

Learning: a Hard and Joyful Process

A Cognitive Based Approach to learning and Teaching

Faculty of Business and Management

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1. Introducing the topic

Improving the productivity of Higher Education is an ambitious objective worthy of enhancement for several reasons.

One of the main components of such an enhancement is the curriculum and how this curriculum is introduced.

The term «curriculum» is used here in its educational sense and includes the list of courses that form its content, the teaching methodology, the objectives of the program concerned, and the assessment approach.

Disregarding some rare exceptions, related to curricula and teaching methodology in Higher Education remains VERY conservative.

Innovations touch in general on:

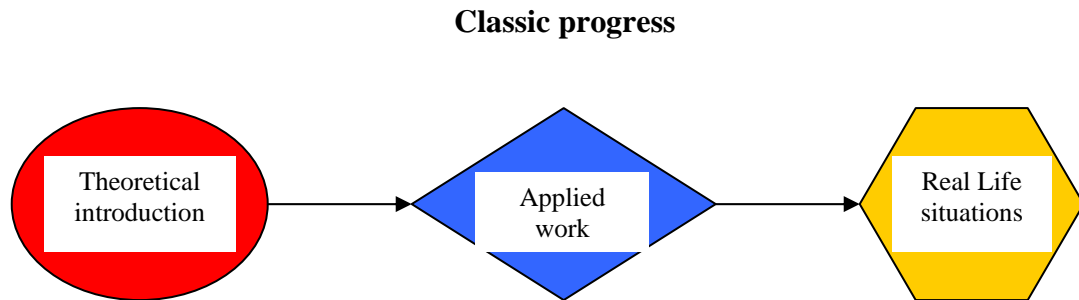
- (i) the content that evolved with the evolution of Science and Technology, and
- (ii) some techniques of teaching that followed the advancement of the Pedagogy.

The end of the twentieth century saw a breakthrough of the Cognitive Psychology and its repercussions on the educational world.

Few pedagogues were concerned with the drastic changes that Cognitive Psychology was to bring to Applied Pedagogy. In what follows, I will present the specificity of the Cognitive approach and its relation to the Learning process, and I will say why adopting such an approach will be at the same time Hard and Joyful.

2. Describing the classical Approach

The classic school adopted the “magister dixit” approach as the ultimate and better manner to introduce notions, concepts, and theory, even if this approach uses different tools for didactical purposes.



Administrators Often regret that the fresh graduate they hire need intensive sessions to become updated and productive.

This phenomenon is due to the fact that the information forming the content of the curriculum has not been acquired by the adequate way that will permit its utilization in real life situations.

This approach gives a lot of importance to the didactical techniques and minimizes the importance of the methodological aspect (which is different from the teaching techniques) which is the basis of any know-how.

This type of teaching:

- i. does not stress the critical thinking method and
- ii. overlooks all the preliminary steps that use the treatment of information and problem solving procedures to change information into knowledge.

Methodologically speaking, there is a difference between information and knowledge. An information which is not treated:

- i. in context,
 - ii. with the proper tools and set of invariables to ensure its operationnality, and
 - iii. with the indispensable symbols to its communicability,
- is not going to become integral to the learner's knowledge.

3. Describing the specificity of the Cognitive Approach

The Cognitive approach that I present is based on the original works of Gérard Vergnaud.

Cognitive Psychology combines:

- i. the Developmental issues (physical, intellectual and emotional),
- ii. the Language impact (at the communicative and pragmatic levels), and
- iii. the construction of Knowledge (in Concepts acquisition as well as in Information Treatment).

Any evolution in Knowledge is an evolution that continuously takes all these components into consideration and creates an educational atmosphere that has the potential to change all the educational practices.

Considering the acquisition of «concepts» as an important constituent element of Knowledge, Vergnaud launches the idea of “Conceptual Field”.

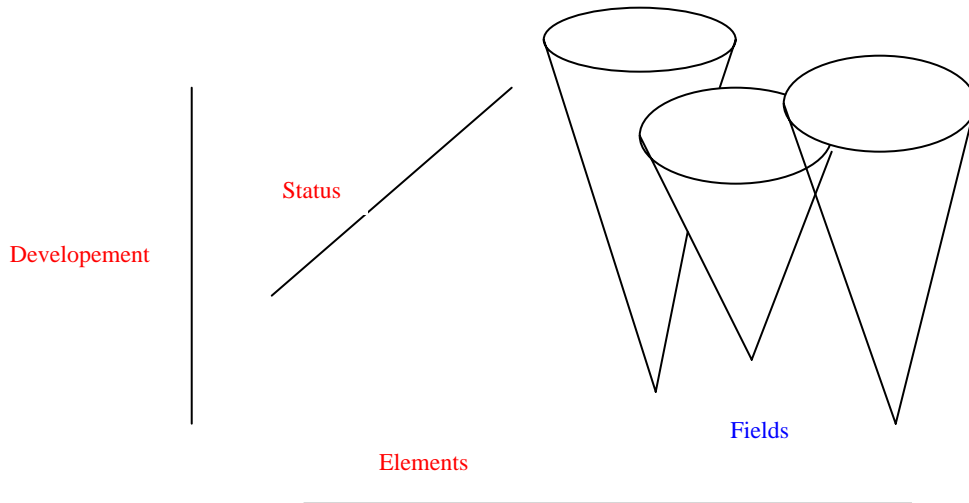
The starting point of the theory is a proper definition of the term concept. A “concept” is:

- a. The set of Situations in which it operates.
- b. The set of the Invariables that make it operational.
- c. The set of Symbols that allow communication and expressions related to it.

The assimilation and the “operationality” of a given concept, depend on combining two dimensions in a specific “conceptual field”. On the other hand,

pedagogues are inclined to opt for independence among disciplines and even sometimes among the different domains of the same discipline.

To illustrate this idea, I propose the following three-dimensional representation model.

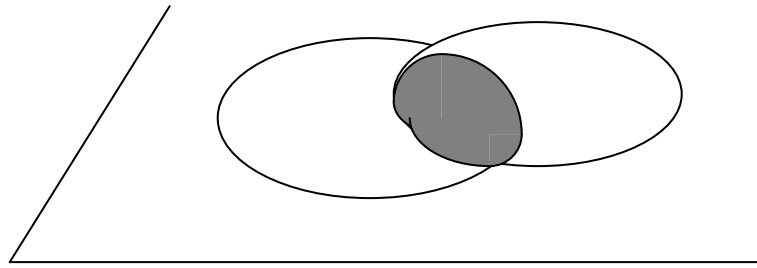


Learning is equivalent to the development of the different conceptual fields. This can be done within the local specificity, taking into consideration:

1. The developmental components
2. The mastery of language
3. The social environment
4. The learner's experience
5. The didactical techniques in use.

Building this conical shape of the conceptual fields is equivalent to the construction of knowledge, and the diagram above shows how these different cones will not develop independently.

The development of the conceptual field (A), represented by the cutting plane (P) will depend on the development of the conceptual field B, and this action is reciprocal. This is illustrated in the following figure:



This is why we have to look to interdisciplinarity as a foundation of any curriculum development.

University instructors have to be aware of the development of different conceptual fields which are the components of each student's construction of knowledge.

4. The main changes to be introduced

A. On the methodological level

Based on this approach, the content for the academic curriculum of a specific major can no more be conceived as a juxtaposition of courses offered in different «service departments» with a concentration in the «department of specialization».

New academic options will have to drive the curriculum engineering process towards new choices based on cognitive tools and on curricular interfaces.

The treatment of information has to be anchored in situations related to the objective of the formation.

The Conceptual Field Theory stresses the preparatory phase that leads to any construction of knowledge. This preparatory phase can not be based on lecturing procedures.

This learning process is based on the individual efforts. It:

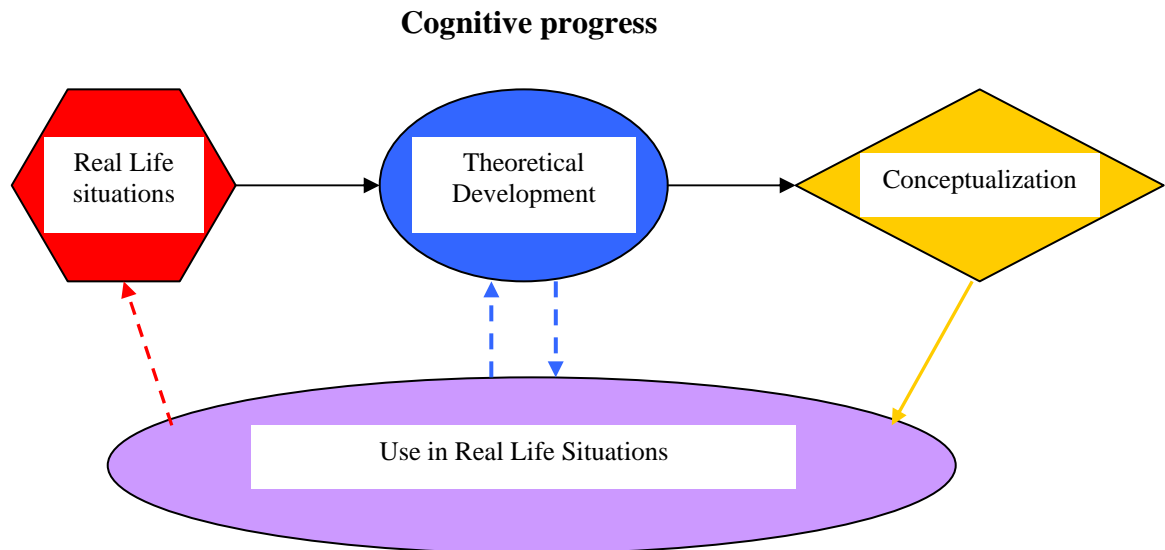
- i. stresses the critical thinking method,
- ii. respects all the preliminary steps in building knowledge in a progressive way,
- iii. uses the treatment of information and problem solving procedures extensively to change information into knowledge.

B. On the operational level

A concept is mastered through its invariables and these invariables are only acquired from experience and from the utilization of this experience.

Through this process the learner will master the different schemes (skills for example) which will lead to acknowledge the adequate concepts-in-act and theorems-in-act that will permit the development of the concept itself.

This is why, experience and its utilization become constituent elements at the basis of any curriculum and not only elements of applied work. The following figure illustrates how it will work



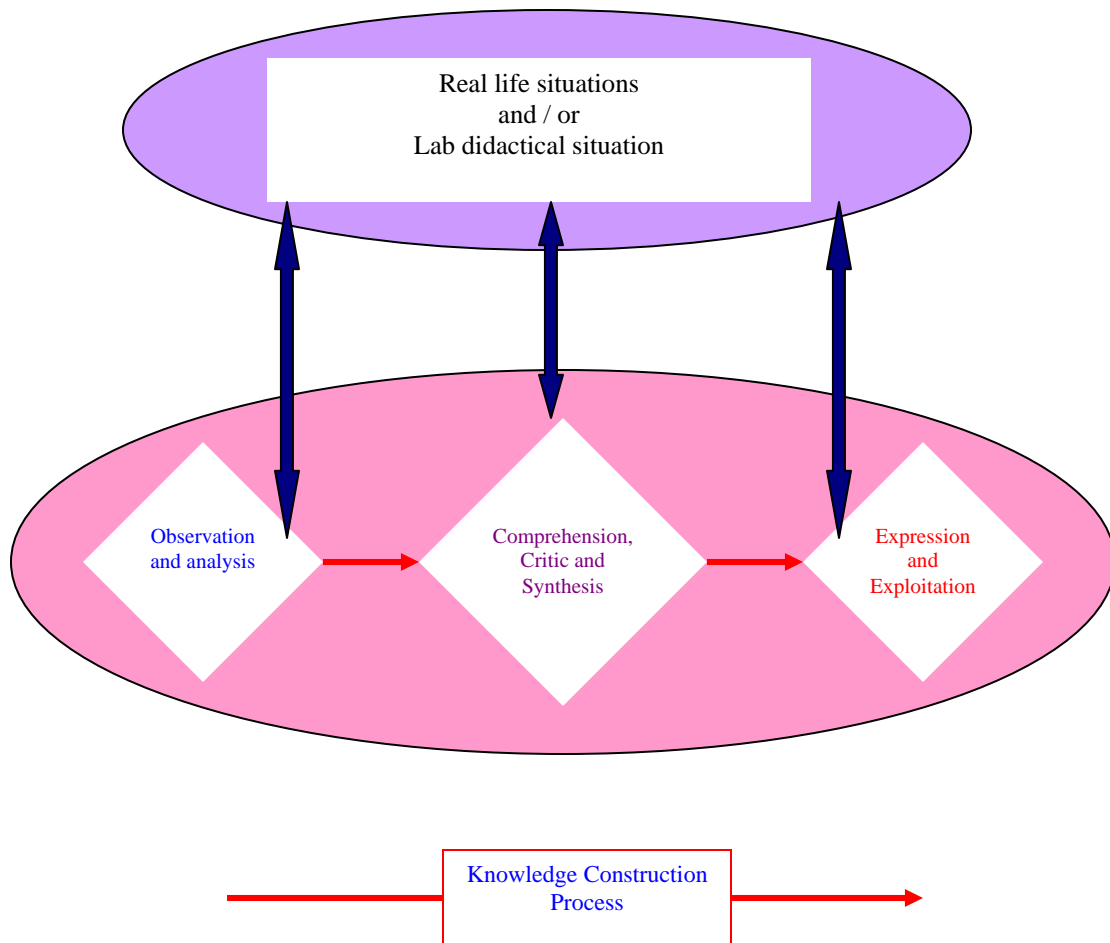
The difference between the classic diagram and the cognitive one is not formal and the implied methodological and operational changes are not simple adjustments of some didactical practices.

The cognitive methods have not yet answered all the questions related to assessment and evaluation. But we can, nevertheless, make the following remarks:

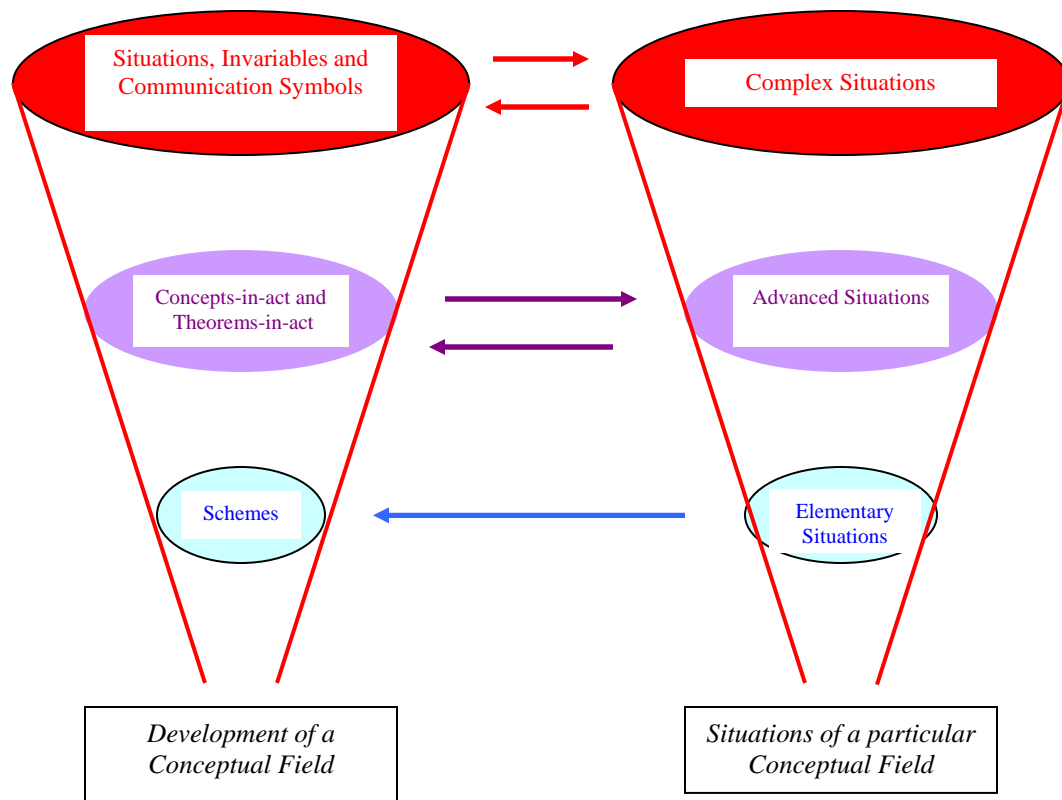
- i. The relation between experience and the gradual acquisition of concepts allows instructors and learners to be aware of the evolvement of the learners' competencies.
- ii. The relation between knowledge building and real life situations helps the instructors to assess the students' potentials in utilizing their knowledge.
- iii. The relation between the different components of a given concept and the relation between several concepts of one specific conceptual field can be evaluated through synthesis tests.

C. Class Situation

To be more practical let us look on the process itself, in a class situation:



Let us look to a typical example:



5. Case Study

I am going to give as an example the curriculum of an Education Science Department.

Let us assume that the objective of such a curriculum is to prepare students graduating with a BA+TD (4 year program) to become teachers in elementary schools, with a possibility to undertake, after a while or immediately after their graduation, an MA degree.

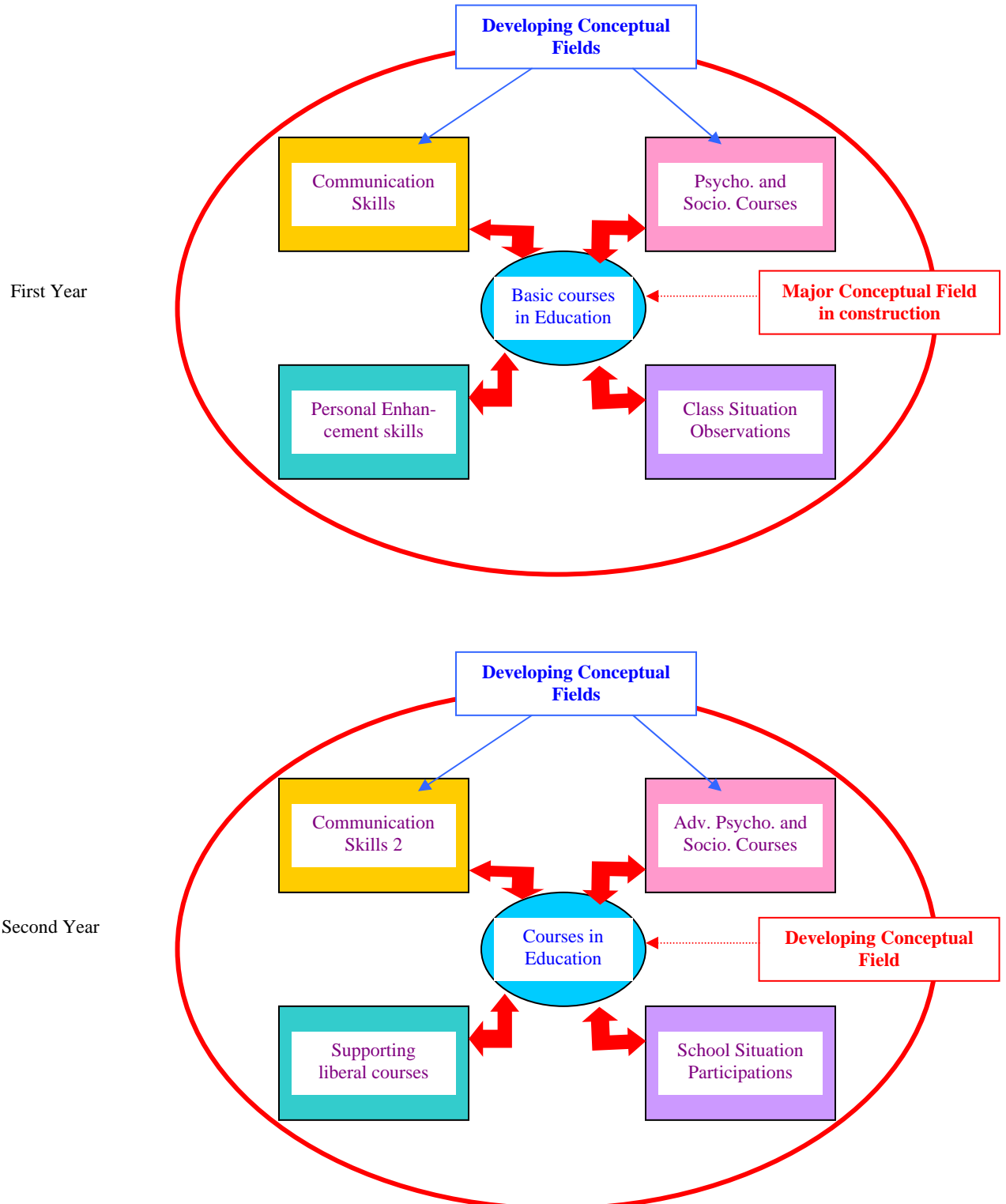
A classical approach will design a curriculum like this:

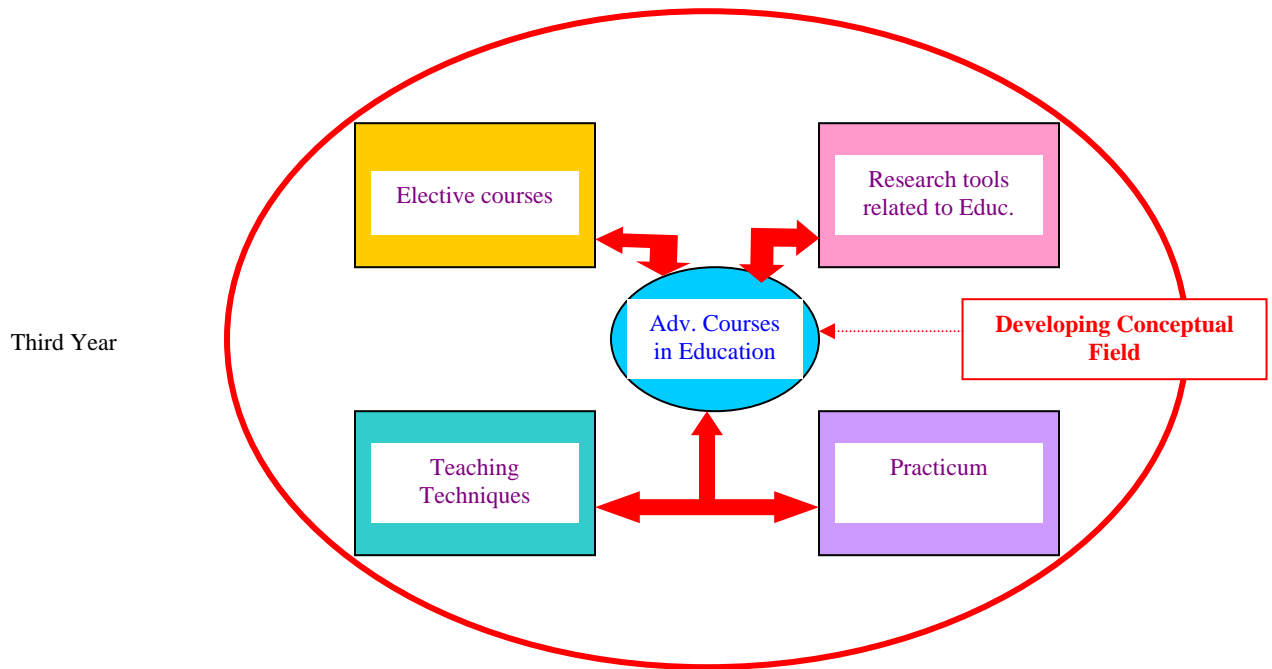
The B.A. Curriculum T.D.			
<u>The University requirements courses</u>	<u>The Department requirements courses</u>	<u>Elective courses</u>	<u>Different didactical courses</u>
Liberal Education Computer Literacy Communication Skills	Education (mainly) Psychology (1 or 2) Sociology (1 or 2) Statistics (1)	From inside or outside the Department	General Introduction Teaching methods for different subjects Observation and training

In this case:

- i. No special attention is given to the students as future teachers. What will be their capacity to perform in terms of body language, communication human skills, resolution conflicts etc?
- ii. The Psychology, Sociology and Statistic courses, when offered, are offered from the perspective of the departments within their own objectives. Each course may give valuable information but will not be integrated with other information coming from any other source.
- iii. The Education courses will cover generally, History of Education, the different schools of thought in Education, some basic principles about curriculum design, school documents and class management.
- iv. The TD courses, offered in a fourth year, focus on different didactical tools for different disciplines under the general title “Teaching...”. Class observations and lessons planning complete the teaching diploma requirements.
- v. The percentage of electives will vary from one university to another. Some universities will give their students the option to go for a minor which may or may not be related to the field Education.

A cognitive approach will address the issue from a totally different perspective. Even if the student does not want to go for a TD, but only for a BA in Education, he/she will have to know the real life situation of Education.





Let us note the following:

- i. The liberal education courses will reflect the acts that the students will have to perform (or at least will have to be able to perform) in a school setting.
- ii. The computer literacy courses will stress the computers as a learning tool especially for remedial use in class.
- iii. Other personal enhancement skills will have to be introduced in terms of conflict resolution, problem solving approach, debates techniques etc.
- iv. The communication skills should not only reflect language mastery, but also, they have to prepare the students to choose their body language, the way they will address the students in different age, the pragmatic aspect of any communication etc.
- v. The Psychology and Sociology courses will stress on how Education can be directed and influenced by psychological or sociological aspects. A critical

- approach to the study of real life situations, and case studies, will be basic ingredients of the students work.
- vi. Introductory Education is an introduction of the complex relation between human development, social needs, knowledge building, logic maturation and communication abilities. Critical thinking is the basis of such an approach in Education courses.

Such a proposal may have the disadvantage of being very compact in terms of the curriculum.

It will be very difficult to adjust prerequisites for two or three semesters within a specific academic year, while it might be easier to plan for offering the courses as co-requisites within the same year.

It may seem also that such a proposal has the disadvantage of reducing the number of electives and of increasing the number of the required major courses.

But at the same time the main advantages are:

- i. To have graduates who are critical thinkers and know exactly the field of their future work, and who have had the chance to enhance their competences during their university formation.
- ii. To have graduates who had participated actively in building their knowledge by linking it directly to real life situations.

6. Hard and Joyful

A. Why is it hard?

It is demanding, for both faculty and students.

A.1

The instructor has to accept that he is a manager of learning ONLY, that he is not the unique reference for his students, and his main role is to be a learning facilitator.

The instructor has to accept the flexibility of the curriculum content, and has to link the content of the curriculum to the learning context of the learner.

The instructor will have to make sure that learners are developing different skills which will help them in real life situations.

The instructor will have to accept to always be challenged by his students, on the basis of Critical Thinking development, and the basis of knowledge changes in all fields.

The instructor will have to adopt a multiface method of assessing and evaluating the learners.

A.2

The learner has to accept to be the main player in building his knowledge, and has to make the difference between knowledge and information.

The learner has to overcome the simplistic idea of the curriculum as a sum of information related to the field of specialization.

The learner has to be aware of the importance of mastering many skills not always directly related to his main interest.

The learner has to be aware of the link between his experience, the information he is gathering and the know how related to his field in order to become knowledgeable.

The learner has to accept being treated as a future responsible in the community and that any assessment of his work as learner will take this into consideration.

A.3

The academic community will have to act as a group.

The academic community has to revisit all the well established formats of any curriculum on the basis of the community needs, the students' backgrounds and the moving arena of Higher Education.

The academic community has to redefine its relations with the real life context as a basis of knowledge and not only as the practicum field of some theoretical information.

The academic community has to rethink the interdisciplinarity within the University in order to put the necessary links between the departments, the courses contents and the methodology of teaching.

The academic community has to experience the compulsory link between knowledge building and different types of research.

B. How can it be joyful?

No JOY without pain!

Leniency does not lead to joy. It leads only to a satisfaction which will not live.

The absence of any tangible results will end by a bitterness towards the University.

Joy is not an immediate result but a life long process.

Only well rounded personalities can enjoy the joyful resulting from painful efforts.

**After all,
Our aim is to build such personalities!**