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LEARNING STYLES AND SELF-REGULATION IN HIGH SCHOOL STUDENTS

Keywords
Learning style, Self-regulation, Behavior, Individual differences

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Abstract

The issue raised by this research is to identify the predominant learning style and the need to know the relationship between the predominant learning style and self-regulation in high school students. There was no significant relationship between the active learning style and the self-regulation ability of high school students. Significant relationships have been identified between reflexive learning styles, theoretically and pragmatically, and the ability of high school students to self-regulate. Preferences for a learning style and self-regulation vary with age, class, gender and preferred subject matter. There was no significant relationship between the predominant learning style and the self-regulation ability of high school students. The existence of a direct relationship between reflexive, theoretical and pragmatic learning

styles and self-regulation seems to indicate that these styles are preferred to the active style of self-regulation.

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1. Review of literature

A modern educational trend is the substitution of traditional classroom learning with active forms of learning based on personal learning styles that make this process more efficient and lead to higher academic results (Fallan, 2006).

Everyone has a unique learning style, personal qualities that influence the ability to acquire information, interact with others and participate in the learning experience (Al-Balhan, 2007; Mupinga, Nora and Yaw, 2006). Learning styles are the result of preferences for a particular way of learning, context of the learning environment, areas of learning growth and the general way of doing it (Rassool and Rawaf, 2007).

To have a theoretical basis for these researches, it is imperative to define commonly used terms. Therefore, learning styles and self-regulation will be further defined.

In the theory of experiential learning, learning is defined as the process through which knowledge is created through transformation into experience. Knowledge derives from the combination of accumulation and transformation of experience (Kolb, 1984).

The concept of learning style describes the individual differences in learning, based on the natural, usual, preferred way of absorbing, processing and retaining new information and skills. The learning style can considerably influence the learner's response to different learning outcomes (Wu and Alrabah, 2009).

Hereditary dowry, our life experiences and the demands of the environment lead us to develop a preferred way of choosing between four learning modes: active, reflexive, theoretical and pragmatic. The main features of learning styles are: active style -

animating, improviser, discoverer, imprudent, spontaneous; reflexive style - weighted, conscientious, receptive, analytical, exhaustive; theoretical style - methodical, logical, objective, critical, structured; pragmatic style - experimentalist, practical, direct, efficient, realistic (Nevot, 2008). Often, the term "learning styles" is associated with "cognitive styles", "thinking styles" or "learning modalities" (Rassool and Rawaf, 2007).

Learning styles have been found to be closely related to academic performance (Al-Balhan, 2007). The preference for a particular learning style varies with gender (Lincoln and Rademacher, 2006), age, experience and maturity (Long and Coldren, 2006; Palloff and Pratt, 2003; Sheridan and Steele-Dadzie, 2005), depending on the style of thinking, the structure of the intellect (Sheridan and Steele-Dadzie, 2005), depending on the discipline (Dinakar, Adams, Brimer and Silva, 2005) and the teacher's teaching style can sharpen, improve the learning style (Long and Coldren , 2006). Style, ability and learning speed differ from person to person. A study by Şirin and Güzel (2006) revealed that students had different information processing systems and learning styles. Study results indicate that learning styles differ depending on high school subjects and testing modes at admission to the university.

In general, teachers teach in the style that is in accord with their preferences and which they consider effective for themselves (Healey, Kneale and Bradbeer, 2005). Students whose style of learning is compatible with the teaching style of teachers tend to retain information longer, apply it more effectively, and have a positive post-course attitude towards learning subjects (Dinakar et al., 2005).

Children suffer deeply when their natural way of thinking, acquiring and processing information, creating and expressing is criticized, ridiculed or ignored (Al-Balhan, 2007). For example, a good knowledge of student learning styles and adaptation of

learning methods significantly increase their mathematical performances (Al-Balhan, 2007). Chiou and Yang found, following a 2006 study, that teachers can influence students' learning style and occupational stereotypes. That's why the model that each teacher presents are very important, because it can affect the school results.

Felder and Silverman (1988, quoted by Graf, Kinshuk and Liu, 2009) developed a questionnaire model for identifying learning styles, combining with Kolb's model (1984). By combining these models, the Felder-Silverman Learning Style Model (FSLSM) describes the learning styles in detail, characterizing each subject according to four dimensions: active / reflexive, sensory / intuitive, visual / verbal and sequential / global (Graf, Kinshuk and Liu, 2009).

According to FSLSM, students who have an active learning style learn better by working actively with learning materials, applying and probing. They prefer to work in a group where they can discuss the material they have learned. Reflexive people prefer to think, reflect on the material to learn, and work alone. Students with a sensory learning style prefer to learn concrete facts using their sensory experience and are considered realistic and sensitive. Intuitive learners prefer abstract themes, theories, principles, these students being considered more innovative and creative. The visual / verbal dimension targets pupils who best remember what they saw (diagrams, maps) or those who learn better from textual representations, whether they are written or spoken. In the sequential / global dimension, students are characterized according to their understanding: graded or holistic (Graf, Kinshuk and Liu, 2009).

Several studies have been carried out resulting in different outcomes. The predominant learning styles of students involved in normal or intensive programs were different but not significant; those with a normal program were divergent, those with intensive program were convergent, but their learning styles were balanced

(Suliman, 2006). Students with learning disabilities prefer to use more gradual processes, including memories and exercises, towards students without disabilities. In addition, students with learning disabilities reported a greater need for self-regulatory strategies than their colleagues without disabilities, including learning process control, self-orientation, planning, monitoring, and continuous assessment of learning processes and results. Disabled students have stated the need to regulate the learning process (Heiman, 2006).

Lister has discovered that specific learning styles differentiate pupils into three categories: students who need help, regular students and higher-school students, and that there are differences between the characteristics of the learning style of the students who need help from ordinary students (Lister, 2005). For example, Brand (1999) and Brand, Dunn and Greb (2002) have found that students with attention deficit disorder were less persistent in learning. Fine (2002) found that pupils with special education had low persistence, low motivation and low responsibility towards students considered normal.

Nevot (2008) identifies for each learning style - active, reflexive, theoretical and pragmatic - the main bottlenecks that students can encounter and suggests some solutions that teachers can address to improve or improve these sensitive issues.

The most common bottlenecks that can hinder the development of active learning are: fear of failure or fear of mistakes, anxiety, the sense of obligation to do what they do not want, lack of self-confidence, thinking too carefully about certain things. The proposed solutions include new activities, things that have not been done, at least occasionally; activating curiosity; practicing problem solving in groups; changes in activities during classes; discussions; communication of ideas; solving exercises using repetitive techniques; allowing mistakes; stimulating critical thinking (Nevot, 2008).

Regarding of reflexive style, the main bottlenecks are due to the lack of time for planning and thinking, the obligation to change activity quickly, the impatience, the lack of control and the lack of orientation on the finality, the students paying more attention to the work themselves than to obtaining the result. Teachers can improve these aspects by carefully writing, drawing to the blackboard to perform certain tasks, developing protocols, collecting information through observation, oral communication, investigating, adding new information, giving time for creative thinking, providing thought patterns, introducing a reflection phase in each action, awakening the joy of knowing, activating and maintaining the interest, oral presentation of the teacher (Nevot, 2008).

Students with a predominantly theoretical learning style may face the following bottlenecks: the impetus to remain with the first impressions, the preference for intuition and subjectivity, the lack of coordination of structured and organized approaches, the excessive dependence on others (teachers or colleagues), the preference for spontaneity and risk, the inability to convert thoughts into action, and the inability to complete and perform the work. The suggestions offered refer to the careful reading of theories, problems; analyzing complex situations; anticipating obstacles and finding solutions to overcome them; summarizing theories; formulating the conclusions; practicing the formulation of questions; perseverance; storage practice and automation; application of concepts (Nevot, 2008).

The pragmatic learning style can raise certain issues for students, such as: Exaggerated thinking about useful things, lack of vision of the usefulness of the lessons learned, not finalizing topics, distraction of attention and lack of concentration. Possible suggestions for remedying these problems are self-correction and self-evaluation, soliciting help from experienced people,

experiments and observations, studying the techniques used by others, role-plays, exercises and the use of images (Nevot, 2008).

The term self-regulation refers to the processes by which people control their thoughts, feelings, and behaviors. When people manage to self-regulate, they effectively manage their perceptions of themselves as well as social relationships. They behave in ways that are consistent with their goals and standards of behavior. Instead, when people fail to fight self-regulation, they lose control over personal and social experience. Successful self-regulation is essential for adapting to all areas of life (Hoyle, 2006).

Self-regulation is the ability of the self to change behavior. This increases the flexibility and adaptability of the human being's behavior, allowing people to adapt their actions according to social and situational requirements. It is an important basis for the popular conception of free will and socially desirable behavior. It provides benefits to both the individual and society, and good self-control contributes to positive results, including good school and work outcomes, popularity, mental health, and interpersonal relationships (Baumeister and Vohs, 2007).

From a theoretical perspective, self-regulation is a proactive approach to the process by which individuals constantly organize and manage their thoughts, emotions, behaviors, and the environment in order to achieve their goals (Boekaerts and Corno, 2005). Self-regulation operates through three areas of psychological functioning that are essential in the learning process: cognitive (eg learning strategies), motivational (eg self-efficacy) and metacognitive (eg self-monitoring and self-reflection) (Trautwein and Köller, 2003).

Research conducted by Stoeger and Ziegler (2008) demonstrated that primary classes can successfully implement self-regulation, and homework helps learners learn how to manage their time, develop their self-efficacy and self- reflection of performance.

Self-regulation refers to the human ability to change the response to different challenges. This is the process by which people try to gain control over the initial response to certain stimuli. Adjustment means change, especially changing behavior to bring it into line with certain standards, ideals or goals. Changing behavior is based on following rules or pursuing ideals or targets. To change a response, we do not necessarily overwrite it, although self-constraint is a form of self-regulation, but it is also amplifying or prolonging a response. However, the most common form of regulation is the over-writing or suppression of the response (Baumeister and Vohs, 2007).

According to Baumeister and Vohs (2007), self-regulation involves four stages: standards, monitoring, self-regulation power and motivation. First, self-regulation implies the adoption of standards that will open the way. Monitoring is intended to regulate behavior by standards. The power of self-regulation or the power of will helps to fulfill ideals. Even if the standards are very clear, monitoring is effective, and the person's resources are abundant, however, the person may not succeed in self-regulation and the goal cannot be achieved. The role of motivation is particularly important because it helps the subject respond to various situations.

Self-adjusting behaviors are gradually developing over time, always practicing. Some experimental studies demonstrate that students can be trained to develop self-regulation skills while doing homework. It is important for students to continue these self-regulation activities to become aware of the relationship between homework's and certain processes such as goal setting, self-reflection, time management, or delay of satisfaction (Ramdass and Zimmerman, 2011).

Those who learn should be involved in self-regulation, as there is evidence to support a clear understanding of the role of this factor improves the results of the activities. For students, the effort

allocated over a long period of time request for alternative and attractive activities. Students need to use self-regulation to stay interested (Bembenutti, 2009).

Theoreticians in the field claim that students who successfully regulate their learning are actively engaged in the process of acquiring knowledge and can adapt their behavior to achieve their goals. Specialists assert that the effectiveness of the self-regulation process varies according to the school context, personal effort and performance (Housand and Reis, 2008).

Studies conducted by Housand and Reis (2008) highlight the fact that the personal processes, the environment and the individual behavior of both teachers and pupils are factors that facilitate students' use of self-regulation strategies for reading.

Establishing and pursuing goals is particularly important at the gymnasium level. It has been noticed that students who have self-regulation skills learn about intrinsic value and feel more confident in achieving goals than students who lack self-regulation skills. Students who set high targets often choose the tasks that challenge them, regardless of their level of ability. They demonstrate a high level of perseverance when faced with difficult tasks and frequently use effective learning strategies (Cooper, Horn and Strahan, 2005).

When students adjust themselves, they analyze the activities in terms of the goals they have proposed, and then develop a strategy on how to complete the task by choosing the most effective methods. Practice and consolidation are the key to success. Once students recognize the impact on their learning methods, they begin to be more accountable to their learning (Zimmerman et al., 1996, cited by Cooper, Horn and Strahan, 2005).

Essential for successful goal setting by students is the realism of goals. Students who have realistic goals can monitor their progress. They are usually interested in the topics presented in the classroom, ask questions and advance ideas for discussion. When

doing their homework or tasks, self-regulating students clarify their difficult things, ask questions, and are deeply interested, make predictions, find basic ideas, summarize what they have read and correlate with other previous knowledge and experiences Zimmerman et al., 1996, quoted by Cooper, Horn and Strahan, 2005).

Teachers can help students acquire self-regulation skills by structuring courses and practicing educational methods to help them self-regulate. This will increase student confidence and self-regulation ability (Cooper, Horn and Strahan, 2005).

2. Methodology

This research has used tools whose results are numerical data expressing the quantity. It is a quantitative and transversal study. The subjects were examined at one point, the instruments being applied in one step.

Two tools for data collection have been applied: Cuestionario Honey Alonso de estilos de aprendizaje (CHARA) and, respectively, The Self-Regulation Questionnaire (SRQ), developed by Miller and Brown.

After the two questionnaires were handled, the data were analyzed with the Statistical Product Package for Social Science, version 10.0 for Windows, after which the results were analyzed to see whether there was a supposed correlation at the beginning, according to which there are different levels of self- depending on the learning style, and there is a learning style that correlates with a higher level of self-regulation.

In order to establish the correlation between the two variables, the statistical significance of the correlation coefficient r by Pearson was applied. In order to obtain the statistical results, descriptive analyzes, frequency, comparisons, validation and reliability of instruments were performed, the Alpha de Cronbach coefficient was determined (see Table 1), correlation analyzes

were performed to compare the scores obtained at self-tuning with each of the four learning styles, and ANOVA was run to see if there is a statistically significant relationship between predominant learning and self-regulation (see Table 2).

Objectives

The specific objectives of this research were:

1. Determining the predominant learning style of high school students.
2. Analyzing students' learning styles in relation to their self-regulation capability.
3. Identifying possible relationships between learning styles, self-regulation, gender, age, class, and preferred subject.

Hypotheses

According to research problem announce above we have the following hypotheses:

H_1: There is a relationship between the score obtained in the active learning style and the self-regulation ability.

H_2: There is a relationship between the reflexive learning style score and the self-regulation ability.

H_3: There is a relationship between the score obtained in the theoretical learning style and the self-regulation capacity.

H_4: There is a relationship between the pragmatic learning style and the self-regulation ability.

H_5: There are differences in self-regulation capacity depending on the student's predominant learning style.

Variables

Research explores the two main variables: the predominant learning style, as an independent variable, and self-regulation, as a dependent variable. In addition, demographic variables: gender, class, age, favorite subject will be subject to additional analysis.

Methods

To identify the four learning styles, we used the Honey-Alonso Learning Styles Learning Questionnaire, which has 80 items. Summing up the scores and comparing them, learning styles have been identified: active, reflexive, theoretical, pragmatic. Self-Regulation Questionnaire, developed by Miller and Brown, was used to evaluate self-regulation. It provided values between 63 and 252. Higher than 191 scores indicate a high self-regulation capacity, with a moderate self-regulation capacity between 171 and 190, and scores lower than 170 indicate a capacity for low self-regulation.

Population

The population consisted of 237 students from grades IX to XII from a high school in Bucharest. The choice of high school was random. Students have been selected so that there is a uniform distribution of them across classes.

3. Results

A total of 237 students, of which 99 boys, representing 42%, and 138 girls, representing 58%, participated in this study. The age of the students participating in the research varies between 15 and 19 years. After analyzing the data, it was found that students have some preferred subjects. Of the total of 237 pupils, 24 of them, representing 10.1% of the total, have no preference.

In descending order, preferences were as follows: biology (13.9%), geography (12.7%), history (9.7%), English (8%), mathematics (3%), music (3%), religion (3%), French (2.5%), sports (6.3%), Informatics (2.5%), physics (2.1%), psychology (2.1%), drawing (1.3%) and philosophy (1.3%). The data analysis shows that the predominant learning style is the reflexive (79 students, representing 33.3%), then the active style (57 students, representing 24.1%), followed by the pragmatic style (36 students,

representing 15.2%) and finally the theoretical style (31 students, representing 13.1%).

Without predominant learning style was 34 students (14.3%). Based on the frequency analysis, it was found that 57.8% of students had moderate self-regulation, 25.7% had a low level of self-regulation, and 16.5% had a high level.

The level of self-regulation varies depending on age, sex, class, and favorite subject. Based on descriptive statistical analysis, the lowest score obtained for the self-regulation variable was 135 and the highest 212, where the lowest was 63 and the maximum was 252.

Of the 79 predominantly reflexive students, 50 are girls and 29 boys; of the 57 predominantly active students, 34 girls and 23 boys; of the 36 students with predominantly pragmatic style, 15 girls and 21 boys; of the 31 students with predominantly theoretical style, 19 are girls and 12 boys; out of a total of 34 students without a predominant learning style, 20 are girls and 14 boys.

The pragmatic learning style predominates the boys, compared to the other styles, where the girls predominate. The distribution of learning styles by age is relatively uniform in 15-year-old students, with those aged between 16 and 18 years predominating in active and reflexive style, and 19-year-old predominate reflexive learning style.

The active, reflexive and pragmatic learning style is more common in the 11th grade and the more theoretical style in the 12th grade. The active, reflexive and pragmatic learning styles are the least among the 9th graders, and the theoretical style is less common in grades X and XI.

The active learning style is associated with the preference for geography, history and sport; the reflexive learning style is associated with biology, English, geography and history; the theoretical learning style is associated with preference for biology; and the pragmatic learning style is easily associated with the

preference for geography and biology. It can be noticed, for example, that preference for biology or geography is associated with several learning styles, so we cannot conclude that a learning style leads to one preferred subject.

Students' ability to self-adjust varies by class, age, gender, and preferred subject matter. It is noted that self-regulation is high and medium in the XI grade, and low in grades X and XII. It can be concluded that self-regulation varies according to the class in which the student is.

More boys than girls have a high self-regulation capacity and more girls than boys have a moderate and low self-adjusting ability. This leads us to the conclusion that the level of self-regulation varies by gender.

Generally, regardless of the preference for a particular subject, most students had moderate self-regulation. However, there have been issues that have been associated with a low level of self-regulation: French, drawing, religion and physics. These materials, from different curricular areas, we cannot conclude that preference for them would predispose students to lower self-regulation capacity. Also, students who preferred Informatics did not experience low levels of self-regulation.

From the correlation between the predominant learning style and the level of self-regulation, all learning styles are strongly associated with an average level of self-regulation, with slight tendencies to high or low levels. Thus, active and theoretical learning styles tend towards a low level of self-regulation, while in the reflexive and pragmatic learning styles there is no obvious difference between the high or low levels of self-regulation.

4. Discussions

Based on statistical analyzes, it was found that between active style and self-regulation there is no statistically significant

relationship, but the reflective, theoretical and pragmatic styles exhibit associations with self-regulation.

The research by Tapias et al. (2011) confirmed that most respondents had a reflexive learning style, with girls being the majority. In some countries, in the active and theoretical style, the boys were the majority, and the pragmatic style, the girls; in other countries, boys predominated in all styles. In the present research, reflexive style occupies the first place in the ranking, with more girls than boys, and the other results are different. It can be concluded that the preference for a particular learning style is not determined by the gender of the respondents, however the reflexive style is widespread. On the other hand, the application in several countries of the Honey-Alonso Learning Style Learning Questionnaire has demonstrated the reliability and validity of the tool.

Ergür (2000) and Güven (2003, quoted in Şirin and Güzel, 2006) confirmed that learning styles differ depending on high school subjects and admission scores. And in the present study, the predominant learning style had some fluctuations, depending on the preference of high school students for certain school subjects.

Self-regulation, as a set of cognitive, metacognitive, motivational, and behavioral strategies, must be seen in the context of certain goals, in this case self-regulation of education. Unfortunately, many students do not understand that their main purpose in school is learning. It seems that self-regulation of achievements is more common than self-regulation of learning (Kaplan, 2008). For this reason, there may be no significant relationship between learning styles and self-regulation.

5. Conclusions

Based on the results of the study, we have formulated the following conclusions:

1. There is no statistically significant relationship between the active learning style and the self-regulation ability of high school students.

2. There are statistically significant relationships between reflexive, theoretical and pragmatic learning styles, and the ability of high school students to self-regulate.

3. Students' preference for a particular learning style varies by age, class, gender and preferred subject.

4. The ability of self-regulating students varies by gender, age, class, and subject matter.

5. There is no statistically significant relationship between the predominant learning style and the self-regulation ability of high school students.

It is very important for teachers to know the predominant learning styles of their students to adapt their teaching-learning methods accordingly to improve the quality of learning. The instructional-educational process involves several types of activities, which can specifically address different learning styles. The most important quality of a good teacher is the ability to put himself in the student's place (Nevot, 2008).

Mooij (2008) places the process of self-regulation at the center of a triangle of selecting learning tasks (by others, by the learner for others), guided learning (guided by others, directed by the learner, and directing others) and evaluation (by others, self-evaluation and evaluation of others). The four elements influence each other. The role of the teacher in this case is to select learning tasks, to lead learning, and to use assessment methods according to the pupils' learning styles to get the best results.

Finally, it is recommended that teachers be made aware of the fact that they can improve the specific learning bottlenecks, improve the self-regulation ability of students, and help them learn better if they adapt their teaching methods to their learning styles. Teachers can also be made aware that they can positively influence

students' preference for certain subjects by adopting creative teaching methods and specific to the intellectual, emotional, and spiritual needs of students.

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Table 1

The Cronbach Alpha Coefficient for each learning style:

Learning style	Alpha de Cronbach
Active	.7339
Reflexive	.7221
Theoretical	.6720
Pragmatic	.7076

Table 2

Correlations:

		The activ learning style	The reflexive learning style	The theoretical learning style	The pragmatic learning style	Self-regulation
The activ learning style	Correlation Pearson	1,000	,009	-,058	,562	,026
	Sig. (2-tailed)	,	,887	,378	,000	,691
	N	237	237	237	237	237
The reflexive learning style	Correlation Pearson	,009	1,000	,708	,445	,439
	Sig. (2-tailed)	,887	,	,000	,000	,000
	N	237	237	237	237	237
The theoretical	Correlation Pearson	-,058	,708	1,000	,448	,415

learning style						
	Sig. (2-tailed)	,378	,000	,	,000	,000
	N	237	237	237	237	237
The pragmatic learning style	Correlation Pearson	,562	,445	,448	1,000	,256
	Sig. (2-tailed)	,000	,000	,000	,	,000
	N	237	237	237	237	237
Self-regulation	Correlation Pearson	,026	,439	,415	,256	1,000
	Sig. (2-tailed)	,691	,000	,000	,000	,
	N	237	237	237	237	237

** The correlation is significant at the level 0.01 (2-tailed).