DEVELOPMENT OF INTERDISCIPLINARY COMPETENCE OF TRAINERS IN EDUCATION FOR SUSTAINABLE DEVELOPMENT. STEPS IN PSYCHOPEDAGOGY

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Abstract

In a world characterized by a "tremendous shift", "education has the difficult task to transmit a culture accumulated for centuries, but also a training for a largely unpredictable future" (J. Delors, 1993). These responses of the education systems launched by the complexities of the contemporary world called "new educations" or new types of content (G. Văideanu, 1996).
The appearing of "the new educations" represented an answer to the global problems of contemporary world, which will emphasize the need to an interdisciplinary approach.
The paper makes some theoretical considerations about the appearance and content of education for sustainable development.
The act of communication subscribes to the effort of focusing the educational measure on competences from the perspective of the expectations of a post-modern society. Therefore, communication proposes of an operational definition for the concept of competence, marking out the dimensions involved in forming and developing of a competence.
We attempt to offer suggestions regarding the achievement of some didactical measures from interdisciplinary type in pre-university education, through a group of integrate modules of some interdisciplinary synthesis (such as team-teaching), semestrial and finals, of a group projects and extra-curricular activities.
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Key words: **"**new educations"; interdisciplinary competences; education for sustainable development; training of trainers

In a world characterized by a "tremendous shift", J. Delors stressed during the UNESCO General Conference (1993), "the education has the difficult task to transmit a culture accumulated for centuries, but also a training for an unpredictable future"(apud Văideanu G., 1996, p. 77). These responses to the challenges of education systems launched contemporary world issues (PLC) is called "new education" or new types of content. "New education" yields new targets and contents. "The novelty of the challenges or problems leads to the novelty of the responses, the same as the global nature of the PLC determines whether inter - or transdisciplinary character of the new content" (op. cit., p. 65).

Among the "new education" there are the following forms of them: education technology and progress, education to media, education in terms of population (demographic), education for peace and cooperation, modern health education, modern economic education; leisure education, education for a new international economic order, intercultural education, education with an international vocation, etc. (Stanciu, M., 2003).

Instead of environmental education (ecologic education) we suggest the introduction, in a broader sense, of **educaţiei pentru dezvoltare durabilă** (Education for Sustainable Development, en, l'éducation pour le Développement durable, fr.) (ESD) as a new type of education specific to postmodern society.

MATERIAL AND METHOD

I. The concept of sustainable development

I.1. Genesis concept of sustainable development (SD)

UNO General Assembly adopted on August the 4th 1987, the Report of the World Commission on Environment and Development, "Our Common Future" (A / 42/427), which defined the concept of SD. By this concept consider the type of development that "meets the needs of present without compromising the ability of future generations to meet their own needs." (p. 24).

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

Summit in Rio (1992) developed an action plan (Agenda 21) in this regard. UNESCO was responsible for the application of Chapter 35 (Science in Service SD) and 36 (ESD) of Agenda 21."

In 2005 the UNO declared the "Decade ESD (2005-2014), the implementation of the objectives that UNESCO had to worry about.

The European Union has developed its own strategy for sustainable development. In a document prepared for this (COM final 2001.264 / 2), pointed out that DD is a long term goal to achieve that the EU should be involved. EU Council in 2006 adopted a new strategy in support of DD, which stressed the indispensable role of education in key skills for EU citizens to achieve the SD (10117/06). Research on sustainable development should promote inter-and transdisciplinary projects involving humanities and natural sciences (2006, 10117/06). The document specifies a set of indicators for SD.

SD is described by three dimensions (social, environmental and economic) and relations between them in time (past-present-future) and space (near, far) (DEDD 2005-2014, Contextes structures et de l 'Education pour le Développement Durable, 2009, *Apprendre pour un monde durable*, p.6).

RESULTS AND DISCUSSIONS

II. Education for Sustainable Development (ESD)

II.1. <u>The Concept of ESD</u>

Christian Lévêque, a reputed French specialist in sustainable development, emphasized that the concept of SD is "a word-bag" (with personal nuances that depend on the leading bag), a "utopia constructive", a project of prospective nature. School's mission is to make students form a different reading of the world and to imagine other modes of development to ensure better sustainability and intergenerational equity of humanity on the planet (Michel Hagnerelle, CRDP d'AMIENS, 2009) .

II.2. <u>United Nations Decade for Education for Sustainable Development (2005-2014). Educational implications</u>

As I noted, the UNO declared *the United Nations Decade for Education and for Sustainable Development (2005-2014)*, the implementation of UNESCO which must respond.

The purpose of this Strategy is to encourage UNECE Member States "to develop and incorporate ESD into their formal education systems in all relevant disciplines and non-formal and informal." (UN, 2005, p.2)

The objectives of this strategy are:

„a. ensure that policies, regulations and the operational support ESD;

b. Promote sustainable development (SD) through formal, non-formal and informal;

c. ensure teacher training for skills required to include SD in teaching;

d. ensure access to appropriate tools and materials for ESD;

e. promote research into ESD, ESD development;

f. Strengthen cooperation on ESD at all levels within the UNECE region "(*ib*., p. 3).

Denial is articulated around five axes:

a) more value to the central role of education and learning in achieving shared sustainable development;

b) establishment of partnerships, networks, exchanges and interactions between actors involved in delivering ESD;

c) promoting the concept of transition to SD by SD and learning activities and awareness of all categories of population;

d) Promote the improvement of quality of education and learning in ESD;

e) develop strategies at all levels to achieve specific ESD.

New long-term cross-thematic programs were recommended:

- Leadership and promotion of DEDD;
- Integration of ESD in basic education;
- Reorienting secondary education for ESD;
- Integration of ESD in education and technical and vocational training;
- Integration of ESD in higher education;
- Training of trainers for ESD;
- Taking into account systematic cultural diversity and intercultural dialogue in ESD;
- Education for sustainable management of water resources;
- Education for ecosystems and sustainable livelihoods (UNESCO, 2008).

In the same UNO document (2005, pp 6-9) there were presented the educational implications of ESD Decade:

- A reorientation of the educational system on treating problems and identify possible solutions, examining the multi-and interdisciplinary problems arising in real situations.
- Formal education plays an important role in capacity development in young children,

providing knowledge and influencing attitudes and behavior.

• Support for informal and non formal education for sustainable development.

• Trainers receive an initial and continuing training relevant.

• Consistency of teaching materials used in formal education and those used in non-formal education.

II.3. To an ESD didactics

The development in didactics turns to good account the research of contemporary social and human sciences. Teaching the postmodern (Stanciu, M., 2003b) is a type curriculum that addresses the curriculum in a holistic vision systemic-centered learning efforts of students, providing differentiated and individualized routes. Didactics develops fundamentals of contemporary socio-constructivist type (H Siebert, 2001, Ph. Jonnaert, M. Ettayebbi R. Defile, 2009, etc.).

In this context of our discourse, the contributions of Edgar Morin seem significant. He proposed **a paradigmatic revolution**: the paradigm shift "disjunction / reduction" to a "distinction / conjunction" that "allows a distinction without Disjoins, to associate without identifying or reducing. This paradigm involves a principle of dialogue and translogic ... It bears within it the principle *Unitas multiplex* the abstract Unit up beyond (holism) and below (reductionism). "(Morin E., 1990, p. 23)

The approach Morin proposes envisages two main fronts: to reintegrate man among other natural beings (to distinguish and not to reduce it), "Developing a theory, logic, an epistemology of complexity to suit the knowledge human. "(p. 25) theoretical approach on which it proposes Morin is not to move from simple to complex, but the complexity of something much more complex (*Hypercomplex*) (*ib.,* P. 51). Complexity is a challenge for Morin, not a response (*ib.*, P.134). Complexity is not only the union complexity and non-complexity (simplified), "complexity is the heart of the relationship between simple and complex that such a relationship is at the same time, antagonistic and complementary." (*Ib.*, Pp 135-136) Complexity is the type dialogue: order / disorder / organization (*ib.*, p. 137).

Morin critics the perspective of contemporary mono-disciplinary science acting with true security. Perspective that the author is proposing is a transdisciplinary one. "Transdisciplinary means indisciplinary today." (*ib.*, P. 70).

In the teaching context, the model of alosteric learning A. Giordan stressed the need for knowledge representations of the students (with positive and negative elements) and new paradigms to build and rebuild the foundation of learners with valuable items.

Teaching approaches in the field of ESD requires systemic-holistic approach, inter-and transdisciplinary, active research by students of the environment in its complexity, a pedagogy of group projects, etc.. (Boillot, Francine Grenon, 1996, *apud* INRP , 2004; Stanciu, M., 2003).

Several models of ESD teaching approach are known (INRP, 2004, pp.18-22), which must be exploited in their complementarity critical. Our plea is for the systemic and transdisciplinary approach to ESD issues.

III. Focusing on interdisciplinary competences of the training of trainers in the field of ESD

De Ketele defined in 1996 the competence as an ordinate totality of abilities that are practised to some contents in a certain category of situations to solve the problems limited to that situational area (*apud* Roegiers, 2001, p. 65). This definition emphasizes the three constituent parts of a competence: content, ability and situation.

Learning is "at the same time a divergent process, at the level of capacities and convergent at the level of competences" (Roegiers, *op. cit.*, p. 71). The interdependence between capacity and content will lead to the formulation of a specific objective (*ib.*)

Competence = (abilities X content) X situations = specific objective X situations

The definition of the competences can also be realized in a metaphorical manner (transfer of knowledge or stimulation of the subject's resources at a given time) (Perrenoud Ph., 2002, *In* Dolz J., Ollagnier E., Éds , p. 45). The metaphor of stimulation underlines the subject's activity, which implies "*a totality of complex mental operations,* connected to some situations, rather *transforming* the knowledge" (*ib.*, p. 46). The metaphor of stimulation suggests "the orchestration, the coordination of multiple and heterogeneous resources" of the subject, a permanent recombination of these resources (Perrenoud Ph., 2002, *op.cit.*, p. 56). "Mobilisation has nothing magic, it is an effort of the spirit" (*ib.*, p. 57).

Quebec Ministry of Education document entitled *Programme de formation de l'école québécoise* (2001) is an example of good practice, which reflected a new policy to reform preschool and primary education in Canada on centered skills.

Table 1

The contents of a competence
(Apud Allal L., 2002, Dolz J., Ollagnier E. (Éds.),2002)

Cognitive competences:
 • *Knowledge*
  ➢ Declarative- rules, facts, laws, principles (knowledge) ;
  ➢ Procedural (abilities – know-how) ;
  ➢ Conditional (contextual), which allows the subject to choose in a certain a moment a particular strategy or approach to involve himself in a certain action (M.A. Broyon, 2001). This knowledge is responsible for learning transfer (Tardif, 1992).
 	
 • *Metaknowledge and metacognitive regulations*

Affective components: Attitudes, motivations …
Social components :   Interactions, performances…
Sensorial-motional components :   Gesture coordination…

Of this document we present (*table 2*) list transversal (transdisciplinary) competences had in view:

Table 2

Transversal competences

Categories of competences	Types of competences
Competences of intellectual type	to exploit information
	to solve problems
	to practice critic thinking
	to valorise creative thinking
Competences of methodological type	to acquire effective working methods
	to use TIC
Competences of personal and social type	to structure the identity
	to cooperate
Competence of communication type	to comunicate efficiently.

IV. Teaching with interdisciplinary approaches to achieve education for sustainable development

The key to an effective teaching approach in ESD action learning is linked to life in the near environment. The students may be involved in development projects in the development of research-action, allowing the acquisition of basic concepts, principles and rules of effective action in pursuit of a SD.

Several known ways of introducing ESD in educational plans and programs (each with advantages and disadvantages) infusional approach (*approche infusionelle*) integrated modules, different school subjects, synthesizing interdisciplinary (team-teaching ") quarterly and final.

Further, we do a brief overview of these procedures (G. Văideanu, 1988 and 1996):

IV.1. Infusional approach requires effort of all educators in promoting ESD content, information dissemination through educational courses. The main advantage is that there is no need to change plans and curricula.

Difficulties come from issues of training all teachers in this topic, it might happen some educators to ignore and also not to specify who will carry out the syntheses. This spray will not always lead to knowledge about important changes in attitudes and behavior of individual system. Even when someone assumes the role of coordinator, difficulties persist. It has remained the way most of us use.

IV.2. Another course of action to promote ESD content is the integrated modules. Advantages of modular organization were highlighted in another paper (Stanciu, M., 1999). Problems arise in this context that mainly take place in multiple disciplines of education, teachers need special training. Also, we consider that the relationship between modules can provide a design effort and education action team of teachers. We noticed in testing in this respect in our country, but outside the formal work.

In many countries (usually with a high economic standard) ESD issues are achieved through specific disciplines included in the curriculum. New curricula in force until the 2004-2005 school year, the profile provided technical specialization "Environmental Protection" - topic disciplines addressing environmental education: "Ecology and environmental protection", "management and environmental legislation," Analysis of factors environment. Also we can initiate various optional subjects which have this theme. At primary school may be held Optional entitled "Childhood Seasons." We think that experience could be harnessed through the publication of methodological guides on real issues of the four seasons, addressed in a transdisciplinary manner. To students from high schools with agricultural profile, and V-VIII schools could initiate Option "Organic Farming", through which students are initiated into the promotion of ecological agriculture, an opportunity for each individual's health Earth and a priority direction of action for a modern and efficient agriculture.

IV.3. The most promising way more interesting, but harder to implement (G. Văideanu) is a of interdisciplinary (team-teaching) semester and final synthesis. These summaries complement infusional approach or teaching can be independent. Examples, in this respect, several methodological aspects of the organization such as

team teaching lessons on "Water, air, soil (class IV) which was done by a teacher of Science with secondary teachers Physics, chemistry and biology. Can initiate thematic projects "protect nature, the green life." Students at "Michael the Brave" from Bucharest (Class XII) addressed a topic summary: "If hot air could be ... harder and cold air would be ... lighter ...!!!" A French author has developed problems " SD Geography" (Esoh Elame J.,2002).

Assessing the effectiveness of these activities can be done using traditional methods and tools, especially complementary methods: attitudes scale, longitudinal studies, portfolios, thematic projects, investigations, group projects, practical actions to protect the environment, etc..

IV.4. It also organizes a wide range of extracurricular activities, targeting environmental education objectives. A first step is the establishment of a "Dictionary of DD" to clarify basic concepts. To this end, students will see the collection of magazine "*World Tree*" will watch science programs, "*Teleenciclopedia*", "*Discovery*", will visit the "*French Cultural Center*" for a consultation to achieve exceptional books (" Les petits écologistes en action "Album d'Activités-Mon-Larousse). Next, students will be encouraged to search and find curiosities, riddles, legends about plants, animals and natural elements. All this accumulated knowledge will be used in a contest called "*Discover Nature Together*." Encourage inquiry is a way to develop multiple intelligences.

There can be organized games on pollution to define terms (cluster method), exercise-game positive discrimination of the negative aspects and discussions pro and con ("Who is guilty?", "Save the forest!") on the industrial, agricultural, as a source of material goods but also of pollution, identify the causes of this phenomenon and prevent the expression of views on the causes and sources of environmental pollution reduction, analysis and exploitation of known cases of practical measures (case study). It is difficult to change people's behavior without providing alternative solutions ("What would you do if ...?"," What would happen if ...?). Creating opportunities helps people to follow appropriate channels of conduct.

In the thematic cycles called "Forest Month", students can learn a lot of information about the forest, like passionate environmentalists. Here are some curiosities that can be understood together: "*Forest oxygen factory", "Longevity tree", "Wedding trees", "Strength of roots", "Pharmacy in the forest"*. But mostly, students can perform compositions / essays entitled "*Factory of sun*", "*Talking with wheat grain, with a drop of rain, with a leaf, one swallow*", etc.). Students from UASVM Iasi initiated in collaboration with students at the Technical College "Gh Asachi" the project called"*Eco Gesture Month* "(2010).

To participate in various activities dedicated to protecting the natural and anthropic environment, students may be made with **Ecologic calendar** following events: World Water Day, World Earth Day, Moon Forest, Parks Day Dendrology, International Environment Day, International Day of Preservation the Ozone Layer, etc.

Students can be trained to live in corners arrangement of the school, planting and care of flowers and trees. Winter can be organized actions Bird care, building houses for them. Visits and trips aim to establish a truly mobile laboratory. because all issues have been seen by students organized into groups. Visits and tours can be followed by turning personal opinions expressed in the compositions, drawings, sketches, posters and photographs, models of landforms representative environment showcase seasons. Also, students from different countries can collaborate in various projects on the SD.

CONCLUSIONS

The need for coherent national strategy for SD and especially its implementation at national and local level.

Instead of environmental education (ecological education), we suggest placing in a broader sense, **education for sustainable development** (*Education for Sustainable Development, en, l'éducation pour le Développement durable*, fr.) (ESD) as a new type of education specific to postmodern society.

ESD should be tackled in a holistic perspective systemic-inter and transdisciplinary. This approach provides the methodological framework for various educational approaches.

A sensitive issue that can be found worldwide is the training of trainers for ESD. MODECOMP research project attempts to provide a modern perspective of training the debutant teachers focused on competences (Dumitriu, C., coord., 2010).

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