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21st CENTURY LEARNER- SOFT SKILLS CASE

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Abstract

Experts in education and training recognize the importance of developing competence to solve problems. In the educational context, both teachers and curriculum designers agree that teaching and assessment tasks are problem-oriented. Exercising the problem-solving ability allows the student to discover and build their own learning strategy and adaptation to multiple contexts. The problem-solving problem has to be actively practiced since high school, benefiting from the solid development of cognitive processes higher. In our study we included 56 high school teenagers, 28 adolescents from an experimental high-school group and 28 adolescent control groups, all enrolled in high school, grade XI. I used Problem Solving Inventory (PSI) -Heppner and Peterson P.S.I, a 35-point instrument designed to measure how individuals generally react to daily personal problems. We expected that the subjects in the experimental group 1, who will follow the activities of our module, would have statistically significant results significantly higher in the Inventory of Problem Solving (PSI) -Heppner and Peterson than in the control group. At the same time, the subjects in the experimental group 1, who will follow our module, will have statistically higher results in the Inventory of Problem Solving (PSI) -Heppner and Peterson than in the pre-test. The obtained results confirm the assumptions of the research.

Keywords: Problem solving skills, learning strategies.

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1. Introduction

Our job is not to take care of the educational system that educates our children, but to create a system that suits the needs of the children.

If we look at the past, that is, our educational course, and make a list of things that did not exist 10 years ago, I think it would be long and very varied. Clearly, it would not include the many changes in technology, but also books, music, work habits, details of private life that help us manage more easily in the turmoil of our everyday life. Perhaps the list would have tripled if we took the exam for a longer period than 20-30 years ago, and perhaps our parents and grandparents would be contradicted by the new variants of spectacular adaptations. Of course, we know that technology is growing every second, maybe nanoseconds. The question is how do we make the education system fit into the society's needs with a new configuration stage to become more relevant to children's lives. Mass education, certainly, should prepare children for adult life and active citizenship. But does it even succeed? To what extent does schooling prepare students for the challenges of the future by developing strategies and abilities, healthy behaviours so necessary? In order to fullfil this role, education needs a clear vision of the needs of the future and the levers to achieve it? If we cannot anticipate the future, then how can we know what is the right citizen ideal for society or its fundamental abilities?

Educational transformations have been more and more frequent in our country, proof that educational policies are chaotic, they are not consistent with each other, they are discontinued, implementation, but especially their evaluation is poor. This greatly affects the quality of education, the poor investment in it, and especially the lack of relevant practices, with an important impact on the formation of young people. After all, it may be said that society is not concerned with the quality of education or that it is dangerous to teach young people to think for themselves.

2. Problem Statement

We live in a world where we are constantly tempted to return to the values of the past in order to feel secure and stable.

A few years ago, China reformed its education system by developing a new national curriculum tailored to the needs of the country's society to create productive and level-focused employees before specialization. The Organisation for Economic Cooperation and Development (OECD, 2014), when published the results of The Programme for International Student Assessment (PISA), demonstrated that these efforts were not in vain, and China dominated the top rankings. China quickly understood that the education system must move from the rigid academic system to an open, adaptable to economic development.

Also, The Organisation for Economic Cooperation and Development (OECD, 2013, p.27) published data on the impact of the technological revolution on our day-to-day lives and on communication, buying, and so on: “social and economic transformations have changed skills needs. As job activities and requirements are increasingly mechanized, the need for routine thinking and sequential thinking is declining. Instead, it is increasingly important to develop higher cognitive skills, process information and develop interpersonal skills. So the job development chart is booming, 21st Century workers should have

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a lot of skills to store and process selected information and work with them, including interpersonal communication skills, self-management, competence to learn, help fellows, adaptation skills".

For centuries, education has been called upon to develop young people in the spirit of society's needs. For many generations and especially after the war, many have concluded that education is too much centered on the academic side, which is very difficult to adapt to face the changing world, and therefore needs a vision of the future beyond school : increasing the employment rate, developing employment opportunities and social involvement, developing confidence in vocational education and vocational training, raising the age of certain jobs, engaging young people in volunteering activities to practice future professions.

Different learning communities recognize the importance of developing competence to solve problems. Labor market experts, human resources managers, education and training professionals include these cross-curricular / key competencies.

Dunker (1945) drew attention to the process of problem-solving competence and said that can be understood as the ability to discover a solution/method for achieving an objective, a solution that is not yet apparent from the PISA study. The results of The Organisation for Economic Cooperation and Development (OECD,2014a) study argues that evaluating this problem-solving competence it should be an internal problem specific to each country. Others like Reeff, Zabal and Blech (2006) says that solving the problems of a team, as a member of the team or as a leader, is essential for the development and employment of the labour market. However, the challenges of developing this competence stand in the way of collaborative tasks, which international tests are trying to solve.

As indicators of problem-solving competence, May and Newman (1980) describe the behaviour in Table 01, detailing the stages of each level of behaviour.

Table 01. Problem solving indicators

Stage	Cognitive field
1. Identifying the Issue	Awareness Issue
2.Definition of the problem	Translation and interpretation of inputs received. Fix the limit of the problem
3. Problem analysis	Decomposition of cognitive, affective, psychomotor problem components. Determining the existing relationship between the elements of the problem. Organization of the principles involved. Determining the desired effects
4.Data Management	* Selection of data collection methods Identification of required data Reporting data collection methods Selection of data collection methods * Data collection Applying data collection methods
5. Developing the solution	* Data analysis Organization of collected data Classification of collected data Reporting data collected about the problem and the results obtained *Determine the alternative solution Synthesize the data collected in a series of alternatives directed to the desired results * Selection of the final solution Evaluate all solutions and prioritize them according to various criteria Finding arguments for anticipated results
6.Implementing the solution	The actual results obtained from the desired ones (the effectiveness of the evaluation)

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3. Research Questions

The world of our children will be even more uncertain than our own. The rapid development of globalization and communication means that the world will become more and more fragmented, depersonalized and decentralized. Many of us may despair and desperately claw back to the good old days in the hope that we can reverse these trends. The reality is that this will not happened and, in many ways, the future looks so stark is because it is a world that we are not prepared for, a world that we would not feed comfortable in. So what kind of people will our children need to be? Does our system explicitly seek to develop soft skills in its current state? It is doing what it is designed for, preparing our children for the challenges of their futures? The real tragedy is that we are underestimating the potential of our young and of what they know and do.

4. Purpose of the Study

Research is based on the piloting of a self-standing module for the formation of transversal competencies, especially problem-solving. The system of modules is organized from the perspective of the curriculum at the school's decision, being made up of independent learning units with cross-curricular content, especially useful for counselling hours. Among the general purposes of the module we mention:

1. Adopt transdisciplinary perspectives in addressing content;

2. Familiarizing with student-centred teaching strategies;

3. Developing transversal skills such as critical thinking, problem-solving.

In order to exploit the general hypothesis, we propose its sequencing into operational units, also divisible:

1. The experimental group that will follow the activities of some of the teacher’s methods (graphic organizer, problem-based learning, debate, Think-pair-share method) will have statistically significantly higher results on the Problem-solving inventory (PSI) Heppner and Peterson, than subjects in the control group.

2. Subjects in the experimental group that will follow the activities of a specific organizer, such as the problem-based learning, debate, Think-pair-share method, will have statistically significantly higher results in the Problem-solving inventory (PSI) Heppner and Peterson than to pre-test.

The main working group volume comprised 56 participants, 28 teenagers constituting the experimental group and 28 teenagers forming the control group, all enrolled in high school, grade XI. Regarding the subject genes, in the experimental group 16 subjects were male and 12 females, and in the control group, 15 subjects were male and 13 females. However, it is important to note that the collected data were not interpreted from the perspective of the gender of the subjects.

The duration of the strategies described above (for the experimental group) was 5 months, with a frequency of 2 hours per week.

5. Research Methods

The main research tool used throughout the research period was the Problem-solving inventory (PSI) - Heppner and Peterson can be used in adolescents as well as in adults and can be completed individually or collectively (Fischer and Corcoran, 2007). Instructions ask respondents to appreciate what I think is true

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for each indicator. In the next step, the respondents are asked to score on a Likert scale (between 1 and 6) and choose the value that corresponds to the extent to which they agree or disagree. PSI indicators are anchored in such a way that the lowest scores reflect the highest perception of problem-solving capacity. The assessment of responses addresses three sub-scales: confidence in the problem-solving capacity

The questionnaire used for the research was administered before and after applying the strategies for the experimental group. The Problem-Solving Inventory (PSI) -Heppner and Peterson and the control group were applied in the same manner, more precisely in September and February, but without any experimental intervention.

Graphic organizers are very important teaching strategies for learning, for setting knowledge but especially for personalized use, according to the needs of students. The presentation of information in this manner, through multiple forms of expression, using both text and color, is a form of accessibility of the contents. There are numerous researchers such as Dexter, Park and Hughes (2011) or Douglas, Ayres, Langone and Bramlett (2011), which show the impact of graphical organizers on pupils, especially those with poor or needy special.

Problem-based learning seeks to solve problems. It might be a part of a problem. Learner finds solutions while instructor facilitates. This method is very useful, especially when it comes to research subjects when they are old when they become independent in decision making, so it is important to use certain problem-solving stages just to objectively analyze it and identify viable solutions, arguments in agreement with specific needs. Norman and Schmidt (1992) emphasize that PBL is recognized as an experimental learning method designed to create the context of discussing problems and attempting to explain the phenomena that make up the problem.

Debate. During a debate, teenagers challenge each other. The debate can take a break at intervals for additional research. Garet (1996) suggests that the utility of debate has been emphasized since antiquity, being a creative teaching method that has been abandoned in today's education, but which is particularly useful for developing critical thinking skills, communication skills.

Think-pair-share method. It is an instructional strategy where the teacher stops lecturing and asks teenagers to consider a question (think), turn to a partner and discuss their response with the partner. This strategy breaks the content into bite-sized pieces (the brain can only process so much at one time. It gets teenagers active (the method is more than sitting and getting mode and will put the students to talk.) Verbal experience will provide them with new ways to create learning, it provides novelty, more specifically when talking to a person, when Explain, the developer experience will also help you to create content that is easier to remember. It allows for formative assessment, that is, as the discussions within the teams, the teacher can easily realize what the pupils understood or the level they are they have about what has just been discussed, so it is much easier, as a teacher, to apply immediate remedial strategies to the class of students.

For the analysis of the quantitative data obtained in the experimental research, the SPSS (Statistical Package for Social Sciences) version 20 was used. The statistical hypothesis testing was performed using the Kolmogorov-Smirnov or Shapiro-Wilk test, the Mann-Whitney U test, the Wilcoxon test, Anova Multiple Measures, post-hoc tests, t-test for independent samples.

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6. Findings

After the analysis of the data distribution, the first hypothesis was examined, namely whether the use of the teaching strategies described above had the expected effect. The mean and median of the research groups (Table 1) were calculated, the Wilcoxon test (Table 2) was applied and the magnitude of the effect was calculated.

Table 02. Mean Rank

	Subject group	**N**	**Mean Rank**
Posttest	control group	28	14.54
	experimental group	28	42.46

Since Table 2 shows that the subjects in the experimental group had a higher ranking than those in the control group (42.46 versus 14.54), it results that those who did activities using the 4 didactic strategies get better results in the Problem-solving inventory PSI) -Heppner and Peterson compared to the control group students who did not use the strategies mentioned.

We calculate the magnitude of the r coefficient (using the data in Table 3) to obtain a magnitude of r = 0.856, which according to Cohen's criteria (1988) shows that the effect of experimental activities had a strong effect on their performance on the Problem-solving inventory (PSI) -Heppner and Peterson, which means they have developed problem-solving skills to a greater extent than the control group.

Table 03. Nonparametric tests

	Posttest
Mann-Whitney U	1.000
Wilcoxon W	407.000

In presenting the results, we will calculate and present the median which is more suitable for non-parametric tests for the post-test variable in each of the two conditions of the group variable.

As noted above, for the median experimental group is 123.5 and for the median control group is 69.

Thus, the results show that there are significant differences between the groups (U = 1, Z = -6,410), the students in the experimental group achieving significantly higher results (median = 123,5000 0 in the problem solving inventory (PSI) -Heppner and Peterson questionnaire the control group (69.0000-median) and the size of the effect shown by this research is r = 0.865, which according to Cohen's criteria shows that the effect of the activities using the 4 didactic strategies on the results obtained in the problem-solving questionnaire has a strong influence.

For the second hypothesis, the data obtained will be described in the following.

As the results in both tests are statistically insignificant, it results that the variable is normally distributed. Since the post-test data analysed for the other assumptions were not normally distributed and the sample is low volume, we will apply the Wilcoxon test (nonparametric test).

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Table 04. Post-test grup experimental -Ranks Mean Rank

	N	**Mean Rank**	**Sum of Ranks**
post.problem.solving - pretest.problem.solving	Negative Ranks	0a	.00

Table 4 Post-test test group problems Ranks presents the mean of the ranks, the sum of the ranks and the number of subjects for each of the three comparison situations: negative ranks, positive ranks (28 cases where the rank of the post-test is higher than the pretest variable) and the situations equality.

Table 05. Wilcoxon Experimental Group Test

	post.problem.solving - pretest.problem.solving
Z	-4.624b

Table 5 Wilcoxon Experimental Group Test presents the results of the comparison test. As Z = -4.624, p = 0.001 there are significant differences between the level of development of team competencies measured before the intervention and those measured after the intervention. In order to see the meaning of the difference, we analyse the values in the Sum of Ranks column in the Post-test experimental -Ranks table, and we will report the sum of the highest ranks. In our case, the high value is 406.00 and corresponds to positive ranks, situations where the ranks of the post-test are higher than the pre-test (after and before) ranks.

We also calculate the magnitude of the effect (applying the formula used in previous situations) and the median values for each of the two pair variables (r = 0.763)

In order to verify that the problem-solving competence (organized with other sub-competences) of the subjects is more developed after the intervention compared to the previous situation, we applied the Wilcoxon test. The obtained results indicate that the experimental intervention, the developed activities had a significant effect, resulting in significant differences between the post-test and pre-test variables, z = -4.624, p = .001, the problem-solving competence being more developed after the intervention, for the subjects who were part of the experimental group. The magnitude of the effect is r = 0.763, which highlights a strong effect of the experimental intervention on the development of problem-solving competence as measured by the Heppner and Peterson Questionnaire (PSP), which means that we reject the null hypothesis and accept that.

As can be concluded, the two specific hypotheses set out in the previous paragraphs have been confirmed, which means that there is a high probability that by applying strategies such as graphic organizer, problem-based learning, debate, the Think-pair-share method in each activity from school to develop skills to solve real problems. Of course, it is important to mention that these strategies involve a certain type of educational relationship and an efficient management of the class of students, sufficient work time and teaching materials suitable for classroom use. Also, the small sample of subjects is recognized, so the results cannot be generalized to pupils' cohorts. Teacher training in the use of student-centred strategies is equally important for developing problem-solving skills

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7. Conclusion

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