



Models of Qualitative Changes in Academic Education

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change training, university education, knowledge construction, cognitive education, educational curriculum.

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ABSTRACT *In an educational context, for a pragmatic philosophy where knowledge means use, appliance, identification and solutions to problems, a theoretical instruction dissociated from the ability to act and apply is not enough to get information. Such an opinion is favorable to develop education deeply and permanently connected to reality, having the purpose to promote economical and socio-cultural progress, with a major active role in social life, focusing on knowledge and action and the interaction between the two notions so as to teach students the ability to solve practical situations in their future professional career. In other words, to prepare specialists with intellectual and professional competences who will find a place in a widely scientific society based on knowledge and will be successful in different domains after graduation. Maybe this is the reason of replacing the old paradigm about "the content" of education and "to know" with "curriculum" giving importance to competences, abilities then "to know how to do and "to use what you know". It is obvious that this thesis asks for a new consideration of individual training which will eliminate the old dichotomy between theory and practice, between "to know" and "to do" and which implies a more harmonious learning, a more balanced education where information should combine with practice, theoretical studies should be used in high specialized training to prevent narrow-perspective technologies while the general ability to independently think and act should be the most important objective.*

To properly and fully integrate and apply the theoretical information and the corresponding methods is, surely, the main vector in the qualitative academic change of training and education as, the problem is, to put into value the priceless contribution of practice to personal cognition and manifestation.[5]

A modification of the concept was determined by a new aspect. For example, for a long period of time, science has been perceived as a static element, something ready-made, a sum of information and stated facts, a total of finite products, often considered to be only theories, mathematical formula, various projects or life facts. It was a concept inherited from an old historical period when science was only contemplative, when the idea was to build an ideal world not to change the existing one.

The present day acceptance, knowledge is not science yet, the same way a person having a lot of information cannot be named scholar. Knowledge is only a part of science, a product of scientific activity resulting from a consumed research process. This result taking the form of "knowledge" goes further in a "productive process" to create new ideas. The process goes on with new scientific activities, in a practically endless cycle of scientific "production". Therefore, contemporary science doesn't mean only knowledge in itself but also it is a permanently changing aggregate, an emission of information, something that is continuously built, a long training of thinking and introspection, a perpetual fight with the unknown, an act of creation ideas and a way to get to them, as G.N.Volkov says[14]. Knowledge appears and develops when thinking functions of human activity become objective in point of concepts, ideas, theories, laws, principles etc. This type of products transforms into special tools to see and change reality. In other words, science is not what is already known but what is going to be discovered, it is research and experiment, information and use of natural and social laws. Contemporary science is not only pure knowledge but the activity of a society to produce knowledge.

What will be the effects of this new constructive opinion?

It is obvious that, if science is limited to knowledge, to its products, teaching will present science as a product and education will mean only communication and assimilation of information and ready-stated data. And vice-versa, interpreting science as a process and a method, without underestimating the importance of products, implies the assimilation of science as a process and a method to explore reality, to search, to investigate and to create ideas, all new for the student, but familiar and obtained by the rest of people after personal efforts. According to modern psycho-pedagogy, getting knowledge is the aim of the subject who knows, of the student participating in the learning process with personal efforts. It is a reason for teaching and learning to move towards functional cognition and affection, more than focusing results and products.

Such an effort to produce knowledge is seen as part of a much more elaborate process, that of educating student through knowledge. Cognition directed to the individual, starting from the person and coming back to it, with cumulative effect and permanent mutations, makes possible a spiral evolution of every human spiritual personality profile.

It is very clear that because of the rapid evolution of information and of the society, in general, many of the things, in theory and practice, which are good today to be out-of-date tomorrow. The tendency is that, in a period with so many technological mutations and new forms of organizing work, specific competences lose actuality. The need to modernize and to permanently learn will be more significant. But the most important fact is that the need to know and react in society with all its members will be different from now on. Other problems will have to be solved, future will give new challenges; no matter how good the theoretical education is, the selection of corresponding information and a proper use in new situations will be part of a complex aggregate of intellectual competences and special skills, of mental superior structures adapted to the

wide area of adaptability and mobility demands. Credit will be given to training and modeling intelligence, not considered a unique capacity, but a multitude of abilities or types of intelligence – logical-mathematical, linguistic, spatial, musical, kinetic, intrapersonal or interpersonal [6] involved in many domains and to develop the ability to learn, the most human of all.

If intelligence is multilateral, according to Gardner, rating students in point of only one factor is not acceptable. Neither organizing study on the same principle is correct. Hence the function of the university to detect and cultivate favorable directions to fit the student potential, to help mental progress leading to success and strong personality.

Special attention is to be given to the development of exploring abilities, to the ability of detecting problems and their solutions, to improve critical thinking or creative, imaginative virtues. This is, in fact, one of the innovations of modern education- facilitating learning focused on problems created by personal experiences, real and authentic. Transmission of theoretical information, as already mentioned, and of high integrated structures would suppose more mental flexibility, superior levels of abstraction and generalization, of synthesis and transfer which is considered to facilitate the study of more particular materials, many of them included for the first time in the education curriculum. Other skills and abilities will also become indispensable to accede to social performance status, to get a social position and to keep it – multidisciplinary and interdisciplinary competences, the capacity to anticipate, to plan and organize, intuition, enterprising spirit, initiative, creativity.

All these are present in association with other capacities such as: to have a co-operative and constructive team work, to communicate in a clear way with the others, to have productive dialogues, to be open to the things around, or in association with other human qualities: strong will, courage and self-confidence, tenacity and responsibility, independence in decisions, social integration, resilience to stressing situations. The options, priorities, values and finalities in education will be different and they will give a new shape to learning. The development of superior cognitive functions tends to become a fundamental priority and to represent the solution for an efficient education. In the future, cognitive education can be the main cause to reconsider pedagogy in the first decades of this century, an attempt to find opinions and solutions to contemporary education.

The only problem is: How these superior mental structures could be developed?

A first answer will be: by action, meditation and meta-cognition. These are the solutions given by the sciences about humans and society, which are different from what psychology says. The ideas suggest that cognitive development include the actions of a subject (activism), the surrounding influences, mainly social meditation and cognitive learning.

An explanation for the theoretical sources of the activities that stimulate and develop these features is to be found in the research works of:

- Piaget- who thinks that intelligence is given by the whole activity a subject has (psycho-genetic constructivism);
- Vigotsky and Bruner – disciples of social mediation (so-

cio-genetic constructivism);

- Flavell, Stenberg, Brown, Campione and Borknoski – promoters of meta-cognition in education.

Having this goal to develop superior cognitive capacities, education could offer solutions with permanent, natural, preoccupations to design the contents of learning, to stimulate and develop abilities to study the suggested subjects or materials but, especially, to promote new instruction systems (models) based on high procedures, more formative strategies to better emphasize the intellectual potential of those in the process of education.

Tightly connected to these evolutions, there is a more particular need and desire to study more and to embark upon individual study as a tendency to create another style in life and education – something based on the permanent attempt to learn more and more. This means a reconsideration of “to do”, “to be” as elements of advanced learning, an appreciable effort that leads to self-education and independent study. These systems of auto-didacticism will certainly expand because this method to get informed is more suitable to personal needs to instruct and improve instruction, to reach a goal, each individual being able to use and perform its own abilities and skills. Doing this, the individual can become the author of the personal mental, cultural and professional progress, to have a more active role in self-evolution.

In psychological and pedagogical point of view, to make this attempt possible is of significant importance – adopting a new qualitative stage in attitude towards learning, a start in familiarizing the young with self-directed study, showing superior initiative and responsibility and being able to integrate the specific trends of contemporary society. This is why development of learning and study of learning are priorities in postmodern education.

No matter how far cognitive education goes, one mustn't forget that a progress of intellectual capacities cannot be separated from the progress of emotional capacities, from the evolution of theoretical, reasonable thinking, of growing emotional intuition and sensibility, of mental work and all affective and emotional feelings that support and give life to this human activity. This is because no cognitive attitude can exist without emotional notes. In other words, it is possible to say that cognitive education has not only cognitive objectives but also educational ones, to improve cognitive capacities using positive personal characteristics such as: a particular want to succeed, a better image of oneself, aspects implying emotional motivation that guide individual behavior. In this case, emotional knowledge is a complementary, compulsory part of scientific knowledge, emotional intelligence will be always present in the development of other forms of intelligence and cognitive education will go with a corresponding emotional one.

According to these, a progressive transformation of educational processes is expected, leading to forming high level qualities and competences.

The first level, the cognitive one, is made up of constitutive elements with immediate action: information, data, notions, ideas, theories, mental operations, intellectual and psychomotor abilities, distinctive factors of general, basic education and, at a certain age, giving the quality of individual professional, specialized training.

Different mental faculties are associated to the mentioned

elements and these are perception, memory, thinking, intelligence, imagination, resolving capacity, speaking function etc., a sum of complex factors to assimilate and improve personal acquisitions.

The second level, the meta-cognitive stage, includes meta-cognitive knowledge about personal acquisitions, personal way of thinking, memorizing, understanding etc. It also contains capacities to understand and explain personal mental processes, the progress in learning, capacities to realize and direct personal learning to which self-observation, self-control and self-regulation, orientation of study are added. In conclusion, it can be said that this level is made up of elements with long term action, functions and capacities dealing with the consciousness of personal knowledge and its future gains.

The third level, the paradigmatic or epistemic stage, assumes capacities for scientific investigations, specific capabilities to initiate and manage a scientific experimental project in a particular domain, abilities to show scientific spirit, to search, discover or invent solutions or alternatives etc.

At present, the informational model created and organized on a cognitive paradigm assumes information. It is the result of rapid passing to another historic era, the information and computerization era, which influence is noticed everywhere. It is the time of computers and artificial intelligence, of the individual perceived as a "super-computer", a center to work with information on the idea that knowledge is power.

This model is not about acquisition of knowledge but about asking students to understand information and then use it for developing personal acquisitions.

The starting point of the model is a new construction of learning, a reevaluating it in point of how notions are processed, now considered a superior form of conscious work on information, an internal process to modify, organize, collect and dispersal this information. The activity employs processes and mechanisms as: reception, conceptualization, encoding, memory, formalization, transfer etc., to finally create cognitive structures (representations with different levels of abstraction and generalization – data, concepts, definitions, laws, theories etc.), solid elements, and operative as well, in the academic course of processing new information which leads, from remaking elements to the creation of personal knowledge, to mental conceptual structures, able to manage specific cognitive processes, to teach students meta-cognitive strategies (awareness of personal ability to work and control information), where students can accomplish and improve their learning capacity.

We refer to another kind of intellectual constructivism inviting students to participate and adopt another method of learning in order to have an active, constructive role in a process determined by cognitive strategies, to manage and work with information and different mental activities involved in the process. In such a situation, the teacher would be, in fact, a source of schemes and structures to remake the information later used in didactic career.

This is the reformed face of the new didactics, a cognitive didactics starting from information and based on knowledge and the subsequent products.

A further approach is interactive-creative learning, a progressive activity, starting with the receptivity for newly found experiences, solved by exploration, analysis, deduction, synthesis, generalization, abstraction, particularization, emphasizing the correlations among elements and implying a minute intellectual, psychomotor, emotional and volitional work.

Within the process of interactive-creative learning, the student discovers, imagines, concludes, construct and redefine the meanings, according to personal thinking, creation and psychical consideration of processes. It is the result of individual and collective efforts, of inter-connections in a group, of social communication in finding new realities. An individual who learns in an active way is the "personal initiator and organizer" of learning experiences, able to manage personal acquisitions in a systemic method. Practicing this type of learning, teachers encourage students to build personal study schemes, to assume learning responsibilities by realizing, applying, (self) evaluating, organizing and becoming independent in personal development. [1].

Interactivity is based on mutual relations and refers to active learning when the student works on information to make it a new, personal, internalized element. In a constructive meaning, the student creates new significations when exploring the world around, maybe the educational one, solving problems and/or using the already known information in new circumstances.

The principles used to build interactive didactic strategies are:

- Students have personal projections of meanings and interpretations of education.
- Education aims are discussed, negotiated, not imposed.
- Methodological alternatives for teaching-learning-evaluation are promoted.
- Learning tasks will ask for interdisciplinary information and multidimensional
- analysis of reality.
- Evaluation will be more reflexive than criteria based, including alternative
- methods of assessment.
- Discovery learning and problem solving are encouraged.

Interactive learning is a process of creating meanings taking into account new information and prior knowledge, of changing the cognitive structures of a student after the acquisition of new elements (information, skills, abilities) using intellectual and psychomotor efforts in the activity.

The characteristic of the active-creative process is, in some authors' opinion, "not problem-solving but problem-finding. The term problem-finding becomes a synonym for questioning. Questioning/generalization and discovery of problems is the very substance of the creative process" [4].

New postmodern tendencies can lead to the development of investigative spirit, of divergent thinking, of active, creative attitude in school and they can be enumerated as follows:

- encouraging the student to ask more and more information;
- reducing the factors of constraint and frustration;
- causing communication in organized students-teacher

- ers discussions, debates;
- activating students and asking them to operate with ideas, concepts, objects in order to create new configurations and alternatives;
- cultivating of cognitive independence, of spontaneity and autonomy in learning;
- developing the constructive critical spirit, the ability to debate and find solutions;
- facilitating self-access to information, cultivating reflexive attitude on learning;
- having the possibility to question what is "known" and "unknown" in things and activities.
- When projecting active and creative learning, professor Sorin Cristea [3] suggests an anticipation of "open managerial strategies available in time and space" by:
- explaining the purposes of creative learning in the context of the existing
- inter-action among intellectual efficiency- academic performance- permanent
- re-consideration of teaching-learning-evaluating activity;
- determining of teachers' responsibilities in creative learning (by individualizing
- the didactic sequences in different acceptance manners, cultivation of a winning
- mentality, encouragement of spontaneity, stimulation of maximum/minimum
- potential, alteration of superficiality);
- creating the best emotional atmosphere to gradually defeat the blocking factors
- (fear, pressure, imitation, conformism, criticism, anxiety);
- complete psychological capitalization of teacher-student connection in all its
- educational aspects: intellectual- moral- technological-aesthetical-physical.

The impression created by the teacher on the auditorium is a vector that affects the learning behavior of the student. To have a good atmosphere and a productive cooperation between the teacher and the students, to create conditions of exigency and understanding with affective, responsible notes is a necessity to keep the auditorium connected to the learning process.

A creative teacher gives students the possibility to express freely, fearless, with open, friendly, flexible attitudes, having positive and receptive positions in front of the students, appreciating good ideas but not mocking the failures. Student will be encouraged to express curiosity, indecision and desire for information. The productive atmosphere is facilitated by the fact that, the teacher is always interested in what students have to know, considers the opinions of the others, supports students' belief in their valuable ideas, involve students in evaluation activities, giving them criteria and time to appreciate their work.

To stimulate students' activism and creativity, the teacher must be also a creative, active person, to have positive conduct and attitude. Interactive education re-considers the roles and functions a teacher has. A list of these features is done by Muşata Bocos as follows.

A teacher is:

- an educator who is not imposing scientific information but "creates devices to be
- used in learning", using differentiate and individual pedagogy;
- a designer, a tutor, a manager, a moderator, an organ-

- izer and an administrator
- of contents, activities and learning experiences;
- a mediator in student's process of education in heuristic conditions;
- a facilitator of learning and self-development;
- the student's counselor, giving support in learning;
- a partner for the student in an interactive educational relation;
- a coordinator of students' work;
- an animator, an active factor, a catalyst of developing, communicating activities,
- of interactions and inter-individual exchanges;
- a scenic artist who prepares the conditions for efficient learning;
- an actor in the instructive process;
- a thinking tactician to help the student build knowledge on continuous mutations;
- a reflexive person, before and after the teaching act, promoting reflexive thinking and teaching;
- a co-evaluator, together with the student, of the learning process and its product.

A creative teacher knows how to use questions [1]. Every creative act starts with some questions which have to be clear, logic and not to suggest predetermined answers. The operational question leads to a creative attitude because of the exploration it causes, develops curiosities and, of course, creative learning.

According to C. Rogers, the main source of creativity is the individual tendency to personal update and use the existing potential. The psychotherapist believes that each of us has this tendency to self-actualize and we wait for favorable conditions to manifest and express in specific ways. The motivating, interesting activities correlated to students' desires and aspirations will stimulate development in "close areas" and will facilitate learning [9].

The stimulation of student's personal effort is important for the development of activism and creativity in learning, alongside with the stimulation of the tendency to have own contributions, to be original, innovative, imaginative. The teacher's mission is not completed at the end of the lesson, it continues outside the classroom, too. The teacher has to know the creative potential of every student and the methods to stimulate it, to observe any creative manifestations outside the lectures, in extra curriculum activities, to show students their own capacity and to teach them how to evaluate themselves.

An important vector in stimulating and developing an active, creative learning is teachers' attitudes to students' creativity and their ability to actively manage problem situations. Students' aspirations, their moral and intellectual values appreciated by the teacher have a stimulating role. What is good, nice and valuable for a teacher will have the same importance for a student, more or less in a conscious way.

It was rightfully said that creative teachers determine the creative development of their students without considerable efforts. The secret lies in the transfer of the set of creative values from the tutor to its disciple, followed by self development and self formation of the latter according to the attitudes and convictions borrowed from the teacher and being now "his". In a similar way rigid, conventional teachers will react relating to their students. Non creative educators will not accept the attitudes of a creative student (independence of thinking, problem analysis, curiosity,

contradiction spirit, non-conformism- in the limits of common sense, etc.) stopping any tendency to innovation, but they will have difficulties in finding highly patented creative students because they always underestimate the students.

A good teacher permits students to assume intellectual risks, to speculate, to make unusual associations but will give them support in frustrating situations, in case of failure, uncertainty and ambiguity. It is a good idea to provide students with informative, explicative materials.

"Creation, as an activity of the mind, leads not only simple corrections of the existing cognitive structures but also to the occurrence of new ones" [14].

In education, a change attitude towards student is necessary. The student must be seen as an active and creative participant at self development and the particularly done progress in a changing social, economic and cultural society. Students collect information in more and various sources while universities have to update knowledge and methodologies, too.

It mustn't be neglected the fact that the abilities for an interactive creative learning, the sooner they are stated, developed and consolidated the more efficient they are in the evolution of superior intellectual capacities and of the necessary abilities for an act of creation. It is not enough to manifest a creative attitude, it is necessary to systematically learn the techniques and the instruments to produce something unexpected"[7].

The university in the future will surely be a cybernetic university, a "vivid" laboratory of computers, an inter-disciplinary school where students will be trained to become problem solvers, creators of the new and suitable persons to take correct decisions in special, original situations of social life now and tomorrow.

The main objective of "over industrialized" learning, Alvin Toffler says, "is to increase individual capacity to adapt, fast and easy, to permanent novelty. The more rapid the changes are, the more attention is required to recognize the type of events to come" [12]. Active and creative is the student who " directly interferes in didactic activity to modify variables and characteristic parameters, who fights for personal reflection, who mentally acts to find, analyze, discover new true values, produces new knowledge and is aware of the fact that external messages and influences act by internal conditions"[1]. It is a perspective on student opposing the old one that looked the student as a passive receptor and imitator of the information given by a professor

Inter activity is a characteristic of that student who becomes a participant, with the teacher, to personal development and is equally responsible for the effects of learning. Having a role of an actor in education, this student efficiently plans personal learning, builds knowledge basis, takes risks, makes necessary efforts, chooses study strategies, to use time and evaluating methods properly. Training students for independent learning makes their inner motivation more valuable, brings to life the desire to explore, to find, to experiment, to discover, to create and invent. The active creative student "has critical and creative actions, personally and socially works to get new forms of knowledge."

The active creative student is audacious in critically appre-

ciating a product, is independent in treating and analyzing problems, has an argumentative ability, is free in mind and behavior. Many times, such a student disturbs the class and the conservative teachers. In Dictionnaire de la langue pédagogique, P. Foulquie notices the fact that "in auditorium creative student is often seen as a threat - first, a threat for order and discipline, then a threat for the teacher's lecture" [3]. This student is out of predetermined patterns when activities are boring, tedious. The teacher has to take advantage of the student's need to know, to find new information and to direct all these energies in constructive ways by offering various occasions to develop, to progress and to discover.

The non conformist attitude always present in creative activity mustn't be appreciated by the teacher as an insolent behavior, an impolite gesture lacking respect. It mustn't be treated in a negative way of rejection and subjection but, on the contrary, a favorable climate of free spirit manifestations must be established.

Active and creative student works independently, thinks on long terms notes, has no cognitive barriers and has an unusual desire to explore and create. The young belonging to this category are less interested in team work and have a tendency to draw individual working plans, or involving a small number of friends.

The researcher E. P. Torrance stated that the following attitudes as indicators of individual creative activity of a young person: he can spend time without any suggestion; he wears particular clothes; works more than he was asked to do; finds simple things very amusing; his frequent words are "why" and "how"; he likes organizing competitions in the schoolyard; he enjoys speaking about the things he discovered or invented; is not afraid to try new things; uses all senses in observation [13].

A particular attitude the young and the adult potentially creative have, no matter the domain, is" the vivid interest in new information because of their high level of activism. There aren't uninteresting things for these people, the things are more or less attractive according to the person who analyze, who interpret and evaluate them, and the way of doing this" [10].

The interactive didactic strategies are known to be efficient methods to stimulate the creative potential of the individual and of the group, as well, promoting a methodology based on practicing superior cognitive capacities of students and developing multiple intelligences.

Conclusions. It is obvious that different systems, with different potentials to explain, to solve, to determine, to explore sustain with different arguments the transformations in education. To know these systems is essential in changing perception on learning and gives us a sensibly new image of the methods of academic education.

Some systems have a predominant cognitive vocation (informative); others have an active, pragmatic character; there are some with formative, educational finality. Some of them kept the idea of communication and they will give importance to words (instead of things, facts and experiences); some others, on the contrary, will take characteristics met in scientific investigation and they will cultivate specific attitudes and qualities. More than that, some systems enables performance in certain domains while others are efficient somewhere else; some give priority to indi-

vidual development, others to social progress etc. For all these, knowing represents the substance of learning and reflects the priority university gives to truth. Difference is made in point of the possibilities to get to individual structure through different learning experiences, specific methods and to subordinate, one way or another, instruction and learning to the large process of education.

In the end, it is worth mentioning that modern didactics is not against alternative systems, either complementary or compensatory, but sustains a pluralist approach, of various different solutions to obtain dynamism and flexibility and to create an antidote to educational conservatism, uniformity, monotony and routine in teaching-learning activity.

Such a type of poly-modal didactics belongs, functional and constitutional, to a whole, modern education, opposed to extremist or exclusivist pedagogy. This attitude could be compared to a renunciation to what is known as being "Procut's bed", that is, to the numerous didactic dogmas.

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