

AUTONOMY OF LEARNING BY COMPETENCES

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Abstract

This article illustrates aspects of the management of high school students' competences formed and developed as an on-going and dynamic process passing from the teacher on to the student. It is a self-generated process starting and moving from task-centered learning to transformation-centered one, a process developing the idea of autonomy in diversity and going beyond the boundaries of expectations by means of openness and reflection.

An educational management system will not become dysfunctional unless it is totally conventional, including through the rapport with interpersonal relationships promoting by teenagers in a world whose evolution fails to be linear.

Keywords: learning, competences, autonomy, education

Introduction

For each of us life starts before, during and after school and it is a permanent beginning. It is also under the sign of plurality and results in different life and history conditions. Preparing for life can be done from the point of view of past, present and future and it is projected in time and space where school does not have always the leading role. When it generates, (re)builds and consolidates a positive rapport as well as optimal between education, school and time and space evolution of society welfare, correlated with economic growth and development of longlasting society seen as ongoing learning process, preparing for life becomes longlasting.

From the systemic point of view, education as well as economy interrelate, the outcomes of the educational system being a starting point for the economy and society.

Literature review

Education and well-being are two realities belonging to the same world, whose particular values reside in real situations based on a solid construction of a future which contemporary economy sees it under the sign of competence.

Quantitative and qualitative factors of human beings determine the way group, community and society welfare is established when it comes to increasing the productivity and social cohesion. Increasing, getting and maintaining a high educational level as well as well-being result in reducing the negative effects upon the investment in educational system at the same time with developing an objective competition culture between people, groups and organizations.

Drucker (1993, 1995) states that school and education play a central role in the post-capitalist society of the XXIst century, as producer and distributor of knowledge. Interior and exterior challenges impose on society a way of thinking through education (purpose, values, contents), the necessity of developing activities which promote *the quality of knowledge and the productivity of knowledge*.

Caldwell in Davidson and Ellison (1997) speaks about a rethinking of education and suggests a development of the concept of *thinking in time* in which the future is part of a continuum past – present – future.

Paquay (2002) mentions as practical aspects of evaluating competences, having a formative value, to certify and motivate learning, the use of qualitative criteria, both minimal and performance, so as to promote self-assessment and collective assessment as determining factors to reach autonomy.

Rey et al. (2012) show the advantages of strategies by way of competences for the educational systems:

- avoiding sequencing of tasks, therefore deviations from the objectives of teaching – learning process and the initial meaning of the tasks;
- involving students in all learning stages (design, organization, development, assessment, feedback);
- reducing selection amongst students at the same time with increasing it amongst teachers;
- not facilitating a culture of failure.

It is also mentioned the need to explain and cope with school failure as a challenge and answer determined by inequalities, somehow ordinary and real, between people, in families, organization, community, society etc.

Crahay (2012) focuses on 2 possible cases, studied in specialized literature. The former, called *Availability deficiencies* is that in which students hold no knowledge, procedures, strategies necessary to accomplish a task.

The latter, called *Production deficiency*, refers to the fact that students fail to mobilize knowledge, abilities although they have them. People speak about an assesment of concious mobility knowledge, procedures, strategies learnt in school.

Rey (2014) noticed in official documents and organizational studies the boundaries of statements with regard to competences:

- the certainty of the existence of competences does not reside in its formulation;
- there are no indices to the psychological mechanisms of the competent person, to the way and conditions in which they were achieved and development of a state competence;
- there is uncertainty beyond the competence, that is one fails to be sure wheither a person who once solved a problem-situation will always succeed in solving it;
- the raport between competence and human diversity is variable and there are no clear, stable, impartial, uniform, generally accepted appreciation criteria;
- the statement of a competence belongs to a person and shows her/his view and competence is attributed, in most cases, to another person without she/he drawing attention upon her/his own opinions;
- competence lies at the core of performance illustrating a physical or intellectual action and the success of an action is attributed to the competent person and therefore, competence is an explanation, partial or total, for the respective action.

Competence provides the person with freedom to choose means, methods of accomplishing tasks, power to manage and initiate her/his own steps, methods to get them, having in view the fact that contemporary society focuses on results and fails to give importance to the process.

Nistor (2016) uses the term *potential of a competence*, emphasizes the relationship between the potential and components of a competence and underlines the necessity to gradually pass from educational system centered on the *theoretical potential and the static one* to an educational system focused on *the practical potential and the active one*, process which is built as a system generating personal and professional development.

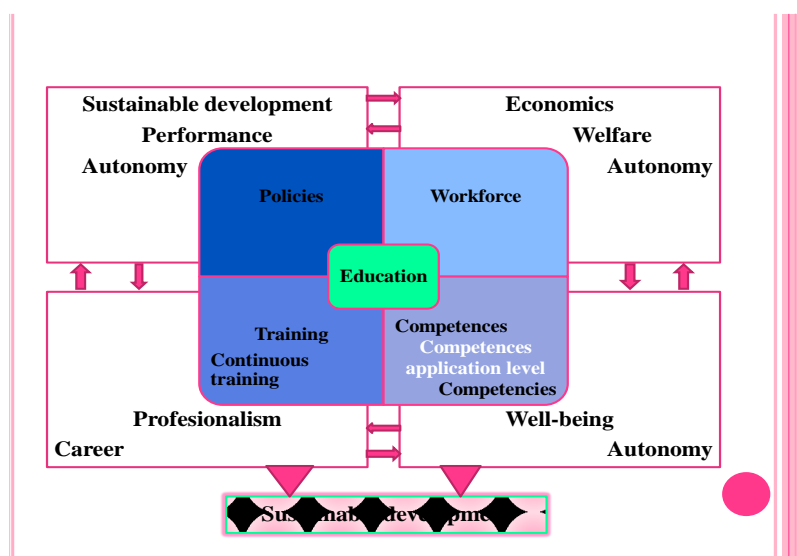


Fig.1 Education in a world of sustainable development

Education, seen on the point of view of competences presupposes no strict approaches related to its economical aspect. One learns to (re)interpret the competent person through the competent action which relates itself to the reality socio-economical dimensions and beyond them.

Research methodology, methods and tehniques

This is a qualitative and quantitative research study with the aim to identify the perception of high-level secondary school students from technological high schools with reference to the autonomy of learning by competences, to analyze the causes which derive from pre-university system and which lead to this perception.

The variables of this research can be classified into 2 categories: independent and dependent. The former are residence areas and gender. The latter refers to students perception towards autonomy of learning by competences. Coding variables involved using the Likert-type scales with 4-5 steps.

Data resulted from questionnaires whose items were under the form of closed-questions which required single answer to show the main options of those questioned with the aim to check the bilateral hypotheses assumed.

Sampling was done according to the purpose and the objectives of the study. Non-random sampling procedures were chosen (volunteer sampling).

The questionnaires were applied between December 2015-February 2016 and October-December 2016 to a population representing two independent samples formed of 11th and 12th grade students who study at technological high schools, real/science department, specialized in mathematics – informatics and natural sciences, humanities department, specialized in social sciences and technical domain, field of electrician/electronics/mechanics. The former sample comprises 165 students while the latter 182 students, those questioned being aged between 16 and 19 years old.

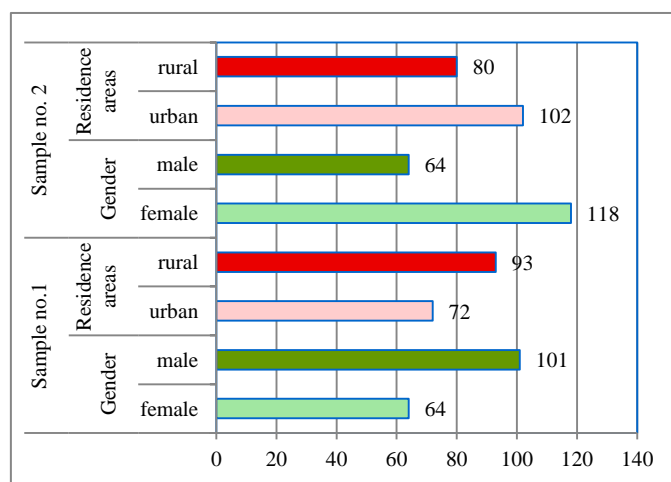


Fig. 2. Structure of the samples

For the primary and secondary analysis of the recorded information were used indicators from statistical analysis, graphical methods and statistical tests by means of IBM SPSS 21.0, G*Power 3.1.9.2 and Excel, Office 2007. The normality of variables distribution were tested as well as the condition of linear dependence between variables. The following statistical indices/indicators were calculated: mode M_o , median M_e , average mean m_a , variance s^2 , standard deviation s , coefficient of variation v , Skewness, Kurtosis. The Alpha Cronbach reliability coefficient was .801, respectively .794. The confidence interval of difference as well as correlation coefficients r_s , Spearman and d_s Somer were determined. For each case it was studied and interpreted the size of effect d_c using the referential system of Cohen. The statistical tests used are the following: *One-Sample T Test*, *Independent-Sample T Test*, the test χ^2 Chi-square Goodness of Fit, applied for df freedom degrees and a two-tailed significance level $p < .05$.

Among the limits of the present research there are:

- the diversity of opinions and expectations of participants;
- the disadvantages of methods, techniques and research instruments, (re)known among scientific communities;
- the size and characteristics of sampling;
- the degree of clarity and coherence of the logical thinking of repondents;
- unidentified effects of one variable upon another.

Data processing, analysis and interpretation

One of the hypothesis of the present reasearch is one of the decisive factors in choosing the students' future career and work field is provided by promoting an autonomy of learning through competences.

The answer to the item *After graduating from high school I'd like a job related to the field of specialization* illustrate that labor market fields of activity related to what students studied in secondary school fails to be of a special interest to the young from the point of view of a future career, they prefer not to take any decision with this regard. Therefore, from the first sample characterized as heterogenous related to this variable, 43.03% of those questioned choose to hire in a field of specialization related to the graduated one whereas 41.82% do not.

15.15% of students are undecided. In this respect, we mention: $m_a=2.93$, $Me=3$, $Mo=1$, $s=1.556$, $s^2=2.422$, $v=53.10\%$, where we deduce that m_a is not a good indicator for the central tendency. For an effect size .27 and a test power .80 of *One-Sample T Test* we get $t_{critical} = 2.012$ for $df=164$ degrees of freedom and a significance level $p=.046$. Considering the reference mean $m_{ar} = 3$ (well, often, enough, much etc.) we get: $t(164) = 8.855$, $p < .05$, the confidence interval for mean difference is $[-1.31, -.83]$, the difference between averages 1.073 is statistically significant, the effect size is $d_c = .69$ and the effect is average. Similar results are recorded for the answers to this item in the case of the second sample.

Within this context, we are thinking of the degree of autonomy in learning by competences from the students point of view, future bachelor of a technological high school.

For the item *I have new, constructive ideas, shared with those around me, creative thinking being induced* applied to the first sample, there have been recorded the following: $m_a=3.66$, $Me=4$, $Mo=4$, $s=1.039$, $s^2=1.079$, $v=28.38\%$, moderate scattering, the representation of m_a is satisfactory. $t(164) = 4.197$, $p < .05$, the confidence interval for mean difference is $[-.50, -.18]$, the difference between means is .339 and it is statistically significant, the effect size is $d_c=.327$, the effect is weak. $\chi^2(4)=64.061$, $\chi^2(4)_{calculated} > \chi^2(4)_{critical}$, $p < .05$, the opinion is outlined, that is new ideas promoted within the group are characteristic to many teens. The sample is relatively homogenous. 61.82% of students state that they have new ideas accepted by the group whereas 14.54% don't have this ability. 23.64% of students do not state their opinion, either because they don't promote critical and creative thinking or their ideas are not accepted by others. Also, from the study of correlations of this variable with other dependent ones, we can conclude the following. Before suggesting new ideas, 40.60% those questioned identify and evaluate possible solutions to solve a problem ($r_s=.164$, $p=.035$, small association, the effect size is .026, the effects are average; $d_s=.141$, $p=.039$, low future association, the effect size is .019, the effects are average). Putting initiatives into practice by 38.18% of students is preceded by their analysis and, eventually, formulating pertinent observations ($r_s=.214$, $p<.01$, small association, the effect size is .045, the effects are average; $d_s=.18$, $p<.01$, small future association, the effect size is .032, medium effects). 15.76% of students always finish the tasks suggested by their colleagues and which are accepted within the group ($r_s=.206$, $p<.01$, small association, the effect size is .042 which leads to medium effects; $d_s=.18$, $p<.01$, low future association, the effect size is .032, the effects continue to be medium). 46.06% of teens are used to establishing priorities before or while having an initiative ($r_s=.225$, $p<.01$, small association, the effect size is .05, the effects are average; $d_s=.197$, $p<.01$, low future association, the effect size is .038, medium effects). Initiatives prove to have bigger chance to succeed for 43.67% of teens if they are shared to many group members as possible ($r_s=.267$, $p < .01$, low association, the effect size is .071, the effects are average; $d_s=.23$, $p<.01$, small future association, the effect size is .052, medium effects) and have a greater impact upon 47.27% of those questioned, if time limit is respected for putting them into practice or for getting positive results ($r_s=.214$, $p<.01$, low association, the effect size is .045, medium effects; $d_s=.183$, $p<.01$, small future association, the effect size is .033, medium effects). In order for their suggestions to have better success rates, 41.82% of students think that they have to be flexible and tolerant ($r_s=.209$, $p<.01$, low association, the effect size is .043, medium effects; $d_s=.181$, $p<.01$, small future association, the effect size is .032, the effects are average) and 35.15% of them think that an important factor is motivation and coordinating colleagues ($r_s=.22$, $p<.01$, small association, the effect size is .048, medium effects; $d_s=.186$, $p<.01$, small future association, the effect size is .034, the effects are average with a decreasing tendency) in the context in which 55.15% of teens state that they are interested in quality and efficiency ($r_s=.265$, $p<.01$, low association, the effect size is .070, medium effects; $d_s=.232$, $p<.01$, low future association, the effect size is .053, the effects are average). Verifying the viability of new ideas can be done by identifying various sources of information by 51.52% of youth ($r_s=.242$, $p<.01$, low association, the effect size is .058, medium effects; $d_s=.208$, $p<.01$, small future association, the effect size is .043, the effects are medium with a decreasing tendency). Constructive initiatives focus on interpreting data tables and graphs for 31.52% of students ($r_s=.165$, $p=.034$, low association, the effect size is .027, small effects; $d_s=.138$, $p=.036$, small future association, the effect size is .019, the effects are low). Constructive ideas and put into practice are opportunities to learn and do new things for 52.72% of students, out of which 41.38% from science department and 58.62% technical department, 40.22% from urban areas and 59.78% rural areas ($r_s=.309$, $p<.01$, moderate association, the effect size is .095, strong effects; $d_s=.274$, $p<.01$, low future association, the effect size is .075, the effects are average). For their initiatives to be understood and shared by their colleagues, 52.12% of teens give the necessary explanations ($r_s=.24$, $p<.01$, low association, the effect size is .057, medium effects; $d_s=.210$, $p<.01$, low future association, the effect size is .044, the effects are medium). 32.72% of questioned consider that their chance to be successful professionally and personally in Romania are big enough because they have constructive initiatives ($r_s=.233$, $p<.01$, low association, the effect size is .054, medium effects; $d_s=.191$, $p<.01$, low future association, the effect size is .036, the effects are medium with a decreasing tendency). Therefore, dependent variable *I have new, constructive ideas, shared with those around me, creative thinking being induced* correlates significantly with other 15 items, determines a minor association, explained variance is between 1.9% and 7% except the item *I take advantage of opportunities to learn and do new things* for which association is

moderate and explained variance is at least 9.5% out of total variance. In all cases, one can record a descending tendency of associated effects.

From the point of view of a graduate autonomy of learning by competences such as using mother tongue and at least one international second language (the former 61.44% of students, the latter 50.60% of those questioned think they don't have special problems in oral or written mother tongue communication, respectively foreign language at a level of an independent/proficient user), knowing and applying elementary computational algorithms (level of maths elementary knowledge is average for 50,61% of students), efficient computer use of Word, Excel etc. (37.35% of youth state that they don't frequently use IT methods and technics, including software use), understanding and use of technical knowledge (45.83% of questioned declare they don't understand and/or don't use technical knowledge) and development of practical skills.

The conclusions which derive from analysing the survey answers of the second sampling are similar to those previously discussed.

The hypothesis according to which promoting autonomy of learning by competences in high school is one of the decisive factors in choosing a future career and related work field is accepted.

One of the components of autonomy of learning by competences is related to evaluation under each forms.

Another hypothesis is that the constructive character of an objective evaluation (formative, summative etc.) accompanied by a regular feedback from the students is conditioned by the open and positive attitude of the teacher and schoolmates, this being one of the determinants.

Irrespective of evaluation type (formative, summative, certification etc.), the current techniques and instruments of evaluation, validation and marking are partially suitable for a fair appreciation of students' real competences, autonomy of learning by competences which students have and manifest in solving theoretical and practical problems with different complexity degrees. Usually, we evaluate results, stereotypical behaviours by applying indicators and the students interpretate them from their point of view. To support these statements we mention other results of the both questionnaires.

The item *Evaluation is objective and constructive*, 67.47% of the first sample of those questioned and 65.93% of the second one answer affirmatively for the most evaluating situations during high school. Evaluations are not always accompanied by an open and positive attitude of the teacher, so as to promote giving and receiving feedback on a regular basis. For instance, item *Teacher's attitude is open and positive during evaluation* the following results were obtained for the second sample: $m_a=2.36$, $Me=2$, $Mo=3$, $s=.835$, $s^2=.696$, $v=35.38\%$, which means that scattering is moderate with a tendency to increase and the mean m_a is not representative for the central tendency. According to a priori analysis, for an effect size .24 and a test power .80 of *One-Sample T Test* we get $t_{critical}=2.367$ for $df=181$ freedom degrees and a significance level $p=.018$. Taking into account the reference mean $m_{a,r}=3$ (well, often, enough, much etc.) there we have: $t(181)=10.303$, $p<.001$, the confidence interval for mean difference is $[-.76, -.52]$, the difference between means .637 is statistically significant, the effect size is $d_c=.76$ and the effect is average to high. Conform to a priori analysis, the *Independent-Sample T Test* applied to group made of 118 female testees and 64 male testees, for an effect size .40 and a test power .70 determines $t_{critical}=2.018$ for $df=180$ freedom degrees and a significance level $p=.045$. We have $F(180)=12.524$, $p=.001$, the homogenous condition being achieved. Also, $t(180)=3.287$, $p=.001$, which means there are significant differences between means, female subjects appreciating more the teacher's attitude during evaluation as compared to the male ones. The effect size is $d_c=.51$, the effect being average. For both tests we have $t_{calculated} > t_{critical}$ for a significance level $p<.05$ which leads to the conclusion of nulle hypothesis is rejected in this case. The same test applied to 102 subjects from urban areas and 80 from rural areas provide the following informations: $F(180)=2.313$, $p=.057$, the homogenous condition not being verified. Also, $t(178.43)=.184$, $p=.054$ which means that there are no significance differences between means related to the criteria *residence areas*. Similar results were registered for the answers to this item in the first questionaired sample.

On the other hand, communication student – teacher is characterized as efficient by testees in the second sample: $m_a=2.79$, $Me=3$, $Mo=3$, $s=.751$, $s^2=.564$, $v=27\%$ having as reference mean $m_{a,r}=3$ (well, often, enough, much etc.), $t(181)=3.751$, $p<.001$, the confidence interval for mean difference is $[-.32, -.10]$, the difference between means .209 is statistically significant, the effect size is $d_c=.27$, weak effect. Also, students appreciate that, very often, teachers are tolerant when they are not prepared enough for class and help them study: $m_a=2.55$, $Me=3$, $Mo=3$, $s=.776$, $s^2=.603$, $v=24\%$ having as reference mean $m_{a,r}=3$ (well, often, enough, much etc.), $t(181)=7.831$, $p<.001$, the confidence interval for mean difference is $[-.56, -.34]$, the difference between means .451 is statistically significant, the effect size is $d_c=.58$, medium effect. A motivating factor to learn is real competition between students: $m_a=2.73$, $Me=3$, $Mo=4$, $s=1.093$, $s^2=1.195$, $v=44\%$ which means that m_a is not a satisfactory indicator of the central tendency having as reference mean $m_{a,r}=3$ (well, often, enough, much etc.), $t(181)=3.391$, $p<.001$, the confidence interval for mean difference is $[-.43, -.11]$, the difference between means .275 is statistically significant, the effect size is $d_c=.25$, weak effect. An explanation of this option is the attitude of some colleagues who prevent them from answering/ participating during certain classes: $r_s=.253$ for a significance level $p=.001$ which outlines the fact that a necessary condition for reaching autonomy in learning by

competences is to build, maintain and develop efficient communication relationships teacher – students and students – students. Group statistics illustrate 118 female testees and 64 male testees. After applying *Independent-Sample T Test* we have $t_{\text{calculated}} > t_{\text{critical}}$, for a significance level $p < .05$: $F(180) = 14.322$, $p = .053$, without checking the homogenous condition of variances variance. Also, $t(158.56) = .184$, $p = .038$ which shows that there are significant differences between means related to gender criteria and that is, male subjects are in favor of school competition as compared to female ones. 26.37% of students who appreciate as positive the teacher's attitude during evaluation are also in favor of learning by promoting competition in school.

Similar results were registered with regard to this item in the first questionnaire.

The hypothesis according to which the constructive character of objective evaluation (formative, summative, diagnosis etc.) accompanied by a regular feedback from the student is conditioned by the open and positive attitude of the teacher and colleagues is accepted.

The results registered and analyzed for both samples are similar which leads to a general appreciation.

Around 15% of the subjects state that they have no elementary knowledge of Romanian (mother tongue), percentage which is close to 50% for mathematics and communication in a foreign language. School permanently wonders whether students know how to identify, correlate and apply knowledge, competences that they have in real life-situations independent or not, contextualized or not. Technological high school reality is an evidence of the inexistence of language and maths competences (reading, speaking, elementary computational algorithms) in many cases during the first secondary school years, reality which determines the teacher to suggest multiple ways to (re)construction which offer the students equal chances to succeed and which allow them to integrate elementary procedures into a problem-situation which will be analyzed and interpreted and for which, eventually, a solution will be provided. The number of students who try and succeed to make and present an essay or to transfer a practical problem into a maths one which often deals with basic knowledge and elementary competences is small. The number of students who search and identify (re)sources to be used in solving problems, tasks, school or daily assignments is small, these presupposing a priori existence of somebody else's obligation to provide them with pertinent, rigorous and correct information from the scientific point of view.

The autonomy degree of problem-solving by students from technical profiles is low and the teacher's choice of establishing methods by himself, solution steps is an alternative imposed by students' level of knowledge, their ability to apply it, their attitude to school and work manifested through a high-level absenteeism.

Less than 50% of testees operate efficiently on computer programmes, understand and use technical terms, develop their technical abilities, aspects which involve a reduce to zero usage of open educational resources.

Alternatives to solving problem-situations, convergent opinions or divergent are observed by majority of students, yet only 60% of youth study them in detail and interpret them, usually not from their own initiative, proportion being the same for the analysis of viability of options which they have when taking a decision. Within this context, we underline the perception of those questioned upon analysis of alternatives by people different from that in which they are asked to solve problem-situations in most cases, which confirms a reduced involvement in decision-making process. Time planning, activities, priorities are occasional for about 35% of subjects.

Although critical ideas and creative ones, pertinent arguments represent advantages for many teens, they are aware of the fact that task solving which develop competences is, in many cases, accompanied by feedback characterized as insufficient, irregular, whether we talk about the given or the received one.

A special reason for studying and learning to do is students' competition. This result raises questions related to real life situations where competition lacks or a certain person is the only competitor. Moreover, how many of real life situations are competitions in which we are evaluated or self-evaluated learning from our own success or failure?

The perception of subjects upon the teacher's attitude towards evaluation is neither positive nor open, the student identifying the evaluation with marking. It is necessary to put an accent on formative evaluation and self-assessment accompanied by pertinent arguments which explain the young the partnership student – teacher along the instructiv-educational process.

A significant part of students technological high school, high-level studying within theoretical profiles or technical do not choose a future career related to their high school profiles or related fields, which partially confirms the viability of economical aspects of education. At this time, learning by competences generates a partial autonomy which has the tendency to become a pseudo-autonomy. It is necessary that the teacher, in cooperation with socio-economical factors to promote various strategies, methods so that it can be recorded, as much as possible, an increasing tendency of homogeneity of working groups and of each students' autonomy, offering assistance in the process of assuming opinions by youth in order to guide their actions starting from the reality that points of views are easier to be made aware of and understood when belong to others, and dimensions of putting them into practice are provided by each person's degree of autonomy within and without the living space, works and (self)education space.

Conclusions

From the group perspective (class/school/technological high schools) or from the global one (Romanian pre-university educational system), students hold competences at an average degree with a tendency to decrease and promote a variable involvement to reduced one, in measuring, analysis, dissemination of results with reference to the quality and impact of learning as a system which generates personal and professional autonomy.

Task-oriented learning, learning by competences is a changing learning by way of its autonomous character of the process suggested by more open expectations, more comprehensive, more reflexive which have a strong impact on the way in which the student builds the diversity of his own experience and integrating it into the perspective of those around him and society.

Brief biography

Daniela Nistor is a high school teacher, having graduated the University of Bucharest, Faculty of Mathematics and a Ph.D. of the same university, Faculty of Psychology and Educational Science. The author holds the Master degree in "Management education and European integration", graduated at the Petroleum-Gas University of Ploiesti, Faculty of Letters and Science.

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