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Contribution of Conceptual Mapping to Understanding and Memorizing: An Intervention Program for a Student with Special Learning Difficulties in The History Lesson

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ABSTRACT

The current educational research conducted in the context of special education is an attempt to ascertain whether conceptual maps enhance memory and help a child with special learning difficulties in understanding a theoretical lesson, such as the lesson of history. That is why a first-grade Junior high school student diagnosed with special learning difficulties is chosen, who was discouraged by his ineffectual attempt to understand and retrace the lesson of history no longer showed any interest in the lesson.

In the framework of this qualitative research, in order to verify the effectiveness of the conceptual maps, a personalized intervention is made in the lesson of history for the student of the first grade, constructing the conceptual maps on the computer with the help of the software program "Inspiration 9". The lessons were based on the book of the history of first-grade Junior high school and refer to the Classical era in Athens. The intervention program lasted five weeks and the student actively participated in this.

Upon completion of the intervention, as well as the student's answers to the same test on the 5th and 7th week of intervention, together with the information given to us by the school teacher and the special education teacher in the integration section, verified the valuable help of conceptual charts in this lesson. In particular, their effectiveness in the field of education and in particular of special education was established and the conditions necessary for conceptual charts to help as much as possible in teaching were explored.

Keywords: 'inspiration 9', Conceptual Mapping, Memorizing, Specific Learning Difficulties.

1. INTRODUCTION

Conceptual mapping as an educational approach was introduced by Professor Joseph D. Novak at the University of Cornell. Based on a previous study by Ausubel (1968), he concluded that "meaningful learning involves assimilating new concepts and incorporating them into existing cognitive structures." The conceptual map is a graphical representation of concepts, where nodes represent the meanings and links between the concepts. The connections between the concepts are made with arcs or lines and can be one-way, bidirectional or non-directional. The concepts and sometimes the links are identified (called). Relationships and connections between concepts can be effectively represented through a conceptual map as the non-linear nature of conceptual maps facilitates the referral and link between different map elements (Ormord, 1955). The primary objective of this educational research conducted in the context of special education is to investigate whether cognitive maps and conceptual mapping help a child with special learning difficulties in understanding and memorizing the lesson of History. In addition, we will investigate whether the implementation of concept mapping as a pedagogical technique helps to maximize learning to make sense and to be meaningful to a child with special learning difficulties.

2. THEORETICAL BACKGROUND

Special learning difficulties are a field of research of interest and confusion for a large number of scientists and not only. According to the most prevalent definition, they concern problems in basic psychological processes of

understanding and using speech. In particular, they manifest themselves as difficulties of thinking, memory, perception, reading, writing, spelling or arithmetic.

In this research, we are called upon to ascertain the effectiveness of the "inspiration" program in enhancing the memory of a pupil with special learning difficulties, so we need to define what we mean by "memory".

Memory is defined as "the ability to encode, process, and retrieve information to which it has been exposed at some time (Swanson, Cooney & McNamara, 2004 in Pantelidou & Botsas, 2008 p.25). Memory includes three parts: short-term, long-term and working. These are three key processes. The first is coding in some form of representation so that the information is encoded. The second is storage and the third is recall. Difficulties encountered by pupils with learning difficulties in their mnemonic competence are important because they are directly related to reading and spelling (Charitaki, Soulis, Tzivinikou, & Peklari, 2018).

Several studies have identified the close relationship between deficiencies in working memory and learning difficulties (Charitaki, Baralis, Polychronopoulou, Lappas, & Soulis, 2015). The performance of children with learning difficulties in projects that assess working memory is lower than that of children who do not have a problem (Johnston & Anderson, 1998).

The memory deficit is due either to inefficient receiving and encoding of information or to the limited capacity of short-term memory (Swanson, 1993). The deficient coding is due to the reduced use of internal repetition, to the deficient phonological representation of information (Beaton, 2004). Students with special educational needs have difficulty in cognitive organization of information because they can not use the cognitive processes of discrimination, grouping, verbal identification (Sousa, 2001).

In addition, in this lesson we will - as mentioned above - have an intervention program for a high school student in the history lesson. Therefore it is important to explain what we mean by the term intervention. The term intervention is equivalent to the concept of differentiated teaching; it refers to "a systematic approach in the overall teaching design for students with different learning needs.

For the proper planning of teaching, emphasis is placed on two main axes: the student and the curriculum (Panteliadou & Antoniou, 2008). In particular, with regard to the student, we must take into account three parameters: his/her level of performance, his/her interests and the way he/she learns, ie whether he/she is aural, visual or kinesthetic (Bertrand, 2002). On the other hand, on the curriculum we distinguish three dimensions: content, content processing and the final product. (Panteliadou, 2008). It is important to say what a conceptual map is in summary and its kinds that have been used in this research. A conceptual map consists of a central concept, which is broken down into individual concepts and is depicted at the top of the map. In addition, it consists of nodes

that represent the concepts and links that define the relationships between concepts by describing how one concept is linked to another (Gouli, Gogoulou & Grigoriadou, 2006).

They graphically depict the individual concepts in which the central concept is analyzed and identified by a label. The links reflect the relationships between the concepts, ie they illustrate what kind of relationship they have two concepts. Links are depicted in the form of lines or arrows. The Triad: Concept-Link-Concept creates a clause. Thus, a conceptual map in essence is: "a diagrammatic representation of links between two or more concepts in the form of suggestions pointing out and highlighting links and relationships between concepts. The concepts may relate to objects or events. Conceptual maps focusing on events are characterized as exploratory as opposed to maps focusing on objects that are described as descriptive. The process of constructing a map is called conceptual mapping "(Gouli et al., 2006, p. 354).

The most widespread types of conceptual maps are initially hierarchical maps, which are presented in hierarchical form, where the most important concept is placed at the top and each individual concept is placed lower on the scale of the hierarchy depending on the relationship with the other concepts. The second category, the spider gram, places their basic concept in the center of the map. The concepts are organized around the center outward. The third category is flowcharts that organize the concepts into a linear or circular representation that can also use algorithms. Finally, we have systemic conceptual charts, which differ only from the previous ones in that they have their inputs and outputs: Spidergrams (Mind maps), Hierarchical maps, Flow maps and Systemic maps.

Conceptual maps have been used in the educational process in various fields, such as environmental education (Vassilopoulou, 2011), science teaching (Biology, Chemistry) (Pearsal et al., 1996, Muryanto, 2006), in medicine (West et al,2002), in computer science (Gouli, 2005), in language (Riley et Ahlberg, 2004), in emotional education and development (Charitaki, 2015) and in nursing (Gul Boman, 2006) and at various levels of school education. It has also been used as a tool for evaluating and investigating students' past knowledge and what they have understood (Vecchia and Petroni, 2007), but also as a collaborative tool (Hmelo-Silver, 2002). Finally, they have been used as a means of improving the reading ability of children with learning disabilities (Rogdakis, 2015).

Conceptual maps have much more advantages than conventional language texts. Thanks to the variety of media transmition, such as images, sounds, colors, they help the student to represent knowledge (Kress & Vanleeuwen, 2001). Indeed, they are a means of critical and creative thinking and help to shift from standardization in the production of knowledge (Dimitriadou et al., 2011). Still, the benefits include the ability to visualize an object or a category of objects, resulting in the ability to recall the abstract.

Another positive thing is the possibility of moving away from the process of memorizing and exploring the student's perceptions with the aim of improving and revising them. In addition, with mental maps, students can follow the learning process themselves and perform self-correction (post-cognition). And of course, they are given

the ability to construct concepts, which greatly help to identify parallelism, comparisons, differences in a way that is understandable. Finally, school adjustment could be promoted since many behavioral problems in Children diagnosed with Specific Learning Disabilities are noted due to their inability to achieve typical attainments (Charitaki, Marasidi, & Soulis, 2018).

Additionally, the benefits include the ability to connect teaching with technology and the pursuit of independent learning as well as the development of critical thinking and the improvement of language skills (Argyropoulos, 2013). Extending the advantages, we would say that the concept of conceptual mapping creates a dimension of communication content that Kress calls "plan" (Kress, 2004, p. 120). Finally, a disadvantage is that they require some practice in learning to build them and much free time to collaborate with colleagues (Charitaki, Antoniou, Soulis, & Koutsikou, 2018)..

3. METHOD

3.1 Research Design

For the purposes of this research, the qualitative method will be used, which, according to Denzin & Lincoln (1994), is a "framework activity" that researchers, for example, examine the objects in their natural environment, trying to understand and explain them on the basis of the interpretation they have given to them.

3.2 Participants

The pupil who participated in the intervention is a child attending the first-year of Junior high school and is 12 years old. According to his diagnosis by the University General Hospital of Athens, he faces special learning difficulties, namely dysgraphia and dyscalculia .

In addition, the child's parents are involved in the survey, namely the mother is forty-seven years old, a salesperson in a clothing store, and the father is forty-five and works in a transport company. They are both high school graduates.

On the other hand, the professor of the school, who teaches history and the professor of integration, will participate in the survey. The professor is a forty-five-year-old graduate of the philology department of the Athens Philosophical School, on the other hand the professor is thirty-five years old with postgraduate specialization in special education.

3.3 Research Tools

One of the research tools to use is the interview. The interview is one of the best-known methods of collecting material, where the researcher submits to the respondent a series of questions to be answered. What interests the researcher is to find out what the respondent thinks about a subject and to compare the opinions of respondents (Zafiriou, 2003).

In particular, the structured interview method will be used by one of the child's parents to fully outline the child's profile. In addition, an interview will be conducted with the humanities teacher of general education and with the humanities teacher of special education that teach the history lesson to the child in order to obtain information on the effectiveness of the intervention and how the student's performance is improving in the lesson of history. The questions were designed based on the curriculum of the first-grade Junior High School. With these questions, experts will study the effects of these questions on the student's performance.

Another technique to be used in this research is the pre-post test. In this task, on completion of the intervention program (5th week) the student will receive a performance criterion and the same test will be taken by the same student after two weeks (7th week) to check the effectiveness of the intervention in order to be able to draw reliable conclusions.

In particular, the test consists of two sets of questions. The first group includes correct-incorrect exercises as well as short answer questions, while the second group includes quotes or images analysis and further questions that require greater development. In particular, there are three questions in the first group, while in the second six. The test questions are based on the theory of the History book of the first-grade Junior High school.

Finally, free participatory observation has been chosen in this procedure . That is, the teacher is involved in the activity he is trying to observe. Unstructured observation is used as it allows the collection and recording of more data, which may not be properly evaluated or omitted in a structured form (Adler & Adler, 1998). Particularly, the history lesson, the questions of consolidation, the questions posed by the student, possible improvement or not, as well as the time the student is required to answer the questions, are recorded weekly.

3.4. Validity and reliability

In the present study, validity and reliability are ensured through methodological triangulation (obtaining research data on efficacy through both informal tests and interviewing teachers in the school context). Here, methodological triangulation will be used, which is the use of multiple methods to study a phenomenon (Stalikas, 2005). Also, credibility is ensured through the use of the performance criterion twice.

Finally, both reliability and validity are safeguarded through the use of research tools drawn from the bibliography.

3.5. Research questions

The aim of the research is to investigate the following research questions:

1. Is the use of conceptual mapping helpful for a child with special learning difficulties to understand the significance of classical events in Greece?
2. Does the use of conceptual mapping help a child with special learning difficulties to understand the importance of the political changes of the classical era in Greece?

3. Is the use of conceptual mapping helpful for a child with special learning difficulties to understand the functioning of the political system of the classical era in Greece?
4. Is the use of conceptual mapping helpful for a child with special learning difficulties to understand the concepts of equality and justice in the classical era in Greece?
5. Does the use of conceptual mapping help a child with special learning difficulties to understand the importance of classical culture in Greece?
6. Is the use of conceptual mapping helpful for a child with special learning difficulties to understand the importance of classical art in Greece?

4. DATA ANALYSIS

4.1. Procedure

The intervention program lasted five weeks in total and the lesson was held at two sessions of forty-five minutes each per week. The chapter of the classical era of Athens was used from the History book of the first-grade Junior high school. The unit was depicted on conceptual maps using the Inspiration 9 program.

In particular, conceptual charts were created for the following chapters of the classical era:

- 'Athens: Towards democracy'.
- 'The alliance of Delos - The alliance as a means of imposing the Athenian hegemony'.
- 'Democracy is stabilizing - Pericles and Democracy'.
- 'Functions of Democracy'.
- 'The formation of the Athenian society'.
- 'The process of education'.
- 'Causes, pretexts and the effects of the Peloponnesian war'.
- 'The hegemony of Sparta: A sovereignty in question'.
- 'The letters, arts and architecture in the classical era'.

Each map corresponds to either a specific paragraph or two or more. We used all types of mental maps that we saw in the previous chapter. The digital format is preferred because it provides possibilities such as development, presentation adaptation and reorganization of nodes, as well as offering a superb illustration in no time. (Mikropoulos, 2016).

4.2. Answer to research questions

With regard to the first research question, whether the use of conceptual charts is helpful in understanding the events of the classical era, the answer is positive. Indeed, the pupil before using the maps simply learned by heart the information he was taught without being able to realize the era of the events.

He simply studied the brochures given to him by the teacher, without being energetically involved in the lesson. This view is reinforced by the answer of the history teacher of the school and of the integration teacher in question 7, where they answer that the student has understood the importance of the classical era.

With regard to the first research question, whether the use of conceptual charts is helpful in understanding the events of the classical era, the answer is positive. Indeed, the student before using the maps was mechanically learning the information he was actually collecting while he had taught the lessons at the school did not understand at what time he was referring. She simply read the brochures given to her by the teacher, without being energetically involved in the lesson. This view is reinforced by the answer given by the teacher of the history of the school and his / her integration teacher to question 7, where they answer that the student has understood the importance of the classical era (Figures 1 and 2)

General Questions: (History School Teacher)
1. What is the student's performance in the history lesson?
Answer: I would describe the pupil's performance as moderate, around 13-15 in terms of performance in writing. The student is not examined verbally but with a test at the end of the school term.

2. Do you believe that the student has the ability to explain the historical terms
and concepts mentioned in the book according to the objectives set in the curriculum?
Answer: Not altogether, but the student is making enough efforts to a satisfactory degree.

3. Do you consider that the student has mastered the ability to describe or classify the historical events of different periods of history?)
Answer: Yes, the student has understood the sequence of events taught in history.

4. Do you think the student can say in his own words and understand the content of the lessons taught in history?
Answer: The student can say in his own words the content of the lessons but to a moderate degree, provided the vocabulary has been simplified in advance.

5. Do you think that the student can evaluate the action of historical figures and events that are being taught? Has he / she developed critical competence, as provided by the curriculum?
Answer: I would say that the student has not acquired critical competence to the extent required. Often, he is confused when you ask him to judge the work of a person.

6. Do you think that the student has understood the importance of classical culture in Greece?
Answer: The pupil has a good understanding of letters, namely history, philosophy, rhetoric and theater.

7. Do you think the student has understood the importance of classical art in Greece?
Answer: The student has partly understood the basic features of architecture and how much they affected later cultures.

With regard to the second research question, that is, if the use of conceptual charts help to understand political changes, the answer is positive. In order for the student to realize that from the end of the previous era (the Archaic period) starts the transition from the aristocracy to democracy, which is established in the classical era, the measures of Solon and Kleisthenes were designed in a conceptual map so that the learner can get a connection of the events and understand how the constitution is changing. Then, much emphasis was placed on Pericles' measures in the classical era. "Sparta's hegemony: A domination in question" was depicted in a conceptual map in which the student understands that after the Athenian defeat in the Peloponnesian war democracy was overthrown and the tyranny was established. Of course, at the end of the classical era, democracy was restored.

The fact that the student seems to have deeply understood these changes is apparent from his answers, those especially related to: "Pericles and Democracy. " This understanding is apparent from his answers to questions eight, twelve and thirteen.

Moreover, through the interview with the class teacher and the special educator, the answers we received were that the student had realized that the classical era with the measures of strong politicians established democracy and although after the end of the Peloponnesian war democracy was overthrown, it was restored at the end of the period.

Then, on whether the student has realized the function of the political system in the classical era, the answer is positive. In this case, in order for the student to understand the functions of the system, he also involved himself by making a conceptual map after having highlighted important information in the form of bullets with the help of his teacher so that the student becomes aware of the most representative works of that period. Along with the conceptual map, the teacher showed images to the child in order to fully understand the differences in the Ionic-Doric rhythm. The fact that the student could distinguish the differences between these two architectural styles is evidenced by the fact that he answers easily and with precision question 6 of group B of the tests before and after and he can compare two images and identify which are Doric or Ionic rhythm. Moreover, it seems to have consolidated the basics of the lesson from the answer given to the question one of the course: "Architecture of the Classical Times", but also from the answer to question four of the tests. Finally, the teachers interviewed answered that the student has grasped the meaning of classical art to a good extent and can tell what work of art is referring to at this time.

5. CONCLUSION

Therefore, in an overall assessment we find that mapping of concepts is a dynamic cognitive tool that supports the educational process by promoting learning objectives (Dimitrakopoulou, 2001). In the first place, conceptual

mapping can promote understanding, since as presented, the knowledge on maps enables both the general view of the content and the selective focus on an area (Gouli et al., 2006; Novak & Canas, 2006).

Moreover, mapping is a tool for the development and cultivation of critical thinking, as it helps the learner to extract the key points of a text and to avoid the accumulation of unnecessary knowledge (Hannafin, 1992). In addition, conceptual charts are a post-reading tool because they help learners to "learn how to learn", ie they have the opportunity to participate in the learning process (Symington & Novak, 1982).

On the other hand, it is also a useful tool for the teacher himself. This is because the teacher can organize course material and simplify complex concepts (Anderson, Inman & Zeitz, 1993). And, of course, they can use it as a diagnostic tool, so that the teacher can distinguish interpretations or misinterpretations that make it difficult to acquire new knowledge and adapt his teaching tactics to facilitate the acquisition of new knowledge (Vosniadou, 1994).

In particular, in this educational research it was investigated whether conceptual mapping helps to understand the events of the classical age as well as the political situation and political changes. The answer to these questions was adequately and positively addressed. In addition, the student has been able to focus and understand basic concepts of the classical age, such as equality and justice. As far as the last two questions are concerned, the student has comprehended satisfactorily the most basic elements of classical culture and art.

It is worth noting that due to limited time, there was insufficient analysis of each text. More teaching time would be particularly useful in order to exercise more the student's critical thinking and to be able to evaluate the work of persons or events.

To conclude, in order to be able to draw safe conclusions we need to have a longer term study, with a larger sample of pupils, different ages and countries in classroom conditions and in different fields. It should also be emphasized that it is necessary in a later study teachers to devote a certain teaching time in learning all the steps and stages of the maps of the concepts, so that students become familiar with the basic concepts and the way they are constructed.

In particular, other surveys could include construction of concept maps supported by a list of concepts and links with the direct goal of learning students to define relationships between concepts already depicted or to introduce new concepts. Of course, it is especially important to familiarize students with the key points of a lesson and build maps with paper and pencil.

This is also a limiting part of the present work, namely that there was no teaching time so that the student first became acquainted with the construction of conceptual maps on paper or on the computer, taking into consideration

that the student did not participate actively in the learning process, but it was limited to getting ready-made drawings.

Two main goals to be conquered before the learner makes the conceptual maps either on the computer or on the paper is the choice of information as well as the emphasis on the relationships between the basic ideas. Also, the student needs to be familiar with the technique of paraphrasing, ie he should not transfer text information as it is.

Last but not least, graphics and sounds, or video, could be added to a later research so that the student can listen to the lesson based on the conceptual map he has made. Thus, conceptual mapping based on the inspiration software addresses all three types of learning, visual, aural and kinesthetic.

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