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Students' Perceptions Concerning their Involvement in Sciences Lessons Learning Activities

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Students' Perceptions Concerning their Involvement in Sciences Lessons Learning Activities

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Abstract

In the contemporary educational settings, it becomes a priority to have a qualitative education, taking into consideration the students' real needs and placing them in the center of the educational process. In this context, it is obvious that the learning process, specific to the students, has to support significant changes, following a well-defined trajectory from passive, mechanical learning, extrinsically motivated to an active and proactive, profound and intrinsically motivated learning. Learning in a school context is a complex and not at all easy process, which aims to achieve positive accumulations and transformations in the way of thinking, feeling and acting of the students. To achieve effective learning is extremely important for the teacher to create opportunities for each student *in the process of experiencing successful* learning, being interesting h*ow students relates to learning outcomes and what are their opinions about the learning activity. In this sense, the paper aims to investigate the upper secondary school students' perceptions considering their learning process in relation to Sciences lessons. For this purpose, in the context of the FP7 PROFILES project, we pursued an analysis based on the feed-back offered by 529 students to a questionnaire, built with predefined responses placed on a Likert scale with seven steps. The questions were oriented on important issues related to the learning activity, like the manifestation of their skills within the Sciences lessons subjects, perception concerning the difficulty/ease of learning new things, thoughts about the difficulty of school tasks and perception regarding their academic performance, associated with success or failure in the proposed learning activity.*

Keywords: learning process, Sciences lessons, effective learning, students' perceptions, PROFILES Project.

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1. Introduction

In the contemporary educational settings, it becomes a priority to have a qualitative education, taking into consideration the students' real needs and placing them in the center of the educational process.

In this context, it is obvious that the learning process, specific to the students, has to support significant changes, following a well-defined trajectory from passive, mechanical learning, extrinsically motivated to an active and proactive, profound and intrinsically motivated learning.

In order to achieve effective learning, it is extremely important for the teacher to create opportunities for each *student* in the process of experiencing successful *learning, being interesting h*ow students relates to learning outcomes and what are their opinions about the learning activity.

2. Problem Statement

Learning in school context is a complex and - not at all - an easy process, which aims to achieve positive accumulations and transformations in the way of thinking, feeling and acting of the students.

Learning represents an "activity with psychological and pedagogical value, conducted and evaluated directly or indirectly by the educator, consisting in conscious, progressive, voluntary and relatively interdependent acquiring, transforming, accommodating, improving, reconstructing, fixing and reproducing of the knowledge, skills, competences and attitudes" [1 p15].

The goal of learning is not a mere accumulation of knowledge, it must lead to "the formation of orientation, thinking and creativity competences, to the flexibility of cognitive and attitudinal structures, to allow an optimal adaptation to the rapid changes we face" [2 p13].

Learning, in the sense of operational action, pedagogically directed, individual or collective, depends on three categories of factors: the particularities of the learner, the particularities of the learning situation and the particularities of the teacher or educator [3].

The trajectory of school learning starts with "a type of activity directed externally by the teacher, being gradually led to an autonomous type of activity. It starts with simple learning forms and gradually moves to selective learning forms" [3 p48].

But with the view to achieve an effective learning, it is extremely important how the student relates to this activity and its effective involvement by capitalizing of all the resources he/she has (cognitive, affective, motivational resources).We cannot talk about effective learning

without the involvement of students in this activity, in the absence of motivation to learn.

Learning motivation refers to "all factors that mobilize the student in an activity intended to lead to the assimilation of knowledge, to the development of skills and abilities. Motivation energizes and facilitates learning by enhancing student effort and focus student attention, creating a state of readiness for learning activity" [4 p70].

Analyzing the bibliographic sources used, we can highlight some important ideas related to the learning activity: learning is a complex process; it involves transformation, accumulation, development, evolution; learning involves both assimilation of information and the formation of skills, the application of the learned knowledge; quality learning consists in the direct involvement of students, the assumption of their responsibility, their valorisation; motivation plays a fundamental role in involving students in learning activity.

Learning activity within the area of Sciences (Chemistry, Physics, Biology) should lead to the students' basic scientific understanding and to the development of the necessary competences for the optimal integration and adaptation to the specific requirements of the knowledge-based society, for the formation of a positive attitude towards Science, in general.

To achieve such goal, learning within Science disciplines must be based on a constructivist learning process based on contextualized activities/tasks in order to give students the opportunity to discover and build, through collaboration, the meaning of the lesson as it runs [5].

3. Research Questions/Aims of the research

The study aims to investigate the upper secondary school students' perceptions considering their learning process in relation to Sciences lessons. The research is focused, especially, to the following research questions:

What is the level of students` satisfaction related to school?

Which are the students' considerations regarding the difficulties related to learning new things in the context of Sciences lessons?

What are the students' perceptions on how well they handle school tasks?

What are the students' perceptions about the degree of difficulty of daily school tasks in the Sciences lessons?

4. Research Methods

In the context of the European FP7 project entitled "*PROFILES - Professional Reflection Oriented Focus on Inquiry-based Learning and Education through Science*" [6], during the project life, we pursued an analysis based on the feedback offered by 529 students to a questionnaire, built with predefined responses placed on a Likert scale with seven steps.

The students participating in the research are upper secondary school students, whose teachers have followed the PROFILES continuous training program. We selected these students for the research sample because they are part of the classes in which the Sciences teachers used in their teaching activity the PROFILES modules, which promote a student-centered learning model and ensure the efficiency of the scientific literacy process.

The PROFILES Modules are based on Inquiry-Based Science Education strategy and on the use of socio-scientific issues, related to real life, which put the student in the situation of formulating hypotheses and then checking its validity through investigation and research.

This research respected the actual ethical standards. The students who participated in the research have been informed related to the right to confidentiality, to the voluntary nature of their participation, the understanding of the received information and the fact that the withdrawal from the research process can be done at any time without any negative consequences on participants. Also, the students expressed their consent to participate in the undertaken research.

The questions were oriented on important issues related to the learning activity, like the level of students' satisfaction with the school, the manifestation of their skills within the Sciences lessons subjects, perception concerning the difficulty/ease of learning new things, thoughts about the difficulty of school tasks and perception regarding their academic performance, associated with success or failure in the proposed learning activity.

The processing of the obtained results was predominantly quantitative, in correlation with the qualitative analysis, based on information obtained from discussions with the students and the teachers involved.

In the present paper, we choose, for example, four relevant items in the questionnaire.

5. Findings

The first item analysed in our study refers to students' satisfaction related to school, which is an extremely important variable on motivating and involving students in learning tasks. In the absence of satisfaction, which is associated with positive emotional experiences, the learning activity becomes a routine, an obligation, and it cannot lead to favourable results.

Analysing the answers given by the students questioned to this item (Fig. 1), we can observe that the highest percentages are obtained at the middle levels of the Likert scale. Thus, 35% of students declare themselves neutral related to this aspect and 26% say they are somewhat satisfied. Only 8% of students say they are completely satisfied with the school. We can therefore conclude that the student' level of satisfaction related to school is medium.

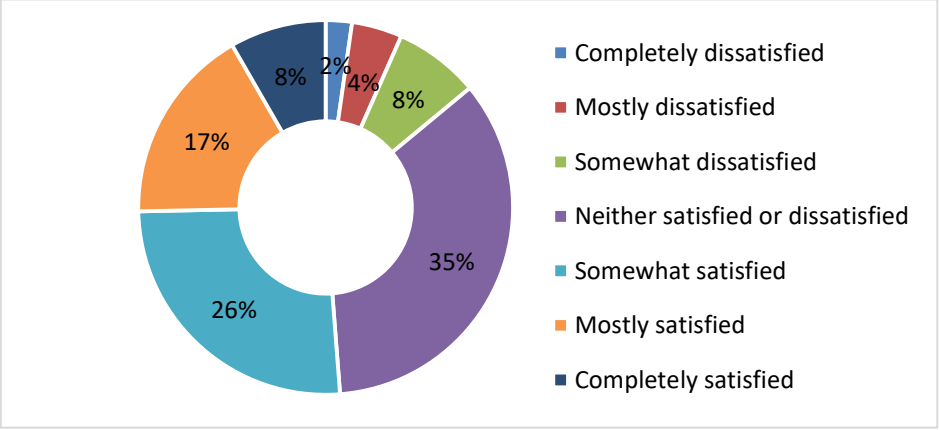

Fig. 1. Level of students' satisfaction related to school

The involvement of the students in learning activities within the science lessons is also conditioned by the stimulation of intellectual curiosity through the novelty of the issues addressed. The second item analysed in this study, focuses on students' considerations regarding the difficulty with which they learn new things.

In the figure below (Fig. 2) we can observe that the highest percentages are obtained at the slightly easy (30%) and moderately easy (28%) levels. Also, a significant percentage (16%) of students say that is very easy for them to learn new things. The obtained results demonstrate the availability and ease which students can learn new things, so this aspect of the novelty of tasks and themes should probably be more exploited by teachers in their lessons.

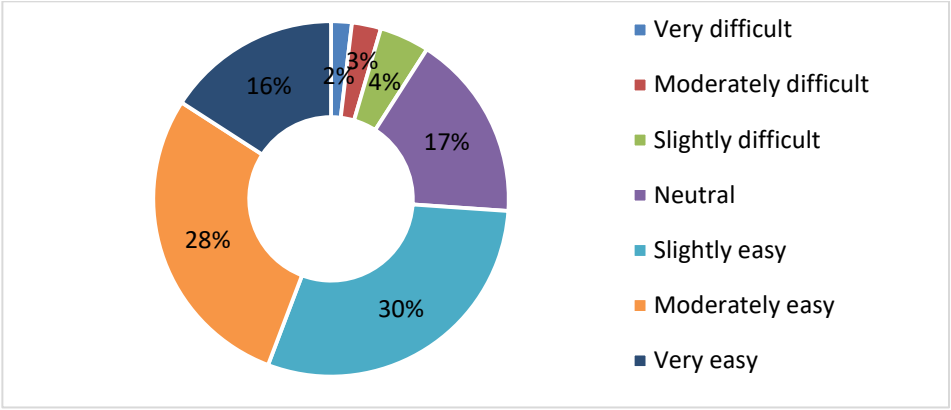

Fig. 2. Students' considerations regarding the difficulties encountered when they learn new things.

The third item of our study refers to the students' perceptions of how well they handle school tasks, which are related to the concept of *self-efficacy*- a motivational construct that relates to students' beliefs in the power and possibility of producing desirable results [4]. This is extremely important for the students' involvement in the act of learning.

Analysing the results obtained, it can be seen that they are placed on the upper levels of the scale, so 35% of the students say they handle very good the school tasks, 21% handle excellent and 11% handle exceptional the school task.

So, the dominant perception of the students is that they successfully handle the school demands. The results obtained here lead us to a serious reflection of the students learning activity, because although their perception is a positive one, it does not always materialize in very good results in current learning activities or in the situations of external evaluations.

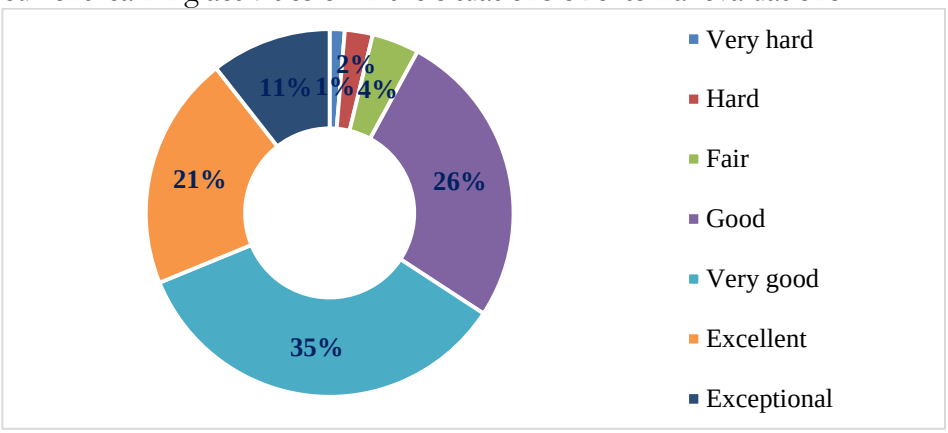

Fig.3. Students'perceptions of how well they handle school tasks

An important factor on stimulating students' involvement in learning activity within science lessons is the degree of difficulty of their daily school tasks. This is precisely why this item focused on students' perceptions concerning this issue.

The answers given (Fig. 4) show that the students consider the school tasks neither easy nor difficult (neutral) (30%), slightly easy (30%) and moderately easy (17%), which leads us to the conclusion that school tasks are not considered much too difficult to lead to demotivating the students.

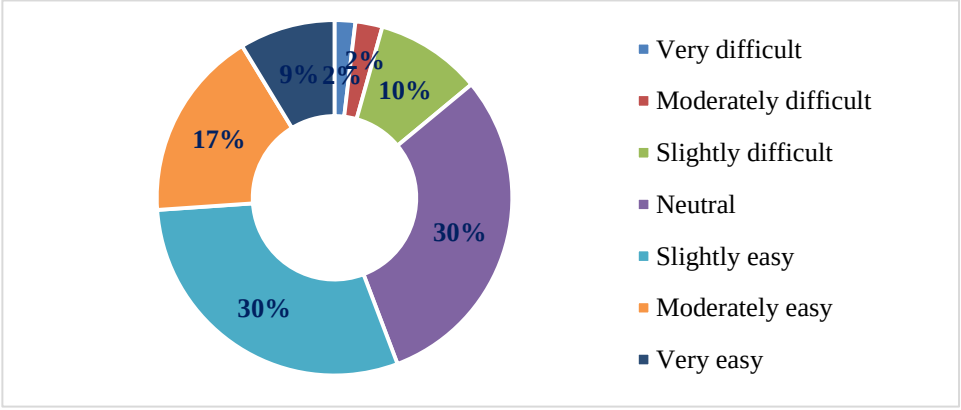

Fig. 4. Students perceptions concerning the degree of difficulty of their daily school tasks

6. Discussions

After presenting and analyzing the answers obtained to the above described four items, we can make some comments.

According to the obtained results, the level of the students' satisfaction related to the school is medium, which should lead to a reflective analysis by the science teachers, in order to find a solution for increasing the satisfaction of the students concerning the school, in general.

The satisfaction within the learning activity is an extremely important variable for learners, based on motivation. When students are delighted with the results, they will be motivated to learn. Learning has to be rewarding, whether this satisfaction comes from the feeling of accomplishment, from the praise received from the teacher or from the simple pleasure of the learning process [5].The teacher must provide feedback and support his/her students, he/she must ensure that the students feel that the lessons learned

are useful or beneficial by creating opportunities to use this new knowledge in real contexts.

Concerning the students' considerations regarding the difficulty which they learn new things, the results show that students think they can easily learn new things. Science teachers must therefore be concerned about using in their lessons of elements of novelty in relation to the themes approached and the teaching strategies used.

The students' perceptions on how well they handle school tasks was another issue addressed in the study. Those perceptions relate to the concept of self-efficacy. According to Bandura [5], the self-efficacy is defined as "people's perception of their ability to organize and execute sets of actions needed to achieve designated performance types." The self-efficacy influences choice of activities, effort and perseverance. Adapted to the school context, the self-efficacy theory asserts that beliefs about efficacy refer to the degree to which a student believes he/she has the resources or the power to perform a school task. It is important that teachers help the students on forming correct perceptions of self-efficacy, because although the results show that students think they are doing well in solving school tasks, their results sometimes invalidate this idea.

The last issue addressed in the present study is the students' perceptions about the degree of difficulty of their daily school tasks. From the analysis of the obtained results, we can conclude that students do not perceive school tasks as difficult, but rather medium.

Having all this information and combined with other important issues considered in the study of the disciplines in the science area, the PROFILES project aimed to make science learning and science specific topics more interesting, relevant and meaningful for students. To achieve such a goal, in the "*PROFILES - Education through Science*" Continuous Professional Development Program, dedicated to science teachers (Physics, Chemistry, Biology), the focus was on developing teachers' scientific and pedagogical competences, on teaching through scientific investigation (*IBSE*) and on approaches that promote this strategy.

We consider that our research has an international and social relevance, it brings added value to the educational domain, because, starting from the research results (a part of this research we presented in this article), the PROFILES Project proposes a fundamental change in the Sciences teaching, starting from students' opinions and their real needs. This requires a pass from the traditional Science teaching model, based predominantly on the transmission of knowledge, on theory, to a constructivist model of Sciences teaching, centered on student, with an emphasis on student` direct involvement in learning, on experimentation, on application, on

investigation. Also, as a result of the PROFILES Project, there have been changes in the curriculum of Physics.

We think that the contribution of our study to the development of the research theme is that we bring into attention the importance of the students' perceptions concerning their involvement in sciences lessons learning activities. We believe that only in the conditions in which we start from the students and from their opinions, needs, interests, we can conceive a quality educational process, that leads to the formation and development of fundamental competences of the students in the field of Sciences.

7. Conclusions

Corroborating the results obtained by students, previously presented and analyzed, with the results of the Romanian students in a series of international tests targeting acquisitions in the field of Sciences (PISA, TIMSS etc.), which are below to the average obtained in the EU countries, we can conclude that there is a need to reconsider the educational practices promoted in the teaching of science disciplines.

The training model that is still widely used in science teaching is a teacher-centered approach, a logocentric dominant model, which in particular includes expositional teaching methods characterized by a *cold* presentation of the knowledge through an excessive routing of learning, a model that can only produce effects as students' passivity and, often, a mechanical assimilation of information, rather than an authentic learning.

In this context, the project aimed to fundamentally change this Science teaching model. That is why, in the "*PROFILES - Education through Science*" training program dedicated for Science teachers, there have been developed and implemented, during Sciences lessons, training modules centered on teaching through scientific investigation (*IBSE*), thereby promoting a student-centered learning model and ensuring the efficiency of the scientific literacy process. The PROFILES Modules are based on socio-scientific issues, which are derived from real life and which invite the student to formulate hypotheses, but checking also its validity through investigation, experimentation, research - all of those being circumscribed to scientific literacy. Only through such a learning approach that places the student in its center and maximizes the cognitive, affective, and actional resources of the learner, we can talk about effective learning and about fundamental and long-lasting acquisitions in Sciences area.

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The authors of this paper declare, on their own responsibility, that the subjects who participated in the research have been informed related to the voluntary nature of their participation, the understanding of the received information and the fact that the withdrawal from the research process can be done at any time without any negative consequences on participants. The whole research respected the actual ethical standards and the participants expressed their consent to participate in the undertaken research.

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