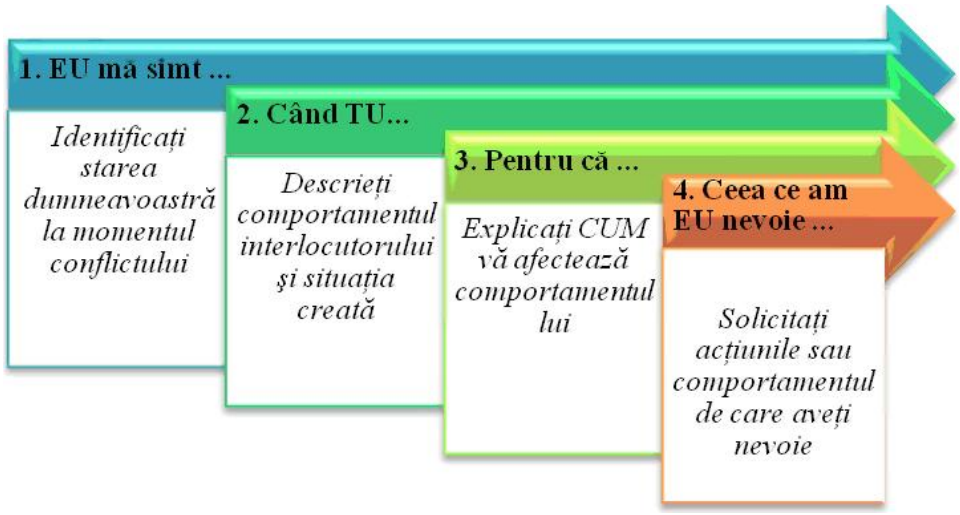
Below we propose to apply some methods of conflict resolution such as: using the I-message, reformulating statements, constructive confrontation techniques, asking the right questions, proper non-verbal communication, active listening.

Utilizați corect tehnicile de comunicare eficientă: mesajul EU, reformularea afirmațiilor, tehnicile de confruntare

➢ **„I..." message**

In issuing the „I" message it is necessary to respect the 4 indications presented in figure 4.3.6:

Fig.4.3.6. The stages of issuing the „I" message



„I..." messages are a useful way of communicating how you feel and why you feel this way without losing control over your emotions. They allow you to resolve conflicts without feeling guilty or attacked by others. These require time and practice to be used effectively.

Examples:

***I** get frustrated **when you** interrupt me **because** I am trying to talk. **What I need is** you to listen.*

***I** was worried **when you** didn't call **to** tell me where you are. **What I need is** the next time you let me know if you are late.*

- **Reframing statements**

Try every time to be as diplomatic as possible in issuing affirmations, focusing on neutral language instead of being direct, negative and hostile. E.g:

- Direct and hostile language: *You are very unorganized. Yesterday you were late for the meeting!*

- Reformulated statement: *Please, be more responsible next time, trying to get out of the house earlier.*

- **Constructive confrontation techniques**
  - Start with a positive affirmation:

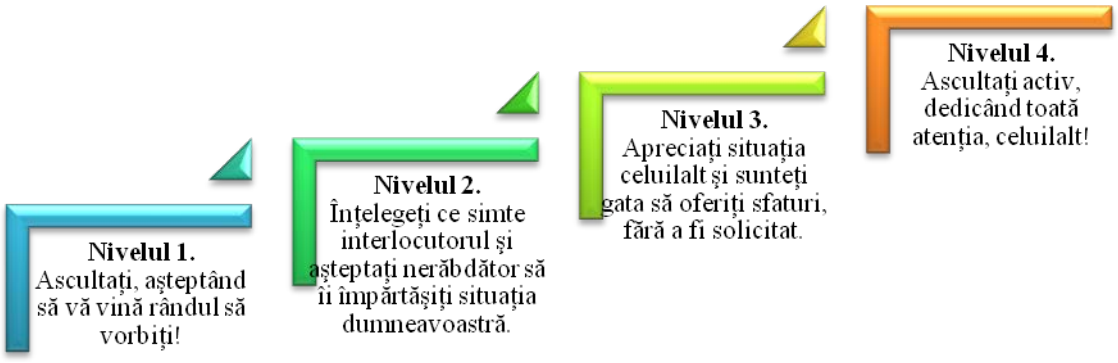
    - I like that our project will be a successful one.
  - Explain the problem or situation:

    - It bothers me, though, that you're often not too polite.
  - End with a positive statement:

    - I want to continue working together to achieve a common goal!
- **Use active listening!**

Active listening is a technique that helps you to establish trust and understanding with the conflicting parties and to present information about their needs and interests. This strategy does not mean that you should sit quietly and listen carefully to what your interlocutor has to say. In fact, active listening involves **4 levels** represented in Figure 4.3.5.

Fig.4.3.5. The stages of active listening



Level 1: You listen to what the other person is saying and wait for your turn to say what you thought while you were waiting for the other person to finish his monologue.

Level 2: Understand what the interlocutor is feeling and try to associate it with your situation.

Look forward to sharing your situation, about what happened, how you felt and how the story ended. Unfortunately, you forget that it was the other person's situation and not yours.

Level 3: Appreciate the other person's situation and problem. Give some ideas / solutions to solve the problem and give you advice - even if the other person did not explicitly ask for it.

Level 4: Listen actively.

According to Dr. Stephen R. Covey, this means: „You seek to understand before you seek to be understood." In other words, try to focus your attention only on the other person and their story.

To reach the highest level, you need a unique set of skills that together represent active listening. This includes the ability to synthesize / summarize stories, re-evaluate negative statements, reformulate statements to increase clarity, reflect on descriptions to uncover underlying emotions, encourage the other person with non-verbal cues and minimal verbal interventions and, more than anything, know what question to ask.

Listen actively and remember that things don't always go the way we want. Always be open to listening to another person's explanation. Sometimes, getting all the information from the right people changes the whole situation. Answer with compassion and simply accept that the other person has a different view of the situation.

- **Use proper nonverbal communication!**

Both our face and our body express a certain message. We do not only communicate with our voice; intonation, phrases and vocabulary, but also nonverbaly.

Changes in body position, subtle movements made with the head, gestures, facial expressions and other movements of the body signal messages that confirm what we want to say and betray our feelings towards the person we are talking or listen to. The problem is that those nonverbal signs can give a completely wrong message and thus exacerbate an already tense situation. Carefully realized, but also with much practice, nonverbal communication can become a useful tool in streamlining your communication, but also in faster conflict resolution.

Consider the following aspects of positive body language and its effects, starting from the information presented in table 4.3.2.

Table 4.3.2. Meaning of the nonverbal message

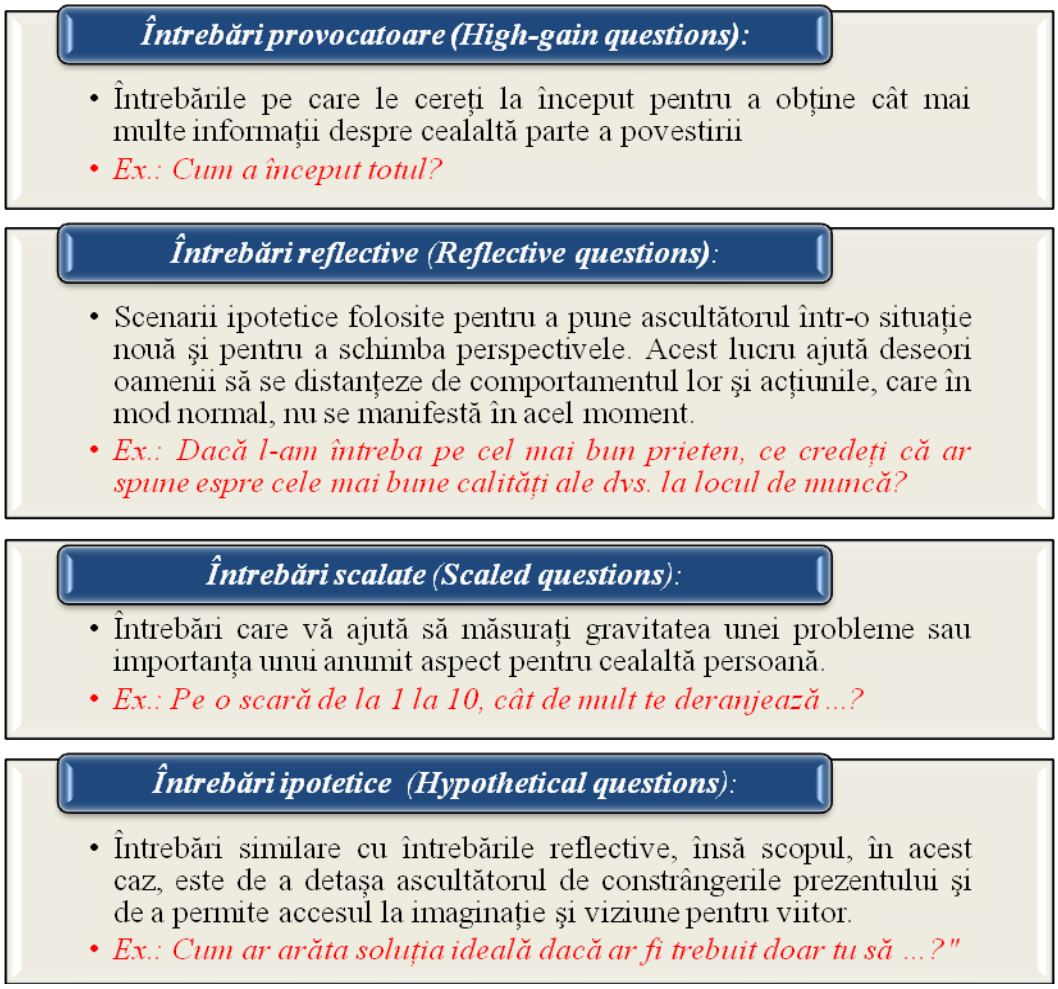
Desfaceți brațele	Poziția încrucișată a brațelor poate să indice dispreț și să acționeze ca o barieră sau să manifeste dezinteres.
Relaxați-vă, dar nu prea mult	Păstrarea unui spate drept, dar relaxarea umerilor arată atenția. Prea multă relaxare ar putea indica dezinteres.
Mențineți contactul vizual	Contactul vizual exprimă interes și este un semn de respect. Clipiți și priviți în ochi persoana care vorbește cât mai mult posibil, fără a o incomoda.
Faceți mișcări relaxante	Când ne simțim alarmați sau confruntați, putem face adesea mișcări rapide și necontrolate cu mâinile și corpul. Dacă suntem relaxați, corpul nostru tinde să se relaxeze.
Semnalați nonagresivitate	În general, dacă stați exact în fața unei persoane poate semnala agresivitate. Stând ușor lateral și folosind gesturi deschise veți semnaliza nonagresivitate.
Păstrați spațiul personal	O distanță de aproximativ 0,5 metri de cealaltă persoană ar fi confortabil pentru ambele persoane.
Zâmbiți și aprobați ușor din cap	Zâmbetul ocazional, dar sincer, indică un aer de căldură. Ar putea dura doar o secundă, dar ar trebui să fie autentic. O mișcare afirmativă din cap confirmă zâmbetul și indică aprobare.

In a discussion, words and expressions used are not the only elements needed to reduce a conflict. Additional information, which comes from nonverbal communication, can often become an advantage, at other times, a disadvantage.

- **Ask the right questions!**

When dealing with a conflict between yourself and a colleague, the focus will be on resolving the conflict and improving the situation. Therefore, invite the other person to the dialogue to detect his or her interests and needs. It is advisable to take into account the styles of questions considered most important in this context, described in Figure 4.3.6.

Fig.4.3.6. Types of questions



The questions asked tend to generate more information and more details, it helps in the detailed investigation of the problems, in clarifying the feelings. Often, you will face the situation when asking a specific question does not give you the answer you expect; so rephrase the question or ask it another way.

NB Homogeneous teams, whose members share the same values, may be more satisfied with working together and experiencing fewer conflicts, but tend to be less creative and produce greater pressures for compliance.

In contrast, heterogeneous groups, whose members have a wider range of values, are more susceptible to conflict, but have the potential for greater creativity and innovation.

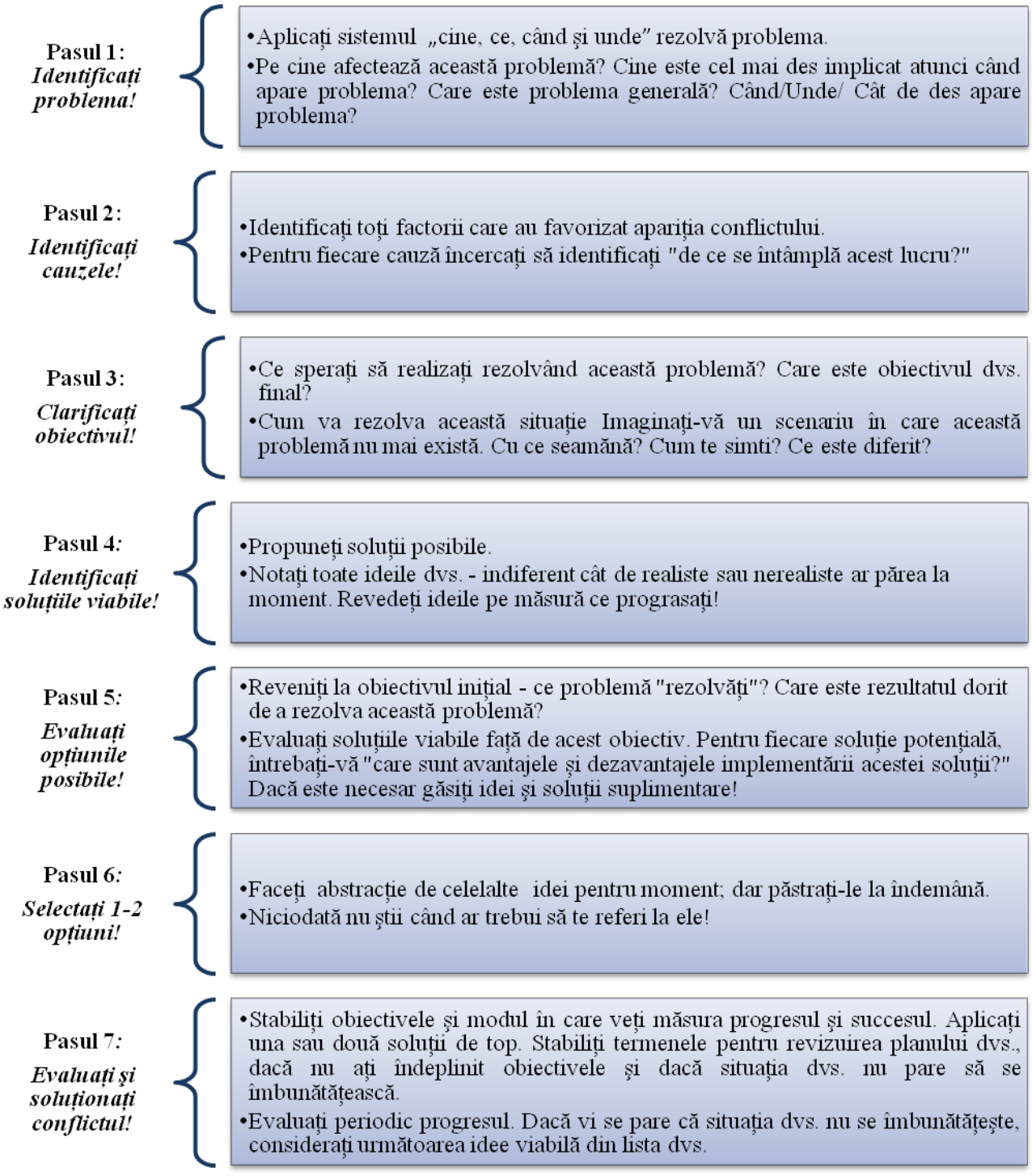
What are the *stages of* conflict *resolution*?

We all face problems in our daily lives, whether at work or at home. Common problems could be time management or personality conflicts at work. As some of these issues may be unpleasant, it is important to come up with an effective strategy to address them. The following steps can help you better identify problems and find solutions to life's obstacles.

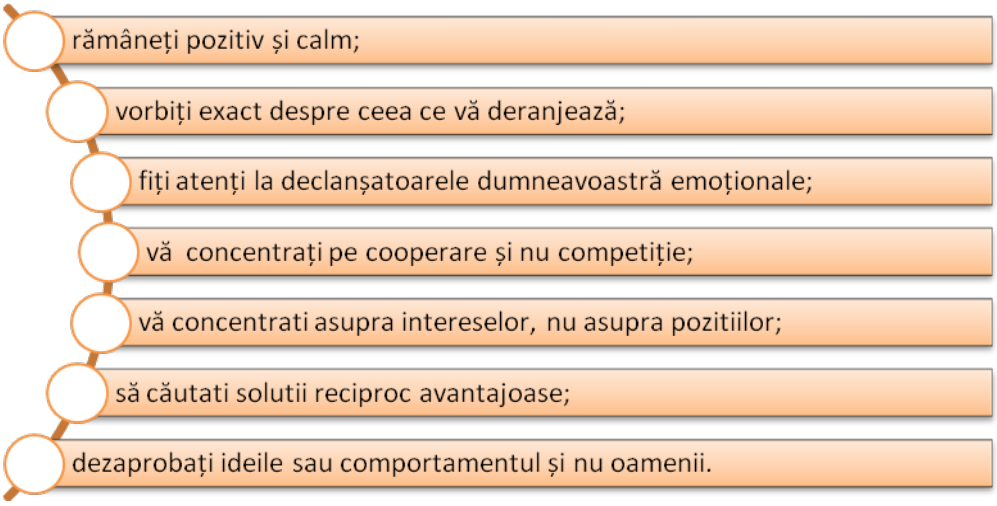
In order to manage the conflict successfully, it would be good for the negative emotions that accompany the conflict to be managed by the strategic use of reflective listening. The differences

of needs that underlie the conflict can best be addressed through an interest-based negotiation. The problem-solving process is used to allow the free generation of ideas that best meet the needs of both parties. Often, a conflict is a result of the different perception of one and the same situation. At the same time, a conflict also presents opportunities for improving the climate in the group. We suggest, in this regard, to pay maximum attention to the interests presented, addressing the issue separately from the person. Thus, in order to *resolve a conflict* we present in Figure 4.3.4. a modality through the prism of the next 7 steps. (https://ed4career.com/blog/7-steps-more-effective-problem-solving)

Figure 4.3.4. 7 steps in conflict resolution



Conflict is an inevitable element in the world. Indeed, in human terms conflict is considered one of the „engines of evolution" that allows us to learn, to progress and to grow. Our goal is not to try to eliminate the conflict, but to manage it wisely and constructively for the success of the whole team. Finally, we suggest that in conflict situations to:



Conflicts can be incredibly destructive to teamwork. Managed in the wrong way, they can quickly get out of control, leading to disruption of cooperation, and the team's mission is threatened. This is especially the case if the wrong approaches to conflict resolution are used. In order to calm the spirits in these situations, it would be good to adopt a positive approach to conflict resolution, in which the discussions are friendly and peaceful, and the focus is on problems, rather than on people. If this is done, as long as people listen carefully and properly analyze possible facts, problems and solutions, the conflict can often be effectively resolved.

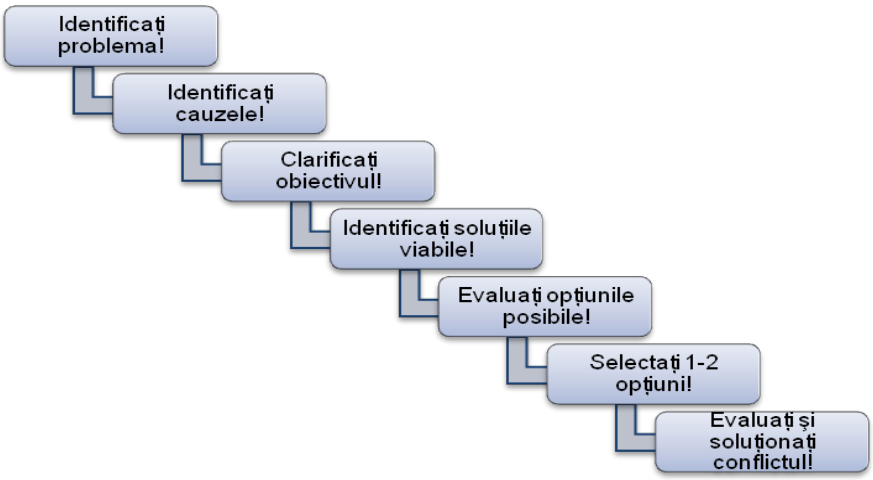
„*Everything is born from the struggle of the opposites and*

from the deepest discord the most perfect harmony results."

(Heraclit)

Tasks

- Analyze a conflict in which you have recently been involved or have witnessed.
- Propose solutions for each stage!



Synthesis and transfer

- Identify some ways to develop empathy for your students.
- Create some examples where the I-message technique will be used.
- Explain the causes of conflict in a team (of students).
- Formulate some solutions for managing different conflicts in the team.

Reflection

What should I do now?

At this point, you may want to limit the unpleasant situations you may encounter occasionally and / or on a regular basis. It would be good to start reflecting on the stressful situations and conflicts you are experiencing everyday.

Think about and analyze a conflict you have recently experienced, regardless of location, people involved, environment ...

Answer the following questions as honestly as possible in writing:

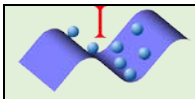
- What was the subject of the conflict?
- What people were involved?
- What happened?
- What were the trigger words?
- How did you feel during this conflict?
- Whose fault was it?
- Have you had the opportunity to avoid conflict?
- What could you have done differently?

Reflecting in writing on your experiences in different situations will help you to understand them more deeply and how you will act in similar situations.

BIBLIOGRAPHY

- BOCOŞ, M-D., *Instruirea interactivă*, Polirom: 2013
- CERGHIT, I., *Sisteme de instruire alternative şi complementare*, Polirom: 2008
- NEACŞU, I., *Metode şi tehnici de învăţare eficientă*, Polirom: 2015
- MAPLES, M. F.,*Group development: ExtendingTuckman'sTheory. Journal for Specialists in Group Work*, 13(1), p. 17-23, 1988.
- TUCKMAN, B. W., *Developmentalsequence in smallgroups.*Psychol. Bull. 63:384-99., 1965.
- TUCKMAN, B. W., Abry, D. A., Adams, M. P., & Smith, D. R. *Learningandmotivationstrategies: Yourguidetosuccess*. PrenticeHall, 2007.
- https://the-happy-manager.com/articles/why-is-teamworking-important/
- https://www.ryerson.ca/content/dam/lt/resources/handouts/GroupWorkConflict.pdf
- http://mrksbrg.com/wp-content/uploads/preprints/2011_H%C3%B6greUtbildning_StudentConflicts.pdf
- https://www.projectmanager.com/blog/conflict-resolution-strategies
- https://www.usf.edu/atle/documents/handout-interactive-techniques.pdf
- https://www.dhs.wisconsin.gov/wicpro/training/conflict/conflict-resolution-training-casestudy.pdf
- https://www.ginaabudi.com/case-study-resolving-serious-conflict-between-team-members/
- https://www.slideshare.net/odetaro/conflictele?next_slideshow=1
- https://www.mededportal.org/publication/10672/
- https://socialemotionalworkshop.com/2017/10/teaching-conflict-resolution-skills/
- https://www.makingbusinessmatter.co.uk/resolving-conflict/

5 MODULE V. PROBLEM IDENTIFICATION AND FORMULATION



INTRODUCTION

This module addresses important aspects of the PBL strategy, such as: identifying and formulating problems from the perspective of different problem situations, taking into account the learner's profile and level of experience regarding solving PBL problems, typology of PBL-focused projects, supervision process of students through various interview processes, the partnership with stakeholders in the PBL process.

The purpose of the module is to provide recommendations on the choice / formulation in the teaching-learning-assessment process of a problem with real life impact, suitable for PBL.

Within the module, there are are elucidated the *characteristics of the problem (in PBL)*, the levels of self-direction, the characteristics that lead to the establishment of the trainee's profile, the criteria for clarifying the problem, respectively, the projects, the essential *design elements* of the PBL project, the gold standards of the PBL, the types and the principles of supervision, etc.

The module guides the teaching staff in order to identify an appropriate situation for the problem and to design it from the point of view of the content, context, connection. The information in the module can serve as a reference in establishing the type of project to be carried out through research, reasoning, reflection, as well as the supervisor's style.

OUTCOMES

At the end of the course the trainees will be able to:

- define the concept / essence of the problem in the context of the PBL;
- report on different types and forms of presentation of the problem depending on its characteristics;
- analyze the level of student self-direction and involvement in identifying and solving problems individually and in groups;
- compare different types of PBL projects and their distinctive features;
- argue the importance and role of supervision in PBL;
- establish relationships with the stakeholders to create opportunities for dialogue between the University (teachers, students, supervisor, etc.) and businesses, LPAs, public institutions, NGOs;
- elaborate teaching-learning strategies depending on the specificity of the problem;
- propose types of projects relevant to the professional training context.

5.1 SPECIFICITY OF THE FORMULATION OF PBL PROBLEMS

What is the *problem* in PBL?

In the context of PBL, a typical *problem* consists of presenting through a *short narrative*, supported or not by images, in a simple, usual (non-technical) language, *of a situation or a state of affairs*, so as to motivate the student to research and have critical thinking, to discover non-standardized solutions in a given field.

Undoubtedly, in this methodology, problems are fundamental, and the essence of problem-based learning resides in the organization of *problem situations* in the educational and cognitive activity of the students; in managing their search activity regarding the assimilation of new knowledge and methods of action by solving the problems that they have as a didactic task.

What is a *problem situation*?

The problem situation is a condition that arises when students do not have sufficient knowledge or do not know certain methods of action, in other words, either they do not understand something or do not know how to do some necessary operations, that is, they face a certain intellectual difficulty.

A problem situation has pedagogical value only if the student's involvement in solving it allows him to distinguish between the known and the unknown and to sketch (independently or with the help of a teacher) the ways to solve the problem. In this context, we give as an example some problem situations, based on contradictions, characteristic of the cognitive process:

- the contradictions between the old knowledge and the new facts for the students and which combat the previous theory;
- understanding the scientific importance of the problem and the lack of a reliable theoretical basis for solving it;
- diversity of concepts and lack of a safe theory to explain these facts;
- the practically accessible result and the absence of its theoretical foundation;
- the contradiction between the possible theoretical solution and its practical irrationality;
- large amount of evidence and lack of a method of its processing and analysis.

Therefore, the problem situation is a precondition for *formulating the problem* in the PBL context.

When determining a problem for the PBL, in addition to the problem situation, it is essential to take into account the learner's profile and his level of experience to solve problems. Thus, it is important to correctly select the problem for the right group of learners.

I. In this respect, it is required to identify which level of self-direction corresponds to PBL learners:

a. *dependent* or lacking self-direction, that is to say, they are completely opposed to being independent learners and want to stick to precise routine tasks;
b. *moderately autonomous*, interested in becoming independent, but must be motivated to take on more responsibility;
c. *students with relative self-direction*, ready to explore ideas, but still demand some guidance on their learning approaches;
d. *students with a high level of self-direction*, that is to say, have a high level of autonomy and are able to set their own goals, manage their projects and time, evaluate their work and collect, use important information for the purpose of developing the necessary knowledge.[7]

If a learner has a low level of autonomy, it may be more appropriate for the initial PBL process to select a simpler problem that has greater clarity. However, there must be a certain level of involvement regarding exploration and questioning.

II. Another aspect that must be taken into account when identifying the problem for PBL is the evaluation of *previous knowledge / cognitive pre-acquisitions*. If students already have knowledge of the problem, then this will encourage them to adjust their pre-acquisitions to the problem situation. This will instill some confidence in the students to encourage autonomy.
III. *The level of interest of the learner on the problem or the motivation of the learner to solve the problem* also presents a particular relevance in designing the problem of PBL. It is important to select a problem that they are interested in and that they can benefit from in a certain way. The problem should intrinsically motivate the learner.

Thus, in the light of the above, through the cross-disciplinary approach to the problems in question, through the development of skills, the stimulation of autonomy, curiosity, the research and discovery initiative, the PBL approach aims to outline the following features, which together make up the profile of the PBL learner, who is presented as:

- **inquirers**: they are eager to develop their natural curiosity. They acquire the skills needed to conduct investigations and research, to present autonomy in learning
- **knowledgeable**: exploring concepts, ideas, solving problems of local / global relevance. As a result, they acquire profound knowledge and develop an understanding of an extended and balanced range of branches of study.
- **thinkers**: exercise their initiative through the critical and creative application of thinking skills in order to recognize and tackle complex problems, taking ethical and well-thought-out decisions.
- **communicators**: understand and express ideas and information with confidence and creativity in more than one language and using a variety of communication modes. Works efficiently and with pleasure when working in a group.

[7] http://www.archimedes2014.eu/doc/courses/RO_Unit%202%20-preparing%20your%20organisations%20for%20PBL.pdf

- **open-minded**: they are open to the perspectives, values and traditions of other individuals and communities. They are accustomed to seeking and evaluating a range of points of view and are willing to learn from their own mistakes.
- **caring**: show empathy, sensitivity and respect for the needs and feelings of others. They behave in such a way as to positively influence the lives of those around them and the environment.
- **risk-takers***:* address unknown situations with calmness and self-confidence and show openness to explore new roles, ideas and strategies. They are courageous and firm when they argue their beliefs.
- **balanced**: understand the importance of intellectual, physical and emotional balance to achieve their well-being and those around them.
- **reflective**: pay close attention to personal experience and personal study. They are capable of evaluating and understanding their own strengths and limitations in order to strengthen their knowledge and personal development.

Once the learner profile has been determined, it is necessary to specify the aspects that make up the problem profile in the PBL, among which we specify: the characteristics of the problem, the formulation of the problem, the classification of the problem, etc.

What are the *characteristics of the PBL problem*?

Certainly there may be more good features of PBL problems than those presented below and they may vary to some extent depending on the discipline. However, many PBL practitioners will probably identify the following characteristics of a good problem in PBL as common:

- **Familiarity**, the more a problem is known to the learner, the faster it will activate his previous knowledge, stimulating the interest and consuming less time to solve the problem. An effective problem must first arouse the interest of the students and motivate them to investigate more deeply the concepts introduced. The subject should refer as much as possible to the real world. If the problem is placed in a context with which the students are familiar, they will feel that they have a stake in solving the problem.
- **Clarity,** the unambiguous problem will not generate multiple interpretations and will lead to a much faster identification of solutions. Good problems sometimes force students to make decisions based on facts, information, logic and / or rationalization. For these types of problems, students will be asked to justify their decisions and reasoning based on the principles learned.
- **The difficulty** of the problem is based on both the level of self-direction / autonomy of the trainee, his pre-acquisitions, as well as the objectives of the company. These problems require students to decide which specific assumptions are needed (and why), what information is relevant and / or what measures or procedures are needed to solve the problem.
- **Complexity** refers to the number of elements of the problem that a learner may face. The structuring modality refers to the number of solutions to this problem. The problem should be complex enough for the cooperation of all the members of the group, so that students can work effectively to find solutions.

- **Structuring**. A well-structured problem has only one solution while a poorly structured problem is less defined and therefore has a number of solutions to a problem.
- **The size** of the problem or case must be such that the students are aware as soon as possible of the need to distribute the effort for an efficient and strategic problem solving. Students should, however, perceive that the power of problem-based learning lies in the ability of the group to synthesize what they have learned and to connect this new knowledge to previous ones and to the goal of the problem. This requires co-operation, learning and group discussions, as opposed to compartmentalized individual learning. The supervisors / tutors do not announce the students the objectives, but will wait for them to formulate certain objectives themselves, so their area of research is not limited, but the teacher will check the quality of their learning later.
- **The relevance** of the problem results from the number of beneficiaries of the problem solution. The more relevant the problem to the learner, the more likely that the PBL process is successful.

Not all information provided in this problem should be relevant to a solution and not all information needed for a solution will be provided to the learner immediately. For this reason, many PBL problems are designed in stages, which are made available to students one by one. The second stage of the problem, for example, can provide students with additional information about the problems attested within the project at the first stage of problem solving. PBL practitioners can also choose to share the broader goals of the problem at the beginning, facilitating students' focus on identifying problems.

Apart from the characteristics of the problems, it is important to take into account the characteristics of the function in designing the problems, that is, the extent to which the problem:

- *leads to intentional learning problems,*
- *promotes self-directed learning,*
- *stimulates critical reasoning,*
- *stimulates the elaboration,*
- *promotes teamwork,*
- *triggers interest etc.*

How do we *formulate the problem*?

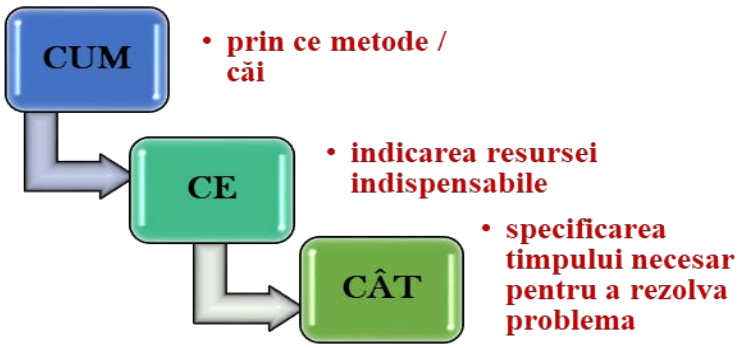
Business people solve problems, they are production problems. Simple people solve personal problems, the ones they think are necessary. But in one case and in the other, the *correct formulation of the problem represents half of the solutions*.

Apparently, the problem can be perceived as the discrepancy between „I WANT" and „IT IS", between the circumstances in which a person is at present and those in which he wishes to be in the future, between the desired and the real one.

Formulating a *problem* is a priori *a thought*, more precisely a thought *about how to obtain* (the method) as efficiently as possible the *desired resources*, that is to say with the lowest costs, in the real circumstances. The main personal resources can be: *physical resources of the body and health resources, emotional, intellectual and creative resources, time resources etc*. From a

professional point of view the resources can be: *material, financial, human, creative, time resources etc.*

In order to formulate a problem properly, we need to appreciate exactly what *resource* is indispensable to us in a specific situation and HOW (method / solution) can be obtained. A formula for presenting the problem, in our vision would be:

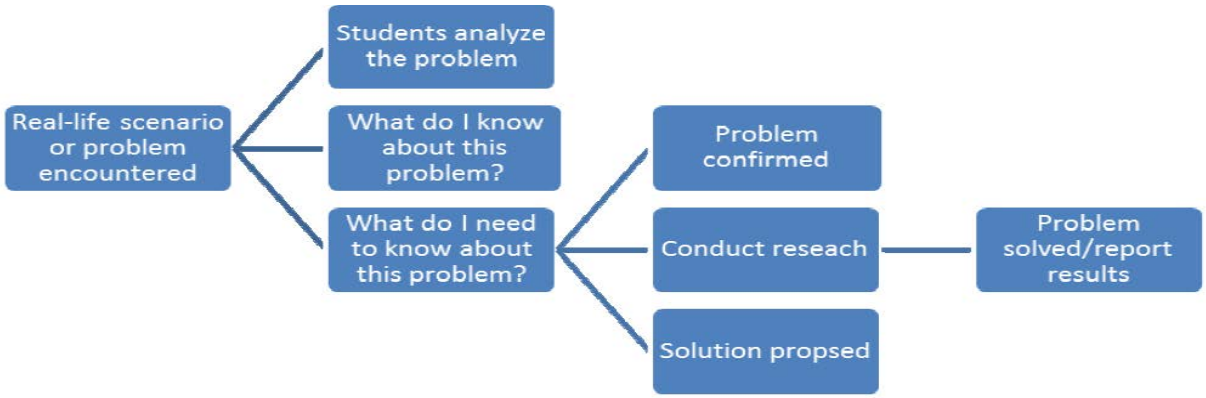


NB Although problems are often perceived negatively (Dahlgren and Oben 2001), however, in PBL problems are used to encourage research and stimulate thinking (Kjellgren et al. 1993)[8]

Replace in the problem formulation all words that have at least one negative connotation by positive semantic constructions. The truth is that this problem is about finding and receiving resources, and searching for resources is a positive activity.

An problem identification and research path was proposed by Matthew B. Etherington in the Australian Journal of Teacher Education (2011).

Fig. 5.1. The path of identification and research of the problem [9]



When designing problems, it is essential to consider the balance between discipline knowledge and process skills such as problem solving and teamwork.

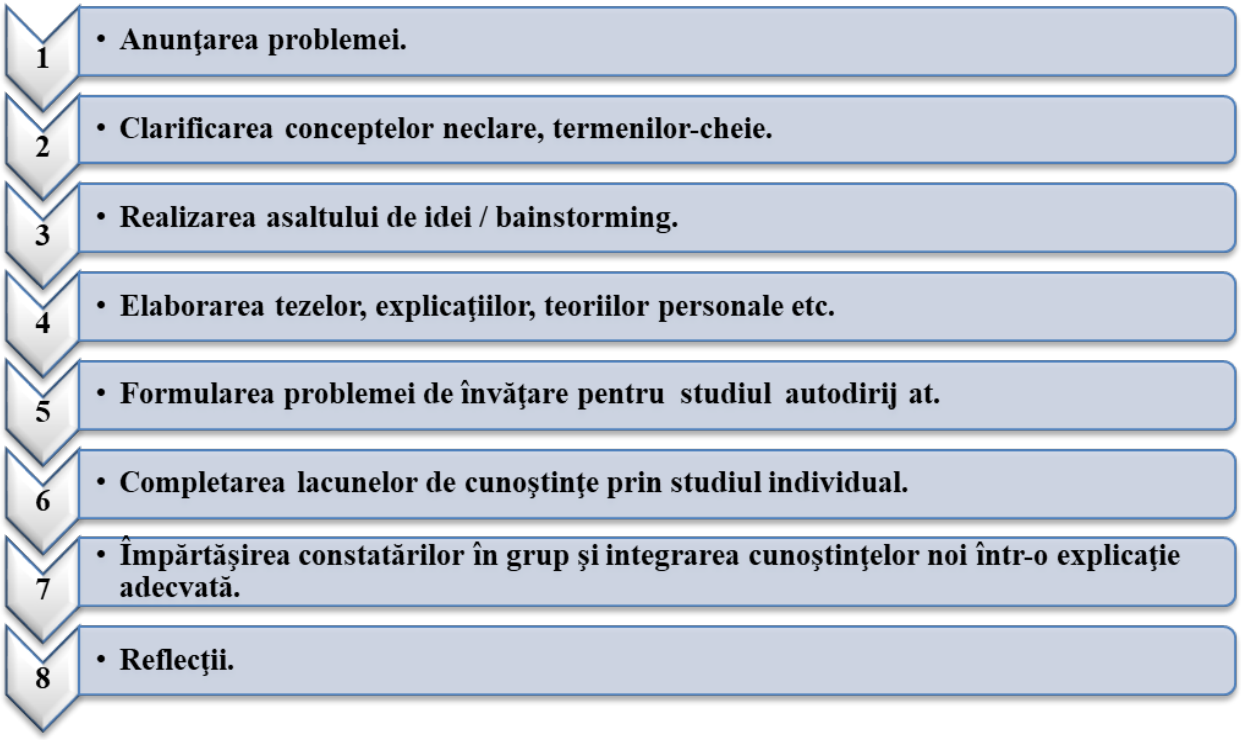
[8] apud Emma O'Brien, Liz Carroll Colaboratori: Ileana Hamburg, Daiva Jonuskiene, Aiste Cepaitiene, Helena Caiado, Maria Vieira, Mario Teixeira, Ana Maria Mogosan, Gabriel Vladut, Con Sheahan.
[9] Matthew B. Etherington. Investigative Primary Science: A Problem-based Learning Approach în Australian Journal of Teacher Education (2011), Vol 36, 9, September 2011

How do we *present the problem*?

The design and presentation of the problems constitute the research area of several scholars in the field. Thus, Stinson and Milter (1996) propose design instructions according to which PBL problems should be holistic, reflecting professional practice; Lee (1999) proposed a model in which the selection of the PBL problem should be done in terms of learning objectives, previous knowledge, knowledge of the field, structure and complexity of the problems, but also of the availability of time; Drummond-Young and Mohide (2001) formulated several stages of problem design: reviewing expected learning outcomes, determining content, selecting a priority problem and expanding it, developing additional materials, requesting evaluative feedback, piloting the problem, reviewing problems, and integrating it into the curriculum; Duch (2001) suggested a five-step process for writing PBL problems.[10]

Based on the numerous information, we propose a few steps to present the problems in the PBL:

Fig. 5.2.The technique of small steps (apud Moust, Berkel, Schmidt)



An alternative variant of presenting / designing the problem is by the **5W2H** method, attested in French literature as the *QQOQCC* method, and in Romanian it appears as the question method. *The 5W2H method* is one that asks questions for collecting data on a process or problem that needs to be solved. Its structure makes all aspects of a subject taken into consideration. 5W2H is most commonly used in the following cases:

[10] Woei Hung, David H. Jonassen, Rude Liu. Problem-Based Learning, p. 499. // https://pdfs.semanticscholar.org/8642/84970bebcd0d62bf0d31a26a1a67ba0e7883.pdf

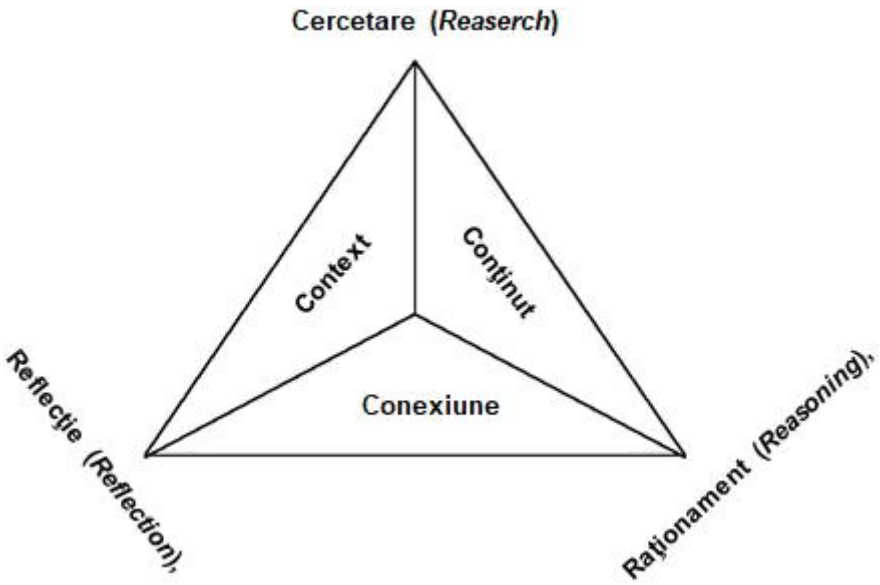
- when analyzing a process, in order to identify opportunities for improvement;
- when it is assumed that there is a problem, or that a problem has to be better defined;
- when planning a project or its stages that require data collection;
- when a process is reviewed after it has been completed;
- in journalism, when writing an article or presentation.

Table 5.1. Description of the 5W2H method

5W2H	QQOQCC	Questions	Examples of questions according to the formula
Who …?	Qui fait…?	Who…?	**Who** has a problem? **Who** is involved in the problem situation? **Who** suffers from the problem? **Who** should take part in solving the problem?
What…?	Quoi …?	What …?	**What** is the problem? **What** is not good in the field ... at the level of ..., in stricto, and at the level of ..., in globo? **What** led you to identify the problem (s) (*reasons, causes, evidence, arguments, findings, results of questioning, etc.*)?
Where…?	Où…?	Where…?	**Where** is the problem? **Where** did the identified problem occur?
When…?	Quand…?	When…?	**When** was it identified? **When** did the problem arise? **When** is it planned to be completed?
Why…?	Pourquoi…?	Why…?	**Why** did the problem arise? **Why** do we need to solve the problem?
How…?	Comment…?	How …?	**How (in what way)** can the identified problem be solved? **How** to proceed? **How** will the problem be eliminated?
How much …?	Combien …?	How much / many…?	**How much** does it cost to solve the problem? **How many** resources does it need ...? **How long** does the problem last? **How many** parties should be involved in solving the problem? etc.

In the context of the aforementioned, it is also worth mentioning Hung, who introduced the 3C3R model as a conceptual framework for optimal systematic design of PBL problems.

Fig. 5.3. The 3C3R model [11]



As mentioned above, a problem can be taken from a number of different contexts with a number of different solutions, but each time reflected in real life. In PBL in higher education, the context is represented by the curriculum objectives and the development of a set of discipline-specific competences.

However in the workplace there is less emphasis on the context of the problem from the perspective of the discipline and more on the problem in the context of the organization and which approach best fits the needs of the organization.

Hung suggests that „When designing problems for a non-profession-specific curriculum, training designers can identify as many applicable contexts as possible and then select the one that would be most appealing to learners."

Analyzing the scheme proposed by Hung, we mention that the **3C** can be presented as follows:

- The content follows the depth and breadth of the studied subject.
- The context emphasizes the authenticity of a problem in a given area, which must be specified in presenting the problem.
- The connection aims at connecting knowledge (content) to various professional contexts, as well as transdisciplinarity and increasing the complexity of PBL problems by referring to similar problems or other efforts to solve them.

Referring to the **3R**, we mention that this implies:

- **R**easerch, that is, the understanding of the learned content can be achieved through research and data collection, autonomously or by guidance by the tutor / supervisor;

[11] Hung, W. (2006). The 3C3R Model: A Conceptual Framework for Designing Problems in PB L, p 57. // Interdisciplinary Journal of ProblemBased Learning, 1(1). Available at: https://doi.org/10.7771/1541-5015.1006 https://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=1006&context=ijpbl

- **R**easoning, which involves encouraging learners to apply what they have learned from research, ie the problem must be designed in a way that encourages the learner to apply reasoning techniques;
- **R**eflection, usually conducted under the guidance of a facilitator, allows the student to understand the solutions they might have missed or the approaches that would have made the learning process more effective. Reflection can take place throughout the PBL process (*formative reflection*) or at the end (*summative reflection*).

Table 5.2. Applying the Hung - 3C3R model through questions

3C3R	Elucidation questions
Content	What is the learning objective for students after completing this module? What are the specific objectives? What is the scope of the problem? How many solutions can result from this type of problem?
Context	How is the problem that we attribute actually valid / authentic to the context? How contextualized is this problem? Can students easily see how these concepts can be applied to other similar types of problems? How relevant is the problem to the research field?
Connection	Are the concepts of this problem based on previously acquired knowledge in the course? Is there a connection between the concepts and objectives of the problem in question with other concepts at the beginning of the course? How can students interact with other fields / contexts?
Reaserch	How does the subject motivate students to research? How do we explicitly explain the general objective of the problem? What kind of research is needed for this type of context and problem?
Reasoning	Is there a model for solving problems that we can implement or adjust? What information resources are made available to students? How are students encouraged to: • analyze the interdependent nature of the variables? • vonnect new knowledge with previous ones? • think about causal relationships? • generate and test the hypothesis?

Reflection	Does the problem need: • complex research of information and reasoning? • reduced information and reasoning research (as well as complexity)? • low information research, but high reasoning? • advanced information research, but low reasoning? How do we allow students to reflect on what they have learned in previous PBL modules as well as current ones?

When presenting the problem we will take into account:

What are the learning objectives pursued (*see SMART*).

A *good objective* is ***SMART****:*

Specific: clarity on what, where, when and how the situation will be changed;

Measurable: ability to quantify targets and benefits;

Affordable: ability to reach goals (knowing the resources and capabilities available to the community);

Realistic: ability to achieve the level of change reflected in the objective;

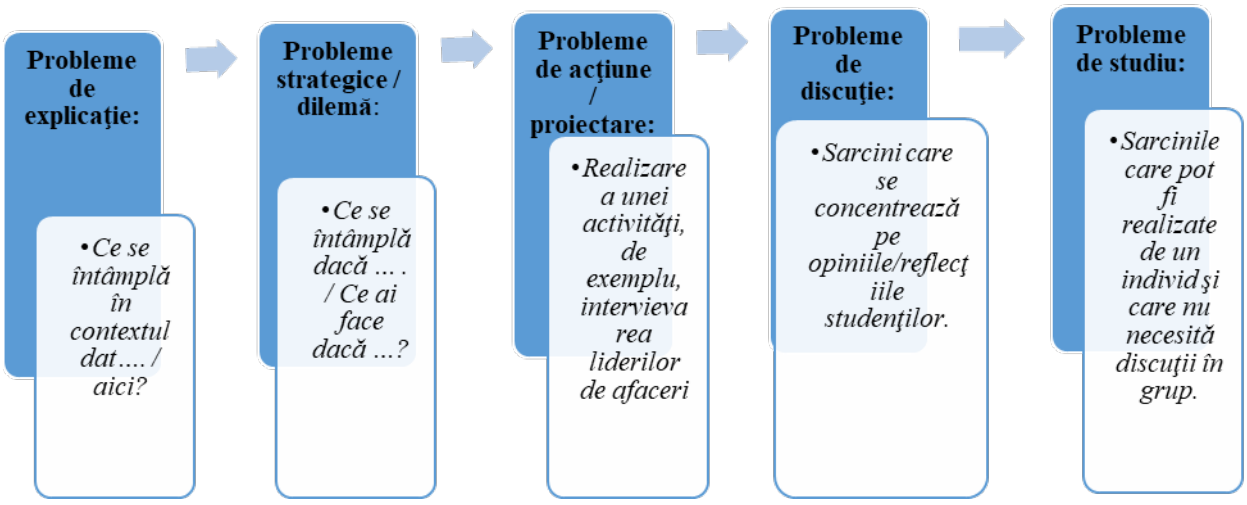
Timely (within time): fixing the time period in which each objective will be achieved.

- What are the most appropriate types of tasks for achieving these goals?
  - **Discussion tasks** - the student can acquire knowledge about different approaches on a particular topic and, in this way, is encouraged to reflect critically. In this type of task it is very important to formulate several points of view that can draw discrepancies, disagreements between students who do not necessarily have to find a solution to the problem.
  - **Study tasks** - The objective is for the student to assimilate certain subjects independently and usually consists in formulating for the student a specific task to study certain subjects. It is important to discuss the task in the learning group, because the activation of previous knowledge is also important here. It can be used as an introduction to a topic, to facilitate the acquisition of new knowledge.
  - **Strategic tasks** - Their objective is to teach students to make rational decisions based on knowledge and understanding of processes and problem situations. The focus is more on decision making, rather than on process explanations.
  - **Application tasks** - Within this type of tasks, the student intends to apply the previously acquired content in a different context. It is useful as an individual self-assessment task as well as for the learning group itself and can stimulate the study of a specific topic. However, this task does not invite the student to discriminate what is relevant in a problem, because the tasks are structured and directed.

- In what format we will propose to the students the problem: exposure, representation, video, working sample, self-recording, etc. The problem as a constituent part of the teaching-learning process can take the form of:
  - *a task that does not have a standard solution*;
  - *a search task* aimed at finding the missing knowledge, thinking and activity to solve them;
  - *a false question*, theoretical or practical, which contains a hidden contradiction that causes different, sometimes contradictory positions in the process of solving;
  - *a task whose methods of solution the student does not know in advance*, but he has the knowledge and skills necessary to implement a complete solution, ie the problem creates for students certain difficulties, surprise impediments, but it is feasible.

How are *problems classified*?

So far, there has been little research into the impact of different types of problems on students' experiences in problem-based learning and there has been little exploration of using different types of problems at different levels of the course. However, *the taxonomy of the problems developed by Schmidt and Moust is a useful guide*. Schmidt and Moust base their taxonomy on the assumptions they made. Thus they distinguish:



According to the SOLO (Structure of the Observed Learning Outcome) ***taxonomy*** developed by J.B. Biggs & Collis, PBL problems can be divided according to the levels of understanding, the qualitative differences of the answers given by the students. We can distinguish respectively:

pre-structural problems, when the student has isolated elements of unconnected information, which are not organized and have no meaning, respectively the learner cannot understand the objective of the task or does not have the necessary information;

unistructural problems, which reflect some quite simple and obvious connections between the elements or render a single relevant aspect, a single task, such as identifying, naming, following a simple procedure;

multistructural problems, can make more connections between the individual elements, but the most important connections between them, those that support a unifying image of the process, are missed, and the student could combine them, describe them, list them, demonstrate a skill set;

relationship problems, based on which students can relate, integrating in a whole more aspects through analysis, application, comparison, polemization, identification and exposition of the causes, argumentation, testing, etc .;

complex / extended problems, based on which the students demonstrate a deep and wide understanding, showing creativity, analytical skills, reflections and synthesis etc., the student makes connections not only within the given subject, but also beyond it, capable of generalizing and to transfer the principles and ideas underlying the specific instance to the applications of other situations.

After the <u>purpose</u> pursued the problems can be:

Type of problem	Description	Example
Detection problems	These mainly concern technical problems and highlight the flaws of a system or approach and identify the solution	How to repair a car on a production line. Fix an error in an IT system.
Decision making problems	These problems require students to make decisions about the solution to be followed from a number of different alternatives. It is a complex process and depends on several factors.	In order to increase the number of customers, should a company export to another country, increase its marketing activities or reduce its prices?
Strategic performance problems	This is a complex problem that may require a number of approaches to solve a general problem.	To improve the cash flow a company must use forecasting methods to reduce over-stock ordering, collaborate with customers to improve forecasting accuracy, and negotiate with suppliers about credit terms.

Design problems	They refer to how to design a product, business or process within a company.	For placing on a foreign market, a product may need to be redesigned taking into account the requirements of the customer.

It may be difficult to know the types of problems that work best in PBL, but some rules are advisable.

Identify <u>authentic</u> problems! Avoid making false simulations / challenges to make them fit a predefined pedagogy. Whatever you choose, make sure it is a real problem and that students are targeting their solutions to a specific audience that is willing to listen. In addition, it is still essential for the PBL to be linked to the curriculum and educational standards. They must see PBL as an opportunity to unite real-world problems with academic outcomes and standards. Students need to understand that PBL is not an exam, and perfection is not the goal.

Confront yourself with the lack of knowledge! A significant challenge in preparing for PBL is to ensure that students have adequate research resources and are prepared to do their own research and communicate / collaborate with mentors. Although it may be impossible to fully prepare for a joint research / field study visit with students, however, sincerely formulating the problems, recognizing the lack of information, knowledge, justifiably correlated with the curriculum can bring psychological comfort to all those interested in solving problem. And sometimes you have to be aware that site visits are de facto connected to the curriculum.

Learning by doing! PBL can take us out of the educational scene and make us feel uncomfortable, apparently, due to the lack of current, adequate, sufficient information or because we do not know or understand the problems or modern technologies that our students are facing. But this is a unique challenge to learn together with students and from students. Openness to such collaboration enhances student confidence, autonomy, self-direction.

Embrace your failure effectively! The potential failure is not a disadvantage of the PBL. Failure is an excellent opportunity to show students that their actions have real consequences and that success is far from guaranteed. Students will not be able to come up with clear solutions for every problem they face. Industries understand that failure is sometimes part of the process; universities should have the same approach. Students need to understand that failure is not only accepted there in the real world, but is often an essential part of the process.

PROBLEM PBL SAMPLE

Problem type: Increase revenue for the Joint Stock Company „Bucuria”

Student profile:

The PBL group is expected to include three employees in finance, marketing and sales. Two students are in the early stages of autonomy (*level 1/2*). Therefore, the problem must have a low /

medium level of difficulty / ambiguity. (*autonomy*). All employees are familiar with the problem because they know the decrease of sales and increased competition the Joint Stock Company „Bucuria" is currently facing on the existing market (*familiarity*). Sales and marketing staff have been searching for new routes and sales markets for a long time, and only 20% of them are successful because of their fierce competitiveness. These staff members are working hard and yet they are having difficulty achieving their sales goals. Finance staff is aware of the difficulties encountered and the impact on the organization in the event that sales do not increase. Therefore, all parties have a strong interest and motivation to solve the problem (*interest / motivation*)

Characteristics of the problem:

- *Difficulty*: Due to the level of autonomy of the students there must be a certain structure and scope on the problem. It will be reduced to focus on experience relevant to the PBL group and will contain a certain structure to guide the learners.
- *Context*: The problem will be adapted to examine the solutions in the context in which the proposed PBL group will operate. This is sales / marketing / finance.
- *Teamwork:* The problem is a *complex / relationship / strategic performance* one that contains a number of different elements and perspectives to solve, therefore the PBL is favorable.

Description of the problem (to be presented to the student)

Overview of the problem:

Content: In the last 5 years the market share of the Joint Stock Company „Bucuria" in Europe has decreased by an average of 3% every year. This has a major impact on the company's revenue and its ability to operate at a profitable margin that meets shareholder requirements. The current net profit percentage is 5% compared to 10% five years ago. This is due to the increase of the expenses and the reduction of the number of customers due to increase of prices.

*Context***:** Therefore, all parties have a strong interest and motivation to solve the problem (*interest / motivation*)

Connection: Previous attempts to increase revenues included:

- Recruiting an extra sales person
- Development of two new products to meet the emerging needs of customers
- Improving the credit conditions offered to customers

Research and reasoning: Research is a necessity!

- Analysis of customer buying behavior in the destination countries and how it can influence our way of selling the product in those countries
- Researching the legislation on excise duties and customs in the countries of destination and what measures the company must take to address them
- Research on export and marketing legislation in the EU on export to the countries of destination and determine if our company complies with these laws and whether something should be changed in our practices.
- Research on the different means of transport and the selection of the most suitable means

- Researching the distribution partners who will sell our product on the market in the countries of destination and selecting the most suitable partner for the organization and our products.

Organizational objectives:

- Increase of sales in the destination countries by 10% in the next year,
- Attracting 20 new customers from the destination countries,
- Establishing 2 distribution channels for these customers.

Reflection

Throughout the process, record whether:

- You have acquired enough information to enable you to understand the problem and understand the possible solutions
- You have analyzed the data sufficiently to allow you to develop and implement a feasible solution that meets all requirements
- What research methods you used and if they were effective (how you collected and analyzed data to identify a feasible solution)
- What reasoning processes have you used and if they are logical and efficient (how did you apply the data to implement the solution)
- If you have integrated your own knowledge conceptually (you have integrated all the necessary knowledge from different contexts and perspectives to reach a solution that meets all the needs of the organization)
- If their problem solving strategies are effective (what approaches do you use to solve the problem)?

At the end of the PBL, register:

- How did you connect the data to develop a solution?
- What was the reason for selecting this solution?
- How would you solve this problem differently if you had the opportunity to start over in PBL problem?
- Do you have monitoring issues or questions?
- What other problems would you apply to the PBL process?

Problem category: Strategic

	**Tasks** • State the rules you need to keep in mind when formulating a problem • Define the problem situation • Describe the types of problems • List the steps to present the problem • Explain how the 3C3R is applied • Analyze the characteristics of the problem in the PBL • Appreciate the importance of the problem in the PBL strategy

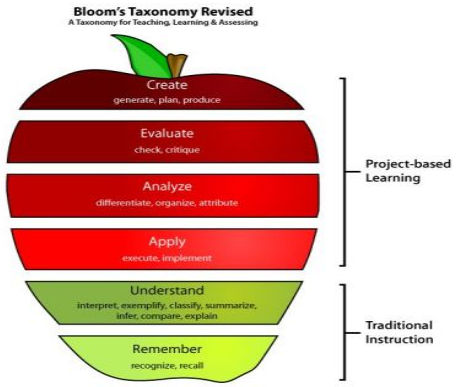
	**Synthesis and transfer** A few questions to ask yourself when creating the learning environment for your course: • Will students be able to identify real-life problems? • What types of problems are mainly relevant to the course taught? • Are the problems proposed / identified sufficiently authentic? • What methods / strategies could help the student fill in the knowledge vacuum needed to identify the expected solutions? • Will the student be able to identify solutions?
	**Reflection** We propose a brief reflection on what the students learned and how they felt during this period. • Do I have enough information to enable me to understand the real problems and help the students, in their turn, understand them, propose possible solutions? • Have I analyzed the real environment well enough to identify the authentic problems needed in the teaching-learning activity of the course? • Which research methods have been most effective in the discipline taught? • Which aspects would require more attention to achieve the desired results? • Where could I identify personally / with students the most interesting problems in the professional field? • Would there be any problems or questions in the supervision? • How did the students feel during the hours taught, the activities carried out?
Conclusion	The information in this section helps to define the concept / essence of the problem in the context of the PBL. The section will contribute to the report on various types and forms of presentation of the problem depending on its characteristics. In addition, it will facilitate the analysis of the level of student self-direction and involvement in identifying and solving problems individually and in groups. Also the presented material will help to compare the different types of PBL projects and their distinctive features.

5.2 TYPOLOGY OF PBL PROJECTS

What is a project?

Actually, any human action that requires the efficient organization according to a plan and the achievement of specific objectives can be generically defined as a *project*.

The word project comes from the Latin *projectum* (to throw something forward), formed, in turn, from the prefix *pro-* (which indicates something that precedes the next action of the word in time) and the radical *iacere* (to throw). The Latin root suggests movement, a trajectory, of a certain relation with space and time. For the first time it was used in the field of architecture in the fifteenth century.



What is the *theoretical framework* in conceptualizing the PBL project?

The PBL projects are based on Bloom's taxonomy, revised in 1999, by Lorin Anderson and colleagues, which differentiate between „*knowing what*", the content of thinking, and „*knowing how*", processes used to solve problems, including through the project. In this case, the emphasis in learning is shifted from traditional learning, focused on updating and understanding of content, towards PjLB, where an important role lies in the application, analysis, critical evaluation and creativity in finding solutions.

To help teachers do PBL well, the *Buck Institute for Education* has created a comprehensive research-based model for PBL, a so-called „gold standard", consisting of seven elements, which aims to facilitate the measurement, calibration and improvement of PBL practice.[12]

The „*gold standard*" includes three parts:

- **Learning objectives**: regarding the academic content and the development of skills are at the center of any well-designed project.
- **Key-knowledge and understanding**: focused on content standards, concepts and deep understandings that are fundamental to school and academic disciplines. In good projects, you learn how to apply knowledge in the real world and use it to solve problems, answer complex questions and create high quality products.
- **Successful key competences**, also known as „*the 21st century competences*", or only content knowledge and conceptual understanding are not enough in today's world.

[12] apud John Larmer, editor in chief at PBLWorks, where he has helped create professional development workshops and PBL curriculum materials. // https://www.pblworks.org/blog/gold-standard-pbl-essential-project-design-elements

The *essential* elements of the PBL project describe what is needed for a successful project and which increase the learning and commitment of the students / trainees. Therefore,

- ***The heart of a project*** is the ***problem or the provocative question***, that is *„about what*", if we generalize, it is a problem of investigation and solving or a question of exploration and answer. An engagament problem or question makes learning more meaningful for students. They not only acquire knowledge to remember them later; they learn because they have a real need to know something, so that they can use that knowledge to solve a problem or answer a question that is relevant to them. The problem or question should provoke the students, but without being intimidated. We propose to the teachers, when designing and running a project, to write the central problem or question in the form of a leading question, friendly to the student, which sets the task, for example, *„How can we improve the recycling system of our country, so that we can reduce losses?*"

- **Supported research / by investigation**. The investigation process takes time, which means that a gold standard project takes more than a few days. In PBL, the investigation is iterative; when faced with a challenging problem or question, students ask themselves / ask questions, find resources to answer them, then ask deeper questions - and the process is repeated until a satisfactory solution or answer is developed. Projects can incorporate different sources of information, combining the traditional idea of „research" (reading a book or searching a website) with multiple interviews with experts, service providers and users in the real world. Students may also question about the needs of users of a product they create in a project or the audience for a written or multimedia piece.
- ***Authenticity***. When people say something is genuine, it generally means that it is real, not false. In education, the concept has to do with how the *„real world" is learning or the task*. Authenticity enhances motivation and learning. A project can be authentic in many ways, often in combination. It can have a real context, such as when students solve problems that people outside the university face (*for example, entrepreneurs who develop a business plan, engineers who design a bridge, or policy councelors*). This may involve the use of real-world processes, tasks and tools, as well as performance standards, such as planning an experimental investigation or using digital editing software to produce videos that are close to professional quality. It can have a real impact on others, for example, when students address a need in their school or community (for example, improving a community park, supporting local immigrants) or creating something that will be used or experienced by others. Finally, a project can have personal authenticity when it talks about students' interests, cultures, identities and problems in their lives.
- ***The students voice and their choice***. Having a say in a project, students get involved in sentiment and attitude, they create a sense of ownership; they care more about the project and work harder. If students fail to get emotionally involved, to use their judgment when solving a problem and only answer a fundamental question, the project

is perceived as a simple exercise or as a route where a set of instructions is followed. Students can have a contribution and control over many aspects of a project, from the questions they generate, to the resources they will use to find answers to their questions, to the tasks and roles they will take on as members of a project team, the products they will create. More advanced students can go further and select the subject and nature of the project itself; they can formulate their own problem / leading question and decide how they want to investigate it, demonstrate what they have learned, they can also decide how they will share their work, tasks, but also laurels.

- ***Reflection***. John Dewey, a fervent promoter of PBL, said: „We do not learn from experience. We learn from the reflection on experience. Throughout a project, both students and the teacher should reflect on what they are learning, to learn, by learning. The reflection may appear informally, as part of the culture and dialogue in the classroom, but it should also be an explicit part of the project journals, the scheduled formative assessment, the discussions at the control points of the projects and the public presentations of the students. Reflecting on content knowledge and understanding helps students solidify what they have learned and think about how they might be applied elsewhere, beyond the project. Reflecting on developing successful skills helps students internalize what skills mean and set goals for further growth. Reflection on the project itself, the way it was designed and implemented, helps students decide how their next project might be approached and helps teachers improve the quality of PBL practice.
- ***Criticism and review***. High quality student work is a hallmark of the Gold Standard PBL, and this quality is achieved through careful criticism and review. Students should be taught how to give and receive mutually constructive feedback that will improve project processes and products, guided by criteria / topics, models and formal feedback / criticism protocols. In addition, they must show openness and tolerance towards constructive criticism from outside, from adults, experts, officials, etc.
- ***The public product***. The Gold Standard PBL outlines three major reasons for creating a public product in the PBL, to remember that it can be a tangible „product" or it may be a presentation of a solution to a problem or answer to a fundamental question. Firstly, a public product greatly enhances the motivating power of PBL and encourages high quality work. Analyze what often happens when students make presentations to colleagues and teachers. The stakes are not high, so they can lose, do not take it seriously and do not care so much about the quality of their work. But when students have to present or expose their work to an audience beyond the classroom, the performance tally rises, because no one wants to look bad in public. The secret lies in finding the sensitive point, it is important that the students are well prepared to do their public work.

We recommend that all projects focus on these successful skills: *critical thinking / problem solving, collaboration and self-management*. PBL projects can also contribute to building other skills such as perseverance or creativity, but we insist on critical thinking, teamwork and good time management as lasting pieces for the future success. Relevant to PBL projects is interdisciplinarity. It is recommended that the working groups in the PBL be of 4-6 members.

In this context, we showcase the experience of the Aalborg University, which promotes the following stages of work on the project:

Choice of theme,
Choice of topic;
Problem formulation;
Methodological considerations;
The theoretical content and projects;
Literature Review of Theories;
Analysis;
Parts of the projects*;*

NB ***Volume of PBL project parts*** [13]***:***

- *Foreward - ½ page,*
- *Introduction – 5 pages,*
- *Overview of the project – 1 page,*
- *Theoretical chapter – 10-15 pages,*
- *Methods – 2-5 pages,*
- *Problem analysis – 20-25 pages,*
- *Conclusions – 3 pages,*
- *Perspectives – 5 pages,*
- *Reflections on the process – 5-10 pages.*

NB *The figures presented above are only as suggestions, or, the differences between projects from the perspective of the structure, the complexity of the problem, demand the adjustment of the volume of the constituent parts of the project* [14].

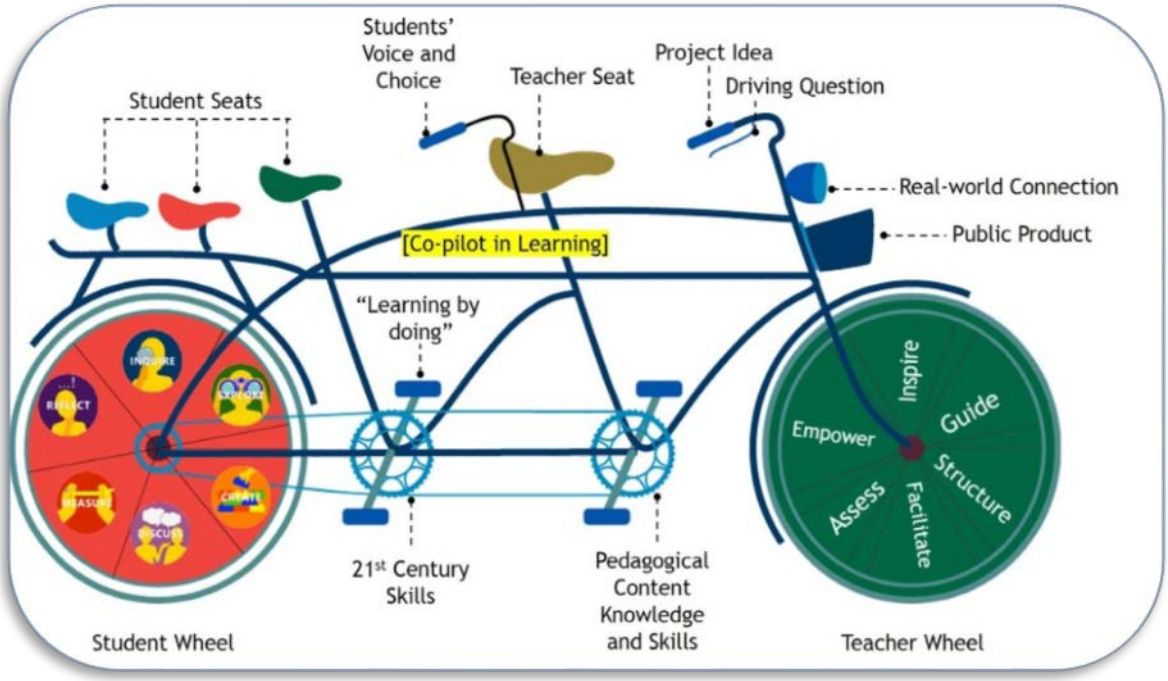
Secondly, by creating a public product the social dimension of learning becomes more important. This has an impact on students and the university culture, contributing to the creation of a „learning community", where students and teachers discuss what is learned, how it is learned, what are the acceptable standards of performance, and how student performance can be improved.

Finally, presenting, publishing in public the products developed by students is also an effective way to communicate with parents, community members and the whole world about what they are, what is PBL and what impact this method has on students. When a team, group, university opens for public examination, the message is: „Here is what our students can do: we are more than test results."

In the context of the aforementioned, a graphic presentation attracted our interest, attested to by Shumali Ali Adi, in 21st Century Learning Methods (https://sites.google.com/site /shumaliaaliade/standard-2/objective-b), where basically, all the elements necessary for the effective implementation of a PBL project are found.

[13] Poul Thois Madsen. Project guide for students of business at Aalborg University. Aalborg University, 2017, p. 19 //
[14] Idem, ibidem

Fig.5.4. The PBL bicycle of the 21st century



How are projects *classified*?

Depending on the size, the project can be: international, national, regional, local, organizational (vide Scarlat & Galoiu).

According to the objective and activity of the project we have: industrial, commercial, management, social, cultural, environmental protection, scientific (research), educational projects etc.

Depending on their size, the projects can be: *small* - have short terms, low value, modest technological requirements, allow daily monitoring; *medium* - have terms between 2-3 years, with average value, average technological requirements, follow-up is done through periodic reports; *big* - they have big terms, between 3-5 years, a high value, high technological requirements, they resort to specific tools and programmes, and the management is done through control reports.

The PBL projects are interdisciplinary, they contain both the aspect of research, education, as well as that of technology, economics and even the social, cultural, etc.

From a curricular perspective, PBL projects, depending on a certain educational system, can be divided into:

- *Mini-project*, which represents an intermediate / final product within a course;
- *Semester project*, which has autonomous status and is, de jure, fixed in the curriculum;
- *The thesis / annual project*, bahelor or master degree project, has mandatory status; this type of project can be elaborated both individually and in groups. Obviously, according to the PBL criteria, the group project is preferable;
- *The internship* is a work experience of limited duration, meant to facilitate the integration into the professional life of the students or graduates of university studies

(*called interns*). The internships can be part-time or full-time, mainly, they are part-time during the university year and full-time in summer. Following the exchange of experience between trainee and employer, a practice report, individually or in group, is prepared, which is presented publicly to the evaluation by a commission

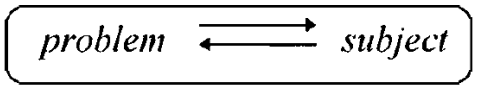
Typology of PBL projects after Kolmos:

An even summary analysis of working practice in the field of PBL in engineering education at Aalborg University allows us to identify at least three ways in which problem orientation is integrated into the project activity. Only that in different types of projects the problem requires to be analyzed and solved by different methods. We mention that the phases of the project are common to all the types of projects described, these being: *preparation, analysis of problems, delimitation, problem solving, conclusions and reporting.*

The projects, however, differ in the preparation phase, as this phase will determine, illustrate whether it is a self-directed learning process or a teacher-controlled process. PhD Anette Kolmos, professor in Engineering Education and PBL, distinguishes three types of PBL projects:

1. ***Assignment project / project with the default theme,***
2. ***The subject project,***
3. ***The problem-based project***

The first type, according to Anette Kolmos, PhD, professor in Engineering Education and PBL, is the so-called „***assignment project***". This project is distinguished by considerable planning and control from the teacher / supervisor. ***The assignment project*** is a project based on tasks, where both the „problem and the subject" as well as the methods are chosen in advance. That is why it is also found as a *Project with the default theme*.



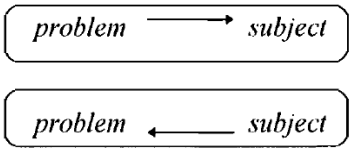
[15]

In the case of such a *project with the default theme*, the educational objectives are very easily monitored and are often formulated as the traditional objectives. Also, in this process it is quite easy to be a supervisor, thanks to the fact that the supervisor knows exactly what will be explored in the project and will direct the students' choices in the planned direction. An example of a problem for the students' activity in such a project could be: *In the university canteen a refrigerator makes too much noise. The task is to measure the noise level, calculate the required attenuation and find a noise damper*.

The second type of project is called by A. Kolmos „***the subject project***". This is characterized by the fact that the topics are proposed in advance, and the students must find the problem. Students are free to choose either *the problem within the topic* or the problem will be given and students will have to choose between several methods described. In this case, the educational ones are mainly formulated in the traditional way. For supervisors within the „***the subject project***", a certain dose of uncertainty appears, because students are allowed to make some

[15] vide A. Kolmos. *Reflections on Project Work, p. 143* - Downloaded by [Aalborg University Library] at 05:01 05 February 2015

choices on their own. Kolmos's metaphor, you know where to find the football pitch and you know the basic rules, but before you start the game, you have to find the ball. As a real example, the previous one might serve, only some changes occur: *In the university canteen there is too much noise from an old refrigerator. The task is to describe the scientific objectives through the use of a signal processor and to find a solution either to create a filter or to replace the bulky fridge.*



[16]

The third type of project presented by A. Kolmos, is the ***problem-based project***. Unlike the other two types, the latter has as its starting point the problem. This means that the problem will be the one that will determine the choice of disciplines and methods that correspond to the original idea of a problem-oriented learning process. Students will have to start with a problem and analyze it, find fundamental solutions to solve it, choose the right solution and design implementation strategies.

[17]

Often, these types of projects are interdisciplinary, and the educational objectives concern the ability to analyze and obtain methodical skills. Respectively, the problem is mainly described as a broader social topic.

The supervisor's mission is more difficult, because it is a self-directed process and the teacher can find himself at the limit of capacities, but this does not make the supervision activity impossible.

Metaphorically, referring to A. Kolmos, we are faced with a situation where students do not know where the football pitch is, do not know where to find the ball, and do not even know the basic rules. And back to our example with the fridge.

There is too much noise in the university canteen. The task is to find the sources of noise and the solutions, that is to solve the given problem.

Starting from the experience of Aalborg University, we can recommend for the first year of studies *the assignment project / the project with the default theme,* in the second year it would be appropriate *the subject project*, because the task predominates, and in the third year, possibly, at the master, *the problem-based project* would be the recommended one.

It should be mentioned, however, that all three types of projects are necessary to ensure the quality of the competences acquired in higher education. Each project, through its educational objectives, contributes to the development of certain knowledge and skills. Presenting the three

[16] Idem, ibidem
[17] vide A. Kolmos. *Reflections on Project Work, p. 143* - Downloaded by [Aalborg University Library] at 05:01 05 February 2015

types of projects in the proper order does not give them any priority and has nothing to do with saying that one type is better than the other, we just mention that they are distinct from each other, they have different objectives and they lead to different knowledge and skills.

Anette Kolmos, the author of the Kolmos classification of PBL projects, is a PHD, professor in Engineering education and PBL, Director of the UNESCO Center of category 2: Problem-Based Learning Center in the field of engineering science and sustainability in Aalborg. Chair for UNESCO in the field of Problem-Based Learning Center in engineering, Aalborg University, Denmark.

PROIECT PBL SAMPLE (*STRUCTURE*)

Table 5.3. Structure of the PBL project

Title page	The logo and name of the institution Faculty, department, specialty, semester of studies Project title ... Project leader: first name, surname, didactic degree, scientific title Supervisor: first name, surname, didactic degree, scientific title Team members: first name, surname, year of study, group Presentation date ... Localty, year
Content	
List of abreviations	
Summary	The team presents the summary of the project, briefly describes the scope of the report.
Introduction	The *Introduction* presents the subject and the object of the research; the motivation of choosing the problem, the research field, the problem situation; the timeliness and relevance of the project.
Content	**COMPANY**: It is described the research topic (company, enterprise, interested party, etc.) from a historical point of view, presented the current context from the perspective of the identified problem, outlined the institution's perspectives **METHODOLOGY**: This chapter presents and explains: • the way in which data is collected, processed, • identifies the working methods that are suitable for the project, the problem, • shows how the work process will be structured and optimized and offers the reasoning of the theory of science,

	• philosophy is chosen, • the strategic design of the research is done, • the time dimension, as well as the techniques, working procedures are established. It also includes the conceptual framework made by the team, as well as how it will reflect the logic of the project **ANALYSIS**: There will be a presentation of the analysis of the internal and external strategies of the research topic that will provide a perspective on the strengths and weaknesses. To investigate these issues, the VRIO framework will be used. The information found will be used later in the SWOT analysis.
Strategic discussions and recommendations	This chapter will present the discovered results, will show the connection between the formulated problem, the methodologies / theories addressed, the results of the analysis and the expected perspectives, will make the necessary recommendations.
Conclusions	It presents the final result that led to a possible solution of the formulated problem.
Reflections	Here will be presented the reflections of the group members on the process of working in group / team, on the elaboration of the report, etc.
Bibliographical references	Use only Chicago style citation and referencing: http://www.chicagomanualofstyle.org/tools_citationguide/citation-guide-2.html

	**Tasks** • Identify the essential elements of the PBL, provided by the „Gold Standard". • Explain how, in your view, the essential elements of PBL provided by the „Gold Standard" would facilitate the measurement, calibration and improvement of PBL practice. • Present the working algorithm on the project, based on experience from Aalborg University, Denmark. • Propose a list of skills needed in the 21st century when developing a PBL project. Provide arguments. • Identify the types of projects suitable for your course / field of activity, based on the classification proposed by A. Kolmos
	**Synthesis and transfer** A few questions to ask yourself when creating the learning environment for your course: • How many people will I include in forming the working group on the PBL project? • What will be the distribution criteria in the project working group? • Which types of projects are best suited for the discipline taught? • Which structure of project development is more appropriate in the context of the Republic of Moldova? • Who would be the beneficiaries of the projects realized during the course? • How would the results obtained from the research of the project problem contribute to the development of the team members, the economic unit, the

	Republic of Moldova? • Would I like to take this course if I was a student?
	**Reflection** We propose a brief reflection on what the subjects learned and how they felt during this period. • Is the above information sufficient to understand what a PBL project is and how it works? • In which area is the need for PBL Projects more stringent? • How open are the students to collaborate in carrying out a PBL research project? • What types of PBL projects are favorable to the educational system in the Republic of Moldova? • How could I raise interest in PBL and make work on a PBL project more efficient? • With whom should collaboration be intensified to make successful PBL projects? • Is the business environment, the employer open enough for collaborations with the academic environment regarding the implementation of PBL projects?
Conclusions	The theoretical-practical support proposed above will familiarize the reader with certain aspects regarding the concept of PBL, more precisely the project approached through PBL, which concerns the in-depth investigation of a topic or problem that captures the interest, energy and time of the learners. From the contents, the beneficiary of the course will find out what are the essential elements of a PBL project, proposed as „Gold Standards", by the Buck Institute for Education, will discover the experience of the Aalborg University in the elaboration and research of the projects, will get familiar with certain classifications of the projects, in particular, with those proposed by A. Kolmos, doctor, professor in engineering education and PBL. Also, the presented material will contribute to the comparison of the different types of PBL projects and their distinctive features.

5.3. SUPERVISION IN PBL

What is supervision?

The term ***supervision*** is a combination of two Latin terms (*super*, which means „above, over", and *vidēre*, which means „see, look") and was built to name an oversight activity for effective organization of work, especially of the work of less prepared people, in our case the students.

Most specialized works describe supervision as an activity that transfers knowledge, skills and attitudes from an experienced person to a less experienced one. Supervision integrates theoretical

and practical knowledge about a client. Also, supervision is a pedagogical and evaluation process (Naslund, 2004). Gerald Caplan, said that the process of supervision is a long-term process, between a professional with a certain competence and one or more professionals without that competence. The supervisor has a certain responsibility, and attending the supervisory sessions is almost mandatory. In general, the literature presents three different models of supervision:

- educational supervision, in order that the supervised persons increase their professional competence;
- methodological supervision, customer-oriented and focused on how to manage a case;
- administrative supervision, from managers to team members.[18]

The supervision in PBL would be found mainly in the educational supervision, but also establishing certain tangential points with the methodological and the administrative supervision. Or, the role of the supervisor teacher, in addition to his involvement in the development of certain skills, also requires orientation to the student, in his capacity as educational client, as well as a constructive managerial approach when it comes to teamwork.

What are the principles of supervision?

Referring to the principles of supervision stated by O'Donoghue (1998: 2-8) in the teaching-learning-assessment process based on PBL, we mention:

- ***All students involved in PBL projects need supervision***.
- ***Supervision means sharing responsibility***. The technique of „throwing the cat in the supervisor's yard", used by the supervisors, aims at sharing responsibility and eliminating stress when they face a difficult situation. The decision to act is shared with the supervisor, and the results obtained are dependent on the quality of the supervision process; the supervisor, from this perspective, is also evaluated according to the results recorded by the team supervised by him.
- ***Supervision overturns the pyramid of the organizational hierarchy***. Due to the functions that the supervision has, it gets to „overturn" the organizational pyramid. „Overturning the pyramid" implies changing the style of communication, control, support and evaluation of employees; increasing the confidence of the supervisors in the person of the supervisor due to this strong professional relationship is manifested by the fact that they approach him whenever they feel this need, the supervisor being considered a specialized person who offers services to the students.
- ***Supervision is based on negotiation and offers solutions for conflict resolution***. In the process of group work, certain conflicts arise, most often when there are different interpretations of the same situation and when the expectations of the students involved are different, even contradictory. Supervision also seeks to alleviate conflicts through individual and group negotiations of different interpretations given to certain situations.

[18] vide Supervizarea în asistenţa socială. Suport de curs. // https://ru.scribd.com/doc/75675480/Suport-Curs-Supervizare-in-Asistenta-Sociala

Negotiation intervenes at all levels characteristic of supervision, being an essential element of this process.

- ***Supervision is one of the most important and powerful professional relationships***. Firstly, supervision is a professional relationship established between the student and the teacher-supervisor, prepared in this regard. This relationship is strong and important precisely because of its orientation towards teamwork, making decisions regarding student practice, the need for training and improvement. Based on trust, the relationship between the supervisor and the supervised develops and gains consistency as both have something to gain from it.
- ***The supervisor supports students by providing quality services***. An important point in clarifying the influence of supervision in providing quality services is precisely the way in which such service is viewed. Quality service is the one that is oriented, first and foremost, to the student, to his needs and to encouraging the students in the realization of the project.
- ***Supervision aims to ensure that the students involved in the project know their roles and responsibilities***. Each student is responsible for a certain segment(s) and, therefore, he must assume responsibilities related to them. It is interesting that supervision operates, first and foremost, with the concept of responsibility, which has replaced that of obligation. All the tasks of the student, member of the group, must be pre-set at the beginning of the work on the project, and the supervisor periodically discusses and analyzes with him these responsibilities and tasks. The supervisor's discussions with the supervised students not only aim at testing the latter in terms of knowing the responsibilities, but also analyzing these tasks and how the students fulfill them.
- ***Supervision aims to support students in achieving performance objectives***. The performance objectives set for each individual student and the working group in the corpora represent an operationalization of both the implementation and impact indicators; in other words, the performance objectives give us an image of how the student works within the group on the project, as well as the impact of his interventions on the beneficiaries, on the image of the group, the organization, the partnership with the other groups, stakeholders.
- ***The supervisor ensures that the student has the necessary resources to carry out his activity and manages these resources efficiently***. The administrative function of supervision also looks at how resources are managed, in other words, how they are allocated and used by those supervised. Even scheduling meeting times is sometimes a source of stress and frustration, if there is no clear procedure, planning in this regard.
- ***Supervision is based on adult education methods***. From the point of view of the educational function, the supervisor can be considered a coach or a tutor. He identifies the training needs of the supervised, plans and organizes some training programmes specific to the programmes in which they operate and makes recommendations regarding the follow-up of continuous staff training programmes. Because the supervisor is a mentor, the methods used to transmit information to the supervised are

not those specific to the academic environment, but adapt to the training needs and abilities of adults.[19]

How is supervision classified?

To make a typology of supervision, we can consider three reference systems: *the supervisor's relationship with the organization, the form of organization and the perspective of approaching reality*. Taking these criteria into account, we encounter the following forms of supervision:

I. From the perspective of the supervisor's relationship with the organization we find
   - *internal supervision*, when the supervisor is inside the organization,
   - *external supervision*, if the supervisor is not part of the structure of the organization, but is a person outside it.

II. According to the form of organization of supervision, we distinguish:
   - *individual supervision*,
   - *group supervision*

III. From the perspective of approaching reality, we distinguish:
   - *classical supervision*, problem-centered,
   - *appreciative supervision*, focused on appreciation

Referring to the style of the supervisor to collaborate with the supervised, we can distinguish supervisors mainly manifesting:

- ***a „contractual" supervision style***, when negotiating extension, offering support both in terms of the project and in personal terms;
- ***the „director" supervision style***, when the supervisor assumes that students need support in project management, but they are not guided from a personal, human perspective;
- ***the „laisser-faire" supervision style***, when the supervisor assumes that the students are able to manage their own research project and themselves;
- ***the „pastoral" supervision style***, when it is assumed that students are capable of managing the project, but require personal support. More succinctly, these categories can be presented in this way:
   a. *contractual* – high support and high structure,
   b. *director* – low support and high structure,
   c. *laissez-faire* – low support and low structure,
   d. *pastoral* – high support and low structure.[20]

---

[19] vide Supervizarea în asistenţa socială. Suport de curs. // https://ru.scribd.com/doc/75675480/Suport-Curs-Supervizare-in-Asistenta-Sociala

[20] Kathrin Otrel-Cass. Good supervision and PBL. Reflections and insights from Master students at the Faculty of Social Sciences at Aalborg University. 19 September 2016. Department of Learning and Philosophy, Aalborg University, Aalborg, Denmark . ISBN: 978-87-93058-38-5 (e-book) // https://vbn.aau.dk/ws/portalfiles/portal/243250002/Report_Good_supervision_and_PBL.pdf

 **How is student supervision done (*face-to-face, online or through mixed meeting processes*)?**

In the process of working on a PBL project the students need that through their supervisory activity to *„learn how to learn*", they feel the lack of *starting points for critical thinking*. Student supervision can be done directly, face-to-face, within pre-arranged meetings according to a schedule both individually and in groups. The advantage of such supervision lies in the fact that the interlocutors can benefit from immediate feedback, can widely use kinesthetic and paraverbal language. The disadvantage results from the lack of specially arranged or comfortable spaces for such meetings, the unavailability of all members of the group to attend the supervisory meetings. A current alternative in the context of a wide area of internet coverage is on-line supervision.

In the academic environment, a supervisor is a teacher / researcher / master, etc. who helps and guides students in their research project; offering both moral support and knowledge, more specifically, scientific resources and guidance. Good supervisors should be approachable, friendly and open to support, showing a positive attitude and an open mind.

Good supervision consists of critical conversations or suggestions by which students are guided to their own discoveries. However, too critical feedback from supervisors can lead to negative feelings, loss of control and discouragement. The qualities of the supervisor are a topic that the students discuss and share with each other, and if they have the opportunity to choose, then they opt for supervisors with a good reputation.

Issues such as ignorance, misinformation, or mismatch with the supervisor's research area and content knowledge may influence the quality of this supervision. Organizational factors include the number of students to be supervised as well as competing responsibilities (Grant & Graham, 1999), which can be time-consuming.

 **What types of questions facilitate the supervision process?**

Regarding the supervision through standard questions, we recall that the task of a supervisor is to guide through the activity, the PBL process.

- **Situational questions**. Situational questions result from clear incidents or duties within the team. The purpose of these questions is to find out how the student would act in a situation they would face. In this regard, suggest to the student a scenario and ask them to explain what solution they would choose and why. Examples of situational questions: *What do you do to motivate yourself / motivate the team to constantly achieve ...? What would you do if a teammate had poor results, but only you noticed this?*
- **Factual questions**. The factual questions are generally open questions. Therefore, it is good to ask the candidate general questions to explain / clarify factual information from his experience. Examples of factual questions: *Please tell me more about the projects that you have completed using software products of type...?. What have been your responsibilities so far ...?*
- **Technical questions**. Technical questions appeal to the student's theoretical knowledge and tend to have correct or incorrect answers. Ask questions that relate specifically to the specific requirements of the project. Also, try to prepare yourself to understand the

specific language. Examples of technical questions: *What are the steps you need to take when ...? How can you find out what market share has the X product of ...?*

Note: Depending on the type of answers, the questions used during the supervision are of two types: **open-ended questions** and **closed-ended questions**. Closed-ended questions ask for YES / NO answers and are effective when the supervisor wants to know a specific aspect of the student's knowledge. The open-ended questions allow the student to freely formulate the answer. Therefore, keep in mind that open-ended questions are best suited to finding out the student's / supervisor's opinions, feelings, and help him / her relate more easily.

…An alternative variant of successful supervision is using the 5W2H method, the efficiency of which has been mentioned in the section related to formulating problems.

Tasks

- Name at least 3 models of supervision, found in the specialized literature.
- Explain what the role of a teacher-supervisor is and what makes it different from a classical, traditional teacher.
- State the principles of supervision (after O'Dongue).
- Classify supervision from the perspective of the three reference systems: the supervisor's relationship with the organization, the form of organization and the perspective of approaching reality.
- Establish your own supervisory style based on the descriptions proposed above.
- Present the advantages-disadvantages of individual and group supervision; direct and online.
- Ask 5 questions to guide the activity of the working group on the project. Please specify their typology.
- Apply the 5W2H method for a real or simulated supervision situation.

Synthesis and transfer

A few questions to ask yourself when creating the learning environment for your course:

- How often is supervision in the Republic of Moldova applied?
- What style of supervision characterizes me most frequently?
- What supervisory principles are appropriate for the course I teach?
- To what disciplines and to what extent can knowledge about supervision be integrated?

Reflection

We propose a brief reflection on what the subjects learned and how they felt during this period.

- How could I improve the process of supervising the group I lead?
- What distinguishes my activity as a teacher-supervisor from my colleagues who prefer the traditional style?
- What kind of behavior should I have for each type of supervision?

	• What is the impact of non-verbal communication in the supervision of guided students?
Conclusions	Supervision integrates theoretical and practical knowledge about a client. Also, supervision is a pedagogical and evaluation process. The supervisory role of the teacher requires, in addition to involvement in the development of certain skills, and student orientation, an education customer role and the constructive management approach when it comes to teamwork. The methods used to transmit information to the supervisor are not those specific only to the academic environment, but are adapted to the needs and training skills of adults. In the process of working on a PBL project the students need that through their supervisory activity they „*learn how to learn*". The qualities of the supervisor are a topic that the students discuss and share with each other, and if they have the opportunity to choose, then they opt for supervisors with a good reputation.

5.4. PARTNERSHIP WITH STAKEHOLDERS

What does the *educational partnership* entail?

In PBL, a special place is held by the *educational partnership*. „It becomes operational with the historical evolution of the school - the basic unit of the education system - as an „open school" in relation to the family, with other representatives of the local, territorial, national community, with different „social actors".[21]

Thus, from a historical perspective, the partnership in the academic environment is presented as, in a way, as a feedback to the so-called university crisis, but also to the needs of young people and 21st century society. Approached through the corroboration of the service, the partnership is presented as a „cooperative education / training activity, which determines reciprocal completions and efficiency in joint exercises", in the higher creative activity, but also in solving difficult problems related to „integrating so-called marginals". From an epistemiological perspective it is presented as a „collaborative process", of interdisciplinary type, necessary at the level of the pedagogical products located in a relational and consensual field. According to the historical perspective, the educational partnership is built interdisciplinarly at the level of the existing links between the economy (research and development, finance, regional and local development) and that of pedagogy (general training, vocational education and training), research and development, social insertion, continuous training, post-school integration).[22]

[21] Sorin Cristea. Parteneriatul în educaţie. Didactica Pro..., nr.3 (79) anul 2013 // https://ibn.idsi.md/sites/default/files/imag_file/54_56_Parteneriatul%20in%20educatie.pdf
[22] Sorin Cristea. Parteneriatul în educaţie. Didactica Pro..., nr.3 (79) anul 2013, p. 55 // https://ibn.idsi.md/sites/default/files/imag_file/54_56_Parteneriatul%20in%20educatie.pdf

The partnership in education outlines and characterizes a socio-pedagogical reality oriented towards openness, in collaboration with:

- non-formal organizations (*clubs, student camps, libraries, university media-libraries, etc.*),
- university media (*university radio, television*),
- social actors (*economic agents, cultural, military / artistic, sports, religious, NGOs, public institutions, etc.*),
- community factors (*family, local communities, LPA, etc.*).

The above-mentioned collaborations lead to the establishment of the following partnership relations:

a) complementarity relations (*with non-formal organizations*);
b) contractual relations (*with social agents, local communities*);
c) consensual relations (*with family, local communities*).

In Sorin Cristea's vision, ..., „the analysis of the pedagogical concept of partnership in education can be done from a historical and complementary perspective. The partnership in education aims initially at its economic function regarding the contribution of some social actors, to the development of the education system, „in a financial form" (which is not sponsorship).

What is the purpose of the educational partnership?

Generally, the university partnership aims to initiate and sustainably develop the *university - labour market* relationship in order to collaborate on a long-term basis to synchronize the competences of the graduates from higher education with the expectations and needs of the labour market, stimulating innovation, research and development of human capital and creating opportunities for students and researchers.

In addition, the educational partnership aims both to provide partners with the necessary knowledge and skills at the level of research and training, as well as to activate research-action models that „favor the partnership between the world of education and the world of work".

Universities are now increasingly adjusting programmes, curricula to the needs of stakeholders (students, employers, civil society, etc.), attracting new and new companies interested in achieving the partnership, establishing viable links between the academic, university and labour market environment.

In their turn, the stakeholders have a major impact in terms of modernizing the curricula on disciplines by identifying different problems, through the contributions and support offered in the elaboration, the realization of the projects, including the extension of the process of teaching-learning-assessment through the PBL method. The effects of involvement, supervision in the educational process of the interested parties are, most often, the solutions reached by students after research, reflections through the PBL method.

NB A stakeholder (conf. IDO 9001 - quality management) is a person or group that has an interest in the success or performance of an organization. Stakeholders may be directly affected by the organization or may be actively interested in its performance. Stakeholders can come from inside or outside an organization.

Improving cooperation between the business environment, universities, research institutions and the state has a national resonance „The social dialogue and partnership of educational institutions with research institutions, trade unions, the business environment, civil society and the public, the media are encouraged, made according to the legislation in force".[23] This topic is also of international resonance. Thus, according to the European Strategies[24], of the principles of the Lisbon Strategy for growth and new jobs, the educational partnership has as a short-term priority the fight against the crisis, and in the long term the facilitation and creation of new jobs, the raising of the standard of living and placing the European Union in the top of the international rankings . The crisis solutions focus on the social economy, where prosperity is ensured through innovation, better use of resources and knowledge.

How are partnerships in education classified?

According to the current Education Dictionary by Renald Legendre, partnerships in education are divided into:

- *service partnership*, based on „more informal relationships", which lead to exchanges of information, resources, methods and techniques, „without a common goal" (eg: university-family).
- *reciprocity partnership*, focused on cooperative relations of organizations in a common educational project, „more formal, frequent and continuous, in a „very strong interorganizational dynamics" (for example: school-local community, school-social actors).
- *associative partnership*, based on „conjunctural or episodic relationships that can be combined", different from the relationships promoted through the service partnership and the reciprocity partnership, which constitute „two extreme types".

The examples are numerous in terms of the natural relations that appear in the external context of education, conditioned by a set of economic, financial, cultural, political, community, religious, variables etc. favorable or unfavorable to the school, education, education process.

Tasks

- Define the concepts: *educational partnership, stakeholder*.
- List the subjects to which the educational partnership is open.
- Classify partnerships in education.
- Identify partnerships between your university and other subjects.
- Determine which stakeholders your institution collaborates with.
- Analyze and present the regulations in force concerning the links between

[23] Codul Educaţiei, art. 8 (1) // http://lex.justice.md/md/355156/
[24] Mihaela-Cornelia DAN. Clusterele inovative: o soluţie pentru dezvoltarea economică a României. În Economie teoretică şi aplicată Volumul XIX (2012), No. 9(574), pp. 3-14 // http://store.ectap.ro/articole/771_ro.pdf

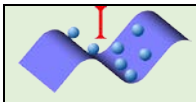
	the academic / university environment and the labour market. • Express your opinion on the quality and sustainability of partnerships between your institution and other stakeholders.
	**Synthesis and transfer** A few questions to ask yourself when creating the learning environment for your course: • What do I know more about educational partnerships? • What are the stakeholders open to collaboration in the field of PBL? • What is the collaboration of students with stakeholders, from the perspective of PjBL and PBL?
	**Reflection** We propose a brief reflection on what the subjects learned and how they felt during this period. • Which stakeholders do I prefer to work with? • How can I personally contribute to the development of the partnership between the university where I work and other stakeholders? • How would I motivate students to be more interested in educational partnerships?
Conclusions	From a historical perspective, the partnership in the academic environment presents itself, in a way, as a feedback to the so-called university crisis, but also to the needs of young people and 21st century society. Partnership in education leads to the establishment of complementarity relations *with non-formal organizations*, contracted with *social agents, local communities*, consensual *with family, local communities*, etc. The educational partnership aims both to provide partners with the necessary knowledge and skills at research and training level, as well as activating research-action models that „favor the partnership between the world of education and work". Stakeholders have a major impact in terms of modernizing the curricula across disciplines by identifying different problems, through the contributions and support offered in the development, implementation of projects.

BIBLIOGRAPHY

1. Codul Educaţiei, art. 8 (1)
2. O'BRIEN, Emma Carroll, Liz Colaboratori: Ileana Hamburg, Daiva Jonuskiene, Aiste Cepaitiene, Helena Caiado, Maria Vieira, Mario Teixeira, Ana Maria Mogosan, Gabriel Vladut, Con Sheahan
3. HUNG, W. (2006). The 3C3R Model: A Conceptual Framework for Designing Problems in PB L, p 57. // Interdisciplinary Journal of ProblemBased Learning, 1(1). Available at: https://doi.org/10.7771/1541-5015.1006 (vizitatianuarie, 2019)
4. LARMER,John, editor in chief at PBLWorks, where he has helped create professional development workshops and PBL curriculum materials. //

https://www.pblworks.org/blog/gold-standard-pbl-essential-project-design-elements(vizitatianuarie, 2019)
5. OTREL-CASS, Kathrin. Good supervision and PBL. Reflections and insights from Master students at the Faculty of Social Sciences at Aalborg University. 19 September 2016. Department of Learning and Philosophy, Aalborg University, Aalborg, Denmark. ISBN: 978-87-93058-38-5 (e-book) // https://vbn.aau.dk/ws/portalfiles/portal/243250002/Report_Good_supervision_and_PBL.pdf(vizitatianuarie, 2019)
6. KOLMOS, Anette. *Reflections on Project Work, p. 143* - Downloaded by [Aalborg University Library] at 05:01 05 February 2015
7. ETHERINGTON, Matthew B.. Investigative Primary Science: A Problem-based Learning Approach în Australian Journal of Teacher Education (2011), Vol. 36, 9, September 2011
8. DAN, Mihaela-Cornelia. Clusterele inovative: o soluţie pentru dezvoltarea economică a României. În Economie teoretică şi aplicată Volumul XIX (2012), No. 9(574), pp. 3-14
9. MADSEN, Poul Thois. Project guide for students of business at Aalborg University. Aalborg University, 2017, p. 19
10. CRISTEA, Sorin. Parteneriatul în educaţie. Didactica Pro..., nr.3 (79) anul 2013 // https://ibn.idsi.md/sites/default/files/imag_file/54_56_Parteneriatul%20in%20educatie.pdf(vizitatianuarie, 2019)
11. Supervizarea în asistenţa socială. Suport de curs. // https://ru.scribd.com/doc/75675480/Suport-Curs-Supervizare-in-Asistenta-Sociala
12. HUNG, Woei, Jonassen, David H., Liu, Rude. Problem-Based Learning, p. 499. // https://pdfs.semanticscholar.org/8642/84970bebcd0d62bf0d31a26a1a67ba0e7883.pdf(vizitatianuarie, 2019)
13. www.archimedes2014.eu/doc/courses/RO_Unit%202%20-preparing%20your%20organisations%20for%20PBL.pdf (vizitatianuarie, 2019)
14. https://sites.google.com/site/shumaliaaliade/standard-2/objective-b(vizitatianuarie, 2019) https://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=1006&context=ijpbl(vizitatianuarie, 2019)

6 MODULE VI. ASSESSMENT OF ACADEMIC RESULTS FROM THE PBL PERSPECTIVE



INTRODUCTION

The essential feature of an innovative teaching system, designed to simulate professional practice, lies in the fact that assessments are based on performance, holistic approach and provide a lot of possibilities for students to introduce their own decisions and solutions.

This module focuses on highlighting the theoretical and methodological bases of assessment in problem-based learning (PBL), with the purpose of offering recommendations on selecting / applying the adquate assessment tools, appropriate for PBL.

Within the module, the particularities of assessment in problem-based learning, the analysis of the specificity of assessment in problem-based learning, assessment strategies adjusted to the PBL approach, assessment tools within PBL, concrete techniques and examples of skills assessment in the context of PBL are elucidated, modalities of diminishing subjectivity in the assessment of the activity and products realized in the group, etc.

The module guides the university teaching staff in order to promote the performance-focused assessment, adjusted to the specific of the PBL.

OUTCOMES

At the end of the course the trainees will be able to:

- identify the theoretical and methodological bases of assessment in problem-based learning (PBL);
- describe the types of assessment in problem-based learning;
- analyze the specificity of assessment in problem-based learning;
- adapt the assessment strategies to the PBL approach;
- develop assessment tools within the PBL;
- apply competences assessment techniques in the context of PBL;
- propose ways of diminishing the subjectivity in the assessment of the activity and products realized in the group.

6.1. THE ESSENCE OF ASSESSMENT IN PROBLEM-BASED LEARNING (PBL)

Why do we assess?

The conceptual and methodological framework of the curriculum „Problem-based learning" (PBL) requires the individualization of the assessment process, which respects the efforts and intellectual capacities of each student in the commitment to acquire competences, knowledge, attitudes.

Sharing this point of view imposes to the university teacher the imperative to keep the student at the center of the teaching / learning / assessment process, carrying out the assessment focused on his *evolution*. In this case, the assessment will acquire a color oriented to the student's needs, being distinguished by the specificity of the traditional assessment.

The **purpose** of the student assessment is to record the *progress* of the learners and to accurately assess at what level they are in the learning process, so that the activities can meet their requirements and ensure the success of each student. The assessment must ensure an active link between what is taught and what is learned with the aim:

- To highlight the strengths of each student, rather than his failure;
- To be multidimensional, focusing on personal, social, emotional, cognitive, professional evolution, as well as on health;
- To include active, cooperative reflection between teaching staff and stakeholders, between teachers and students, between students and students;
- To highlight the importance of the study. To promote success and optimal study for all students;
- To be clearly understood by all students.

Traditionally, assessment has been a method of „judging" a student's ability or competence to ensure assignment standards. However, in the PBL methodology there are many other ***purposes*** of assessment. This may:

- **Make learning explicit** - learning is a cognitive process (it takes place in the mind), so the purpose of assessment is to show students what they have learned through explicit presentation so that tutors can provide feedback and enhance student performance.
- **Motivate and increase student performance**. Students may have better performances if they are to be measured. Also, the feedback provided after the assessment allows the student to improve his learning strategies: „The main purpose of the formative assessment … is to establish the degree of mastery of a given learning task and to indicate the part of the task that is not mastered well ... The purpose is not to classify or certify the student; but it is to help both the student and the teacher focus on the special learning that is required for the mastery degree" (Bloom, 1971).
- **Promote autonomous learning** so that students are responsible for their own learning, for student assessment they are required to do their own work or study. For example,

before an exam, a student learns on his own, for a project he works outside class hours.

- **Ensure the standard**, level of competence for the purpose of classification, certification, transfer, progress assessment, or research on the effectiveness of a curriculum.

Therefore, the assessment should reflect the professional contexts in which our students may find themselves in the future, showing how they cope by acting and thinking as professionals and the lifelong learning skills needed to continue to develop in these changing professional areas.

 **What are the principles we take into account in PBL focused assessment?**

If you want to work with a set of principles that guide you in PBL-focused student assessment, you can start with those developed by MacDonald and Savin-Baden (2004) and Woods (2002):

- Ideally, the assessment should be based on a practical context in which students will find themselves in the future - whether it is real or simulated, ie problem solving, conducting an interview or improving a process.
- Assessment is a judgment based on performance - not on personalities.
- Assessment is a judgment based on evidence, not feelings. Whatever our intuition about a student's abilities, we need evidence in this regard.
- Assessment should be carried out for a purpose with clearly defined performance conditions.
- Assessment is a judgment made in the context of published objectives, measurable and relevant criteria, on which evidence forms have been established.
- Assessment should be based on multidimensional tests: static and dynamic situations; small tasks and long-term projects; academic, social and personal contexts; under a variety of performance conditions; data of a formative and summative nature, as well as with different persons as assessors.

Assessment methods should be developed prior to the beginning of a course and should be clearly presented to all students at the beginning of the course. It is important to consider:

- **Why do we assess students?** Our focus should mainly be on how well the assessment promotes effective student learning.
- **What are we assessing?** Traditionally, assessment has focused on how much students know, volume of knowledge, or content. Lately, more and more emphasis is being placed on skills training, which are considered important for future professional insertion of students. In Problem Based Learning, what really interests us is the ability of students to act in a professional context. This recognizes their need to acquire new knowledge and skills and to approach learning holistically.
- **When will we carry out the assessment?** Experience has shown that if we adopt the „big bang" approach for assessment at the end of the course, most of the time, students will be concerned about identifying indicators that the teacher will apply in the assessment and, preferably, the answer desired by the one who takes the course. In the context of problem-based learning, we will carry out an authentic assessment, which

will permanently accompany the student learning process.

- **Who will carry out the assessment?** *Should it be the individuals themselves, their tutor or colleagues? Or a combination of these?* Problem-based learning must contribute to increasing students' autonomy, giving them greater responsibility for their own learning, then it is logical for them to take on greater responsibility in judging whether they have achieved their learning goals. Similarly, given the fact that they will work with many different people in terms of professional skills, it is important to demonstrate their ability to do so. As a result, the number of those involved in the assessment and providing feedback needs to be expanded.
- **How will we conduct the assessment?** A wide variety of assessment modalities will be applied in applying the problem-based learning strategy.
- **How will we appreciate / mark?** We will apply various performance descriptors, depending on the objectives pursued.
- **What feedback will students receive?** Too often students receive feedback either too late to help them improve their learning in the future, or in a format that does not help them make improvements. To be useful, feedback should help them to learn and be anticipatory, to prioritize the development of competences and not to focus on previously achieved results. Traditionally, students received little or no feedback on the main method of assessment, the exams. Such an approach, generates pressure and diminishes learning, places too much emphasis on quantitative measurement of knowledge. The use of assessment criteria and individual feedback from colleagues will contribute to improving the quality of feedback.

What and how is it assessed in the PBL?

The PBL specifically aims to improve and optimize the educational results of the students, in a collaborative, contextual, integrated, self-directed and reflective manner. Successful implementation of PBL can therefore help students develop their „habits of mind, behavior and actions" [29].

Teachers are aware of the motivational effect of assessment on student learning and that „assessment leads learning". Studies also show that „students do not comply with what you expect, they respect what you check".

It is imperative that the assessment be a component part of any curriculum and find the achievement of objectives of varying levels of complexity: acquiring knowledge, training skills, problem solving ability. Depending on the type of task, various assessment methods will be used.

It should be noted that problem solving ability is largely dependent on the existence of an adequate and relevant knowledge base, in that it depends on how factual knowledge is constructed, contextualized and organized in a conceptual framework to facilitate the finding in the problem of the solving process [30].

Table 6.1. Assessment in PBL

What is assessed		How is assessed
Project launch	• Do students understand the essence of the project? • Do students need to know the basic content and concepts? • Do students need to know the first reference point and have a clear "next step"?	• I know, I need to know, the protocol of the problem statement • Warm-up and / or Exit journals with reference to the general project • Team checking and meetings with the teacher • Pre-assessment without grading to determine the current level of knowledge and understanding
Early phase	• Are students on the right track, looking for the right things? • Have the student teams become more organized due to their assigned roles and tasks? • Is each team member engaged / involved and contributing?	• I know, I need to know, the protocol regarding the following steps for determining the necessary workshops / activities • Warm-up and / or Exit journals with reference to group dynamics • Team checking and meetings with the teacher • Individual tasks and homework
Middle phase	• Are the students involved in the process of learning and understanding the material they are researching and are the variables considered in their solution taken into account? • Do students make connections between research and their project? • Do student groups actually work with clarity towards the „next step”?	• Content-based questionnaires and tasks to determine the necessary interventions and differentiated instruction • Warm-up and / or Exit Journals with reference to content acquisition for deeper understanding • I know, I need to know, the protocol for the next steps • Team checking and meetings with the teacher • The first proposals, sketches, story boards, assaults of ideas, etc.
Late phase	• Do students understand the criteria and check their work in relation to them? • Have the students learned the content and can apply it both inside and outside the project? • Are the teams ready for a culminating event?	• Feedback opportunities (colleagues, invited experts, etc.) based on the evaluation criteria of the project • More extensive individual and group tasks demonstrating the appropriateness of the content (essays, sketches, models, etc.) • Warm-up and / or Exit journals with reference to the criteria of the heading • Evaluation of the team and meetings with the teacher

Culminating event / Climax	• Have students really applied their key knowledge and thinking to create a well thought out product? • Have students been able to effectively communicate the elements of their product? • Has the team worked efficiently?	• Evaluation of the final product according to the formulated criteria • Evaluation of presentations or written documents • Evaluations of collaboration with colleagues • Individual reflections based on what has been learned, the experience as a whole and what can be done differently next time.

Assessment methods must be identified / developed prior to the beginning of a course and must be clearly presented to all students at the beginning of the course.

The product of a group work is presented and evaluated at the end of the PBL. The purpose of the assessment must be precise in order for the assessment to be of high quality and the students to develop their teamwork and communication skills during the presentation. A team member could be bolder and have an amazing performance, ignoring colleagues. Such a situation does not make sense in the context of a collaboration. Anyone can be a good speaker, but not a good colleague. Thus, the assessment of competences must be made through more constructive feedback, even when this is difficult.

The assessment in the PBL must pass the test of cognitive learning - it must also include the assessment of learning outcomes in the affective domain (attitudes), an added value of the PBL curriculum. Such an assessment should involve, as far as possible, the documentation of the specified behaviors and attitudes, observed in a particular situation / context or in the work environment itself. The end of the feedback session (self-peers-tutor) serves as a useful and informal (mainly formative) assessment procedure, often with the need for more formal (summative) self-assessments, or a mutual assessment. For example, interpersonal, communication and teamwork skills. Therefore, particular attention must be paid to the joint elaboration and selection of a rigorous assessment strategy, with the formulation of relevant test elements within this assessment.


How is a PBL project assessed? Experience of Aalborg University in Denmark.

To remedy any confusion that may arise during project assessment, we will describe typical elements of a project assessment[25], elucidating the experience of Aalborg University, Denmark (Poul Thøis Madsen. Project guide for students of business at Aalborg University. Aalborg University, September 2017).

[25] Poul Thøis Madsen. Project guide for students of business at Aalborg University. Aalborg University, September 2017

An examination of a group of 4-5 members will take approximately two hours, including the final discussion between the examiner (Danish examiner) and the external examiner (censor) on the grades. (An individual student will be examined for less than an hour).

1. Firstly, the group members make individual presentations. As a rule, each member of the group must make (approximately) five minutes of presentation. It is important that these presentations are short and concise, leaving time for the project debate. For a group of four, the presentations should not take more than 20-25 minutes. It is recommended to use power point presentations, projector and / or blackboard presentations. Simple reading in the paper is not the best way to demonstrate the student's independent reasoning, which is a key parameter.

The purpose of these presentations consists of 3 parts:

- to give examiners a first impression of each student;
- to „warm up" each student;
- development and completion of the project.

1. It is mandatory that the presentations do not repeat the content of the project. Students can safely assume that the external examiner and the examiner from the home university read the project carefully. Therefore, a repetition of the project may cause irritation and indicate lack of imagination. Rather, the presentations should seek to improve the scope of the project. On the other hand, it is important that the presentations are closely related to the subject and the theories that are analyzed. The exam should be considered as part of the learning process, and the project was completed for the first time. A self-critical attitude will not be treated as weakness but, rather, it will be rewarded.

2. Often, students make several mistakes while reading the final (already submitted) version of the project. It is allowed to issue a paper with more serious mistakes corrected during the exam. This type of approach will often work as a psychological trigger, but is usually not as important to the assessor as it is to the student.

3. After the presentations, the examiner and the external examiner will ask some questions. Depending on the quality of the presentations, the first questions will refer to the project and will be general in nature. Often, questions will be asked to the group, and students should raise their hand if they have an answer. Some questions will be addressed to students individually - especially those who do not get involved enough in discussions (so be active!).

4. Explicitly and implicitly, the questions have as a starting point the deficiencies in the project report and aspects that could have been developed and thus can improve the project.

5. During the discussion (and please note that it is a discussion rather than a verification), it is important that students keep the essence and try to develop arguments, avoiding answers with „yes" or „no". In general, the more students can spend more time arguing, in a meaningful and convincing manner, the less room for difficult questions from examiners. But remember that understanding the questions and therefore listening is also very important.

6. Grading / marking: The official marking regulations place great emphasis on the oral performance of each student. However, in practice, the quality of the project report and the oral performance at the exam will determine the marks together. Individual appreciation will often be

differentiated, and this differentiation is largely (exclusively) determined by individual performance at the exam.

	**Tasks** • Identify the purpose of the assessment in the problem-based study process • Compare the assessment within the traditionally conducted study process and the assessment performed within the PBL • Analyze the principles of the assessment carried out within the PBL • Argue the need to change the way you approach assessment in problem-based learning.
	**Synthesis and transfer** • What changes should I make in the discipline curriculum to adjust the assessment process to the requirements presented? • What must I change in my students' activity and in my activity in order to be able to carry out the assessment according to the principles stated? • What strategy do I have to develop for evaluating a project in the field of professional training? • How important was giving feedback for me so far, and what should I do to provide ongoing feedback to students?
	**Reflection** • Which aspect of the assessment within the PBL is more confusing to me at the moment? • Which of the aspects of the assessment within the PBL do I consider a challenge for my professional activity at the moment? • How do I adjust my time resources to make a true assessment of each student?
Conclusions	Assessment is an important aspect of the professional training process. Within the problem-based learning, assessment is a constructive one, focused on permanently informing the student about his / her progress and success. This fact succeeds if we combine self-assessment, with mutual assessment between colleagues, with the assessment of the teacher and, as the case may be, and with the assessment of an external expert, who can be a partner, representative of the labour market. It is important not to assess only the results, but also the approach. This does not mean that results in problem-based learning are not important. The assessment of the process emphasizes the relationship between the members of the working group, the student appreciates different aspects of the process, which forms various skills and competences necessary for him in the subsequent professional activity.

6.2. TYPES OF ASSESSMENT IN PBL

What are the types of performance assessment?

Depending on the moment of integration of the assessment in the process of carrying out the project / PBL**, three types of assessment** will be used:

- the initial (predictive) assessment;
- continuous (formative) assessment;
- final (summative) assessment.

The initial assessment is made at the beginning of the course / year / semester. Carrying out the assessment at the beginning of the academic year helps the teacher make decisions regarding the arrangement of the student workspaces, the elaboration of the schedule and the design of the activities, the determination of the styles and the motivation for learning. Here are some of the questions that PBL teachers have to answer:

- What competences and knowledge do students already have?
- What are they ready to learn?
- What learning styles do they have?
- In which areas do they show interest?
- What are the problems they want to explore?

Through ***continuous assessment***, students' behavior is observed and recorded when they learn in a group and individually, when they study certain subjects, when they make mistakes and try to correct them.

It is important for supervisors to provide students with continuous feedback on their work. This will stimulate their motivation, they will realize that the teacher is interested in what they are doing and is ready to guide them.

In the PBL, the teacher has many opportunities to speak to the students separately, in small working groups or with the whole group at the same time. The teacher will make comments and observations or ask questions about what students are doing at that time. His feedback must *be positive, concrete and understandable* to the students.

The attitude of the students will also be helpful to the teacher in planning the future activities.

The summative (final) assessment will be carried out regularly at the end of a stage of project realization: quarter, academic year, cycle of studies, etc. Performance assessment has the highest average score in terms of the assessment of skills, products and deep understanding and focuses on evaluating the performance of students, products or presentations in the PBL. Performance-based assessment is also known as authentic or alternative assessment (Airasian & Russell, 2008; Frank & Barzilai, 2004; Moursund, 1999;) and is not just applied at the end of the PBL as a final method of product assessment, but also during the process, to help students learn by

providing feedback, to improve the quality of products and presentations. Thus, it may include a set of tools that assess both the product and the process (Moursund, 1999). In addition to implementing formative assessment, it can identify and solve problems, monitor progress and reduce anxiety (Frank & Barzilai, 2004). Performance assessment offers the opportunity to use multiple assessment tools, which reduces anxiety and provides more information to calculate student level (McMillan, 2014).

Summative assessment focuses primarily on evaluating the final product, using short tasks. As with the formative assessment, the criteria associated with the evaluation of the students' competences are used. Criteria-based assessment structure helps to assess competencies such as collaboration, communication and self-management (Bell, 2010). On the other hand, the individual assessment takes place in the PBL due to the standardized tests. Therefore, traditional testing should be incorporated into the PBL process to achieve individual performance (Capraro, Capraro, & Morgan, 2013; Larmer, Mergendoller, & Boss, 2015). Performance assessment is the most complicated method of evaluation because of the combination of summative and formative assessments, together with those regarding individual performances. It is not to be ignored that the assessment of the performances and the criteria could be new, and the students may not be familiar with them.

Considering that the PBL philosophy is focused on performance assessment, we offer a model of supervision of the PBL project, accompanied by assessment tools, adjusted to each part of the project (criteria).[26]:

Table 6.2. Project assessment and supervision tools

Project part	Criteria	What was treated / addressed	What remains to be treated / addressed
Introduction and formulation of the problem			
Method			
Theory			
Empirical			
Conclusion			
Presentation, communication and formalities			
Coherence			

[26] Dorina Gnaur, PhD, AAU, Learning Lab, PBL-Aalborgmodellen

Table 6.3. Criteria used in assessment - formative and summative

Project part	Criteria
Introduction and formulation of the problem	The reason for the formulation of the problem (detailed in the introduction, the formulation of the problem in a context), in the thematic frame, relevant topic, question (opportunity for discussion, not descriptive), delimitation / selection followed by hypothesis, (originality).
Method	Theory of scientific approach and methods of analysis (reflections on potentialities and limitations, considerations regarding inductive / deductive approach), empirical material (general description), choice and use of the right theory (general summary, limitations, evaluation of sources, coherence between theory and method).
Theory	Deep / thorough contribution, relevance, critical discussion (source evaluation), theoretical innovation (for example, new combinations of theories).
Empirical	General framework / thorough analysis (including type), structure, thematization / focus, applicability and limitations, relevance assessment (what does the empirical contribute to?).
Conclusion	In summary, the 1-to-1 relationship between problem formulation and conclusions (perspective: practical and theoretical consequences of the project).
Presentation, communication and formalities	Readability, linguistic accuracy, linguistic correctness, citations / references, appearance, list of sources and literature[27].
Coherence	Conformity between problem formulation, method, analysis and conclusion („red thread"), structure.

A model for assessing individual performance in groups is reflected in Annex 1

Tasks

- Identify the types of assessment made in problem-based learning
- Analyze the specificity of each type of assessment performed in the PBL framework
- Compare each type of assessment performed traditionally and performed within the PBL

[27] De exemplu, în cazul Universităţii Aalborg din Danemarca, a cărui model de evaluare PBL este prezentat, sursele se vor indica în conformitate cu *Chicago Manual of Style*

	• Appreciate the importance of the current / formative assessment within the PBL
	**Synthesis and transfer** • What will I have to change in the curriculum and in the practical activity in order to be able to carry out an appropriate current PBL assessment? • How could I use the results of the initial assessment to better organize the study process? • What is the difference between the summative assessment that I have done so far and the summative assessment that I have to do in the PBL? • What specific features of the field of professional training should I take into consideration when conducting formative and summative assessment? • Which of my colleagues in the programme would be best to work with in order to make the assessment process more efficient?
	**Reflection** • How clear are the particularities of the different types of assessment to me? • What impressed me most about approaching the issue of assessment in PBL? • What difficulties may arise for me in formative or summative assessment? • What would my students have to do if I did the formative and summative assessment in the PBL key?
Conclusions	The types of assessment combine harmoniously within the learning strategy based on problem solving and form an integral part of the whole training process. The correct design and realization of each type contributes to the creation of a training environment, which puts the student in the situation of being active and learning through action. The combination of individual and group assessment of the process and the product motivates the student to acquire the professional and communication and relational skills necessary for socio-professional integration.

	**6.3. ASSESSMENT METHODS IN PBL**

What methods can be used to assess problem-based learning?

The assessment methods used in problem-based learning courses refer to the nature of the tasks, processes and content of the PBL courses. With PBL, we evaluate the degree of integration of interdisciplinary knowledge, skills and behaviors. Selecting an appropriate assessment, which generally differs from traditional methods, is important to create alignment between what students are asked to do and their learning that is driven by assessment.

The types of assessment that evaluate the tasks, processes, content and integration of

interdisciplinary PBL knowledge include[28]:

- observing the practical activity of the students
- self-assessment
- peer evaluation
- presentations / demonstrations
- reflective essays
- problem reflective journal / reflective journal
- video presentation.

Because PBL involves a large part of group work / teamwork, much of the assessment should focus on group activities. For example, group presentations may make a substantial contribution to the final appreciation of students, but they are nevertheless balanced by a formal mutual assessment that each student receives. The reflective journal method, as well as self-assessment, are powerful tools that encourage students to think about their learning process.

The assessments used in the PBL, including all essays and exams, should keep the focus on context and involve addressing the problem from multiple perspectives when evaluating student learning of course content units.

 **How do we organize the observation of the practical activity of the students?**

As you assess the professional behavior of a student, observing it may be an appropriate method of assessment. Problem-based learning is largely accomplished through collaboration in meetings. As a facilitator, you will attend most of the initial meetings. Therefore, it is possible to observe the professional practice of the students. Using a list of criteria for observation can be helpful.

The Hague University provides a checklist that is used for self-assessment purposes but could also enable the facilitator to observe professional practice and face-to-face sessions (direct contact).

Table 6.4. Observation criteria for PBL tutorial

Criteria	Explanation
Level of motivation and preparation.	• motivation to learn more about the problem. • exploring the sources during the individual study.
Contribution to building team knowledge in tutorials.	• participation in team meetings • active listening • building on the ideas of other people

[28] Woods, D.R. (2005). Problem-based learning, especially in the context of large classes. https://www.queensu.ca/ctl/teaching-support/instructional-strategies/problem-based-learning

Critical thinking skills	• generating ideas • questions, arguments • classification • problem solving • other reasoning skills
Professional behavior	• respect for colleagues • agreement within the team • punctuality
Giving and receiving feedback among colleagues and learning from it	• accepting feedback constructively • attempts to improve the communication of the capacity of a person based on feedback

These criteria can be scored on a scale (for example using a rating scale anchored from 0-5), or by providing evidence of how the student met each criterion..

Why do we need self-assessment?

Self-assessment allows students to think more carefully about what they do and do not know, and what they need to know in addition to perform certain tasks. This method requires students to appreciate their own work. This may include essays, presentations, reports and journals. One of the difficulties with self-assessment is the tendency to make judgments about what the students intended rather than what they actually achieved.

Involving students in appreciating their own acquired acquisitions has beneficial effects on several levels:

* the teacher obtains the confirmation of his appreciations in the opinion of the students, regarding the constant results;
* the students exercise the role of subject of the pedagogical action, of participant in their own training;
* it helps students to appreciate the results obtained and to understand the efforts necessary to reach the set goals;
* cultivates the inner motivation towards teaching and the positive, responsible attitude, towards one's own activity.

(*I. Radu, 1988, p. 246*).

The self-assessment capacity can be formed by adapting the possibilities stated by C. Cucoş (1996, p. 114):

- **Self-correction** or mutual **correction.** It is a first exercise on the path to achieving autonomy in assessment. The student is required to operationally detect some errors, decreases, when carrying out learning tasks. At the same time, there may be times to correct the work of colleagues. Finding your own or your colleagues' gaps, even if they are not sanctioned by grades, is a first step on the path of competency awareness independently.

- **Controlled autonomy**. During the assessment, the student is asked to give himself a grade, which is then negotiated with the teacher or with colleagues. The teacher has a duty to argue and highlight the correctness or incorrectness of the advanced assessments.
- **Mutual appreciation.** Students are placed in a position to appreciate their colleagues, through reciprocity, either in the written work or in the oral assessments / questionnaires. These exercises will not materialize in actual grading, attribution of qualifications, but in assessments / interpretations derived from knowing the self and knowing the other.
- **The method of objective assessment of the personality** consists in training the whole group in order to highlight the results obtained by them by correlating as much information and appreciation - possibly, by confrontation, - in order to form some complete representations about the possibilities of each individual student and of all in one place.

Another method is the student's reflective evaluation. As part of the PBL the student is asked to reflect on certain aspects of the course learning. Asking the student to record these in a word document and present them for assessment is a way to encourage reflection-based learning. Marking how students answered these questions by using the following criteria is an appropriate method of self-assessment.

- Are they aware of their strengths?
- Are they aware of their limits and how to overcome them?
- Are they aware of the application of PBL in other contexts?
- Are they aware of the process used to collect data and the limitations and successes of their approach and how can these limits be exceeded?
- Are they aware of their thinking process behind decision making and whether or not they have been effective or not, how can they be adapted?
- Are they aware of how well they can work with others and if anything can be improved?
- Are they aware of the capacity to connect concepts?

- ***Written assessment / report or reporting the problem***

Another method of individual assessment is to ask the student to draw up a written report or report on the PBL process. The student may be asked to draw up a summary of each stage of the PBL process, which is presented after each step, for example:

- Define the problem as you see it
- What are the possible solutions and why are they adequate?
- What is your favorite solution and why?
- What are the learning goals you want to achieve and why?
- What data did you collect in order to achieve the learning objectives?
- What research methods did you use and why?
- Explain how you have accomplished each learning goal.
- Synthesize the information from the closing session into an action plan.

- ***Group assessment (Presentation of skills)***

You can ask a group of students to present the information they found during the individual study and how well they meet the learning goals set. This allows you to evaluate their communication skills. You can mark students using the following criteria.

- How appropriate was the preparation of the students
- How well the students involved the audience
- Attention appropriate to the tone
- Anticipate questions and be prepared with the answers

When analyzing the method of transmission, it is important to use a combination of assessment methods and consider:

- What do you want your students to know and be able to do and what is the best way for them to demonstrate this?
- How can you evaluate the assessment methods used and the assessment experiences of your students, to help you make further improvements?
- How has each student achieved the objectives of the activity and the individual learning objectives?

What are appreciation and grading descriptors?

Descriptors are generally accepted as a benchmark for students in understanding the requirements and standards related to the assessment task.

The descriptors were introduced into higher education in order to increase the transparency of the assessment standards.

They describe what standard the student must achieve in order to reach a certain level. Table 5 gives an example of the descriptors, which are generic enough to allow you to modify the assessment as you wish.

Table 6.5. Generic level descriptor examples

Level	Description
High level	**Excellent performance**, deep systematic and comprehensive involvement in the performance of the assessment task, brilliantly demonstrating: • a superlative mastery of the discipline, supported by plenty of evidence and quotes, which reflects a deep and wide knowledge and understanding, as well as a wide reading. • an outstanding ability to organize, analyze and express ideas and arguments in an original, sophisticated and discriminatory manner • optimal capacity for critical analysis • excellent mastery of competences, tools and processes • it is possible that the design / programme / prototype will completely exceed the specifications • the student showed a profound perspective, originality and creativity • well-planned solution
Intermediate	**Pretty good performance,** substantial involvement in the performance of the

high level	assessment task, which proves: • deep understanding of the subject, well supported by relevant evidence and quotes • well-developed ability to analyze problems, organize material, present clear and convincing arguments • partially planned solution • good mastery of skills, working tools and processes • the design / programme / prototype works correctly in most situations • parts of the specifications are not fully implemented • some original perspectives and the capacity for creative and logical thinking
Intermedite low level	**Average performance** in terms of carrying out the assessment task: • basic understanding of the subject, but somewhat lacking in focus and structure • the main points covered by the answer, but details are missing • a certain effort to get involved, but only a basic understanding of the topic presented • certain development of critical awareness argumentation partially displayed without providing relevant evidence or quotations • average competence in using the tools and carrying out the processes • the design / programme / prototype is not fully functional • parts of the specification are not fully implemented • defective drafting • lack of evidence of original and logical thinking ability
Low level	**Hardly acceptable performance** in terms of the assessment task: • derivative and lacking evidence regarding logical thinking ability • limited focus on the question asked • basic framework / weak response structure developed • evidence of unclear presentation of the arguments, random aspect, with certain omissions or inconsistencies in response • appearance of unfounded statements, without relevant quotations • answer presented rather descriptively than argumentative or analytical • lack of a detailed explanation or critical reflection • partially planned solution • a barely acceptable mastery of competences, tools and processes • non-functional design / programme / prototype • parts of the specification are not fully implemented • defective drafting • lack of genuine thoughts on the application of the programme • incomplete response or provided in a hurry

When designing assessment and grading criteria, it is important that the tutor / facilitator provide an indicator of the grade and descriptors needed to meet it.

In order to carry out an authentic assessment within the PBL, the teacher will design the assessment process in its diversity, focusing on the following aspects:

- Adaptation of the strategies and methods of assessment to the specific of the PBL (oral assessment, written assessment);
- Elaboration of assessment criteria;
- Assessment within the monitoring of the problem solving process;
- Use of various assessment tools: progress report, observation sheet / assessment grid, etc.;
- Self-assessment;
- Assessment of the product and process by the teacher;
- Documenting the work process through the attendance sheet indicating the activities carried out per person, photo / video documentation, useful links, bibliography, minutes;
- Current and final reporting of the work through PowerPoint presentation, narrative report, product achieved;
- Assessment through descriptors;
- Difficulties in assessing group work

One of the efficient methods of assessment is the current and final reporting, which can be done based on the following algorithm.

Table 6.6. Assessment plan

Learning outcome to be assessed	• Complete each step of the PBL process to address the identified PBL problem • Look for and identify relevant knowledge to enable you to complete the PBL process for a problem faced by business professionals • Apply this knowledge to address the identified problem • Become an effective manager
Assessment method	Written report
Details of the assessment task	The student will be asked to write a report detailing how he or she has approached each stage of the PBL: 1) Define the problem as you see it 2) What are the possible solutions and why are they appropriate? 3) What is your favorite solution and why? 4) What are the learning goals you want to achieve and why? 5) What data did you collect to achieve your learning goals? 6) What research methods did you use and why? 7) Explain how you have achieved each learning goal 8) Synthesize the information from the closing session into an action plan.
Presentation	The student will be required to submit a written

	document: • After the opening phase of the PBL (points 1-4) • After the closing phase of the PBL (points 4-8)
Classification descriptors	Level 1: • The student will demonstrate excellent knowledge for each PBL stage and successful approaches to complete each stage. • They will use high quality sources to build a comprehensive and implementable solution. • They will demonstrate an excellent ability to think logically and innovatively and they will also demonstrate an excellent ability to connect concepts and ideas to build a solution. Level 2…. The student…
Grade / share	40% of the total marks (the share is established by the teacher)

	**Tasks** • Tell about the different assessment methods • Describe the ways of observing the practical activity of the students • Analyze the training possibilities of mutual assessment • Analyze the relationship between criteria, indicators and descriptors in assessment • Compare the advantages / disadvantages of individual and group assessment • Compare the advantages / disadvantages of written and oral assessment • Argue the need for self-assessment in professional training • Appreciate the need to apply various assessment methods
	**Synthesis and transfer** • How will I motivate students to self-assess? • How will I organize and monitor mutual assessment? • What criteria and performance descriptors do I have to develop to assees students? Based on which benchmarks will I develop these criteria? • How will I perform the individual assessment and how will I combine it with the results of the project presentation?
	**Reflection** • Which assessment method did I hear for the first time and what should I study for more clarity? • Based on what will I develop the assessment criteria and how will I formulate the descriptors to make the assessment as objective as possible? • What should I focus on in order to develop and apply a good assessment strategy?

	• By what will the assessment strategy be distinguished in the PBL from the assessment strategy applied by me so far?
Conclusions	**How we assess** is an important aspect of the assessment, which reflects the practical operational aspect of this process. Knowing the assessment methods, understanding their essence, but more importantly, selecting and applying them at the right time and place in the assessment process, is the key to the success of the training process. In order to be able to successfully apply the PBL teaching strategy, the teacher will have to develop and apply an assessment strategy in the PBL key.

BIBLIOGRAPHY

1. Ionescu, Șerban 14 abordări in psihopatologie. Trad. de Bogdan Bălan. laşi: Polirom, 1998. 256 p.
2. Lista tabelară a bolilor ICD–10–AM. Clasificării internaţionale şi statistice a bolilor şi problemelor de sănătate înrudite, revizia 10, modificarea australiană (icd-10-am). Centrul naţional de clasificare in sănătate, 2002 http://www.hosptm.ro/files/drg/icd-10-am/_cuprins.pdf (vizitat martie, 2015) Paris, Joel Ghidul DSM-5 pentru clinicianul inteligent. Ediţia întâi. Trad.: Manuela Sofia Nicolae. Bucureşti: Editura Trei, 2015. 351p.

ANNEXES

ANNEX 1
Assessment of individual performance in groups

The name of the person you are assessing: **Your name:**

Group name:

For each of the assessment categories below, place an „X" in the box that best indicates the extent to which you believe the statement describes the person you are assessing. Complete one for each member of your group **and** one for you. The forms apply at the beginning of the class on the date indicated in the programme.

		Totally disagree	Disagree	Partially agree	Agree	Totally agree
1.	Did not miss the activities of the group by absenting.					
2.	Did not miss the activities of the group by being late.					
3.	Completes all the work assigned by the group on time.					
4.	Comes to class after reading the material needed to enhance group discussions.					
5.	Listens carefully to others' presentations.					
6.	Contributes to group discussions.					
7.	Does not dominate the discussion / Does not place in the foreground during the discussion					
8.	Provides new and relevant information for group discussions.					
9.	Uses the appropriate resources for researching presentations.					
10.	Presents logical ideas and arguments.					
11.	Asks questions that lead to a clearer and deeper understanding.					
12.	Communicates ideas and information clearly / concisely.					
13.	Helps to identify and implement ways in which the group can function better.					

Please make a general assessment:

1. Excellent - Exceeds expectations

2. Good - Meets expectations

3. OK - Improvement in certain key areas required

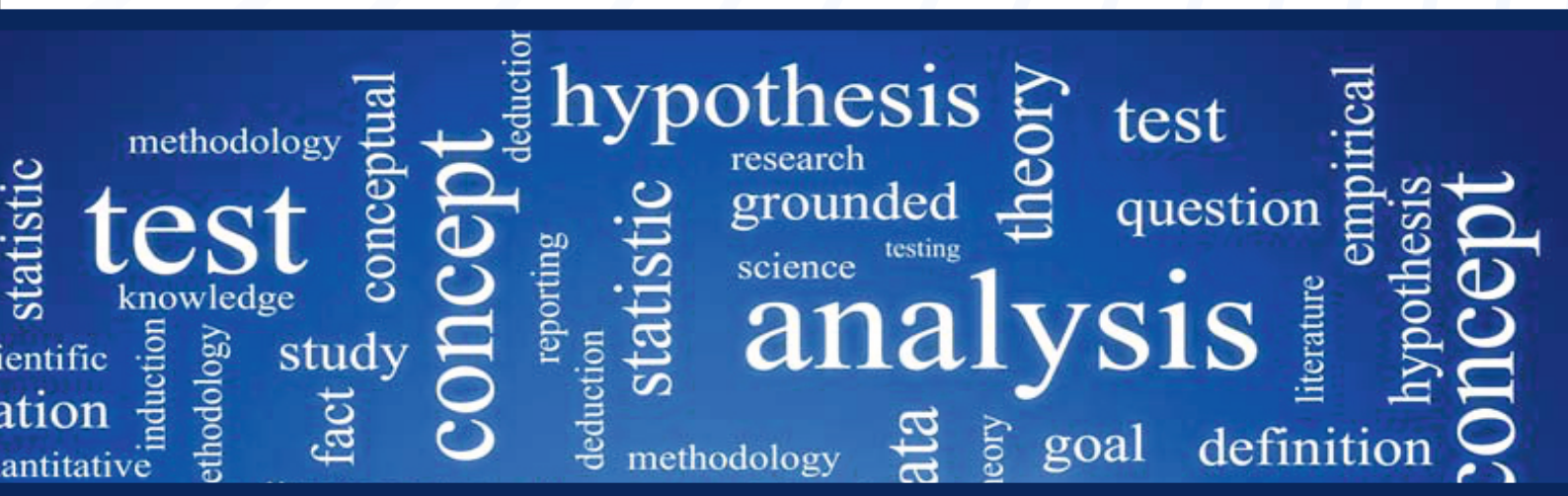
4. Major improvement is required

Use the back of the form to answer the following two instructions. Connect your answers to the above ratings as appropriate.

1. Describe the ways in which this person most helps your group learn.
2. Describe how a change in this person's behavior could improve your group's learning process.

Tell me and I forget,
Teach me and I may remember,
Involve me and I learn.

Folklore



CONTACT INFORMATION

Larisa Bugaian
National Coordinator
Technical University of Moldova
Stefan cel Mare 168
Chisinau, MD-2004, Moldova
Tel: (+373) 22 23 37 05
E-mail: larisa.bugaian@adm.utm.md
www.pblmd.aau.dk