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THE CONSTRUCTION OF CONCEPT MAPS BY 10- AND 13-YEAR-OLDS IN GRAMMAR LESSONS

Anita Habók, University of Szeged, Hungary

Abstract: This study reports the results of a developmental training program that used concept maps in Hungarian grammar lessons, focusing on the effects regarding learning habits. Following a pre-test, subjects in the experimental group worked on a series of concept mapping exercises, while no such intervention occurred in the control group. All subjects were then administered a post-test in grammar and a questionnaire on their learning habits. The results show that students in the experimental group performed better on the post-test. They did not report a more frequent use of meaningful learning strategies, although they acknowledged their importance in learning.

1 Theoretical background

The teaching of learning strategies and techniques is very important in order to make the structuring and organizing of knowledge easier for learners. Memorisation and rote learning are the most often used learning strategies by Hungarian students (Artelt, Baumert, Julius-McElvany and Peschar 2003; B. Németh and Habók, 2006). Instead of these, the strategies of meaningful learning should be brought to the foreground. Informed by Ausubel's work (1968), Novak (1998, 1984) developed concept mapping, a method supporting meaningful learning. According to Ausubel's theory, meaningful learning takes place when new pieces of information are integrated with prior knowledge. Without this, they remain isolated elements in the cognitive structure, difficult to access. Students generally want to learn as quick as they can. In case they do not understand the learning material, they tend to choose a method less time-consuming than elaborating on details. They opt for rote learning, which, however, does not yield deep knowledge they could recall and apply more permanently. Techniques such as concept mapping can foster learning processes, but their acquisition also takes a long time.

Concept maps express meaningful relationships between concepts in the form of propositions. Propositions are two or more concept labels connected by linking words in a semantic unit. Propositions are the simplest constructions in the map. Linking words explain the connection between the labelled links. The concept labels and linking words can be concepts or main ideas. Concept maps comprise a net of propositions. In our research, concept maps are structured hierarchically, usually from the general to the specific.

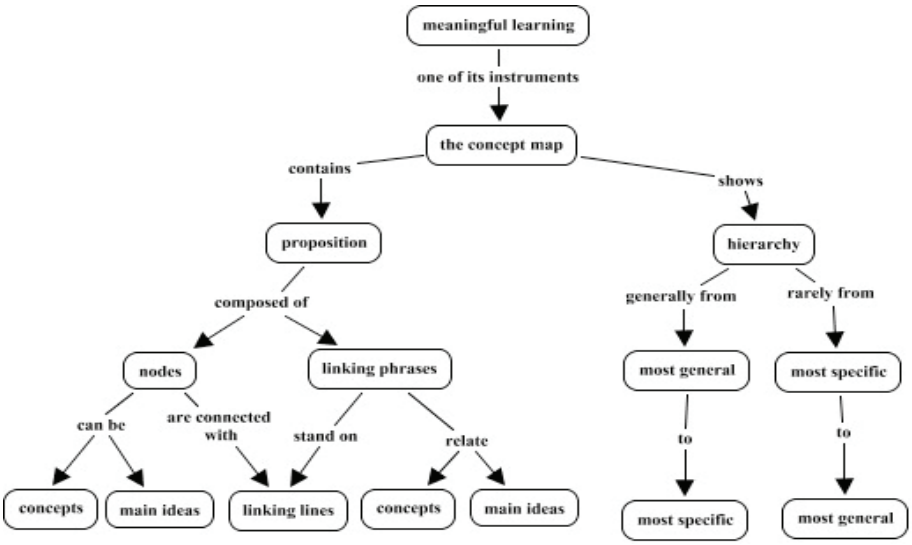


Figure 1. The elements and hierarchy of the concept map

Concept maps can be used in different contexts, for making plans, planning papers, outlining processes or extracting main ideas. They are an instrument for researching prior knowledge (Gurlitt, Renkl, Faulhaber and Fischer, 2007), exploring learning from texts (Hauser, Nückles and Renkl, 2006) or studying the comprehension of texts that students have to understand and learn. Concept maps are subjects of inquiry in different academic fields, e.g. biology (Kinchin, 2001) and chemistry (Branst, 2001). The research presented here focuses on grammar.

2 Aims and research questions

The main objectives were to examine what effect concept mapping has (1) on the process of learning, and (2), on subjects' knowledge of Hungarian grammar and learning habits. We expected improvement in a) text processing; b) finding the relationships within a text; c) locating the main concepts in a text; d) writing summaries and drawing diagrams; e) using a learning technique that they can also apply in other subjects; and f) using meaningful learning strategies instead of rote learning. That is, the developmental programme was designed to facilitate more a efficient understanding of sentences and texts.

3 Methods

3.1 Participants

Participants were 4th and 7th grade pupils. The experimental group consisted of three 4th grade classes (10-year-olds, n=65) and three 7th grade classes (13-year-olds, n=73), from three schools in Szeged, Hungary (two downtown, and one in the outskirts). The control group was selected from three schools from other Hungarian towns, with three classes per age group (10-year-olds, n=72; 13-year-olds, n=59) included in the study. Students were assigned randomly to either the experimental group or the control group.

3.2 Instruments and procedures

The developmental training programme in Hungarian grammar consisted of 25 sessions in the 4th grade and 31 sessions in the 7th. Grammar was targeted because this is among the least preferred subjects of Hungarian pupils (Csapó, 2004). Learning materials were developed for both grades, conforming to National curriculum (N. C.) requirements. The students worked on exercises during the Hungarian grammar lessons; one per lesson. Each exercise required five to ten minutes to complete. Each student had their own workbook with the exercises. First the students read the text of the given exercise alone, then, based on instructions given in the prompts in the workbook, they drew a concept map alone. Feedback was given when all students finished the exercise. The task types included: (1) completing a map by filling in the nodes and defining the linking words, and (2) constructing a map from scratch.

The spelling of the verbs in the imperative

We pronounce and spell the verbs in the imperative in different ways. When a verb ends in the imperative in d or gy, it is pronounced**, ggy** or **gy**, but it is spelled **-dj** or **-gyj**.

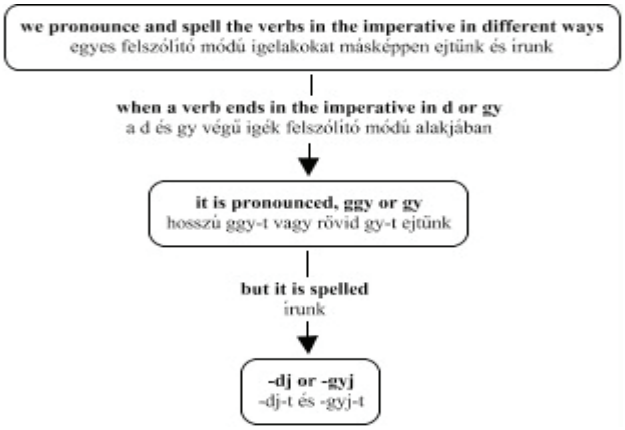
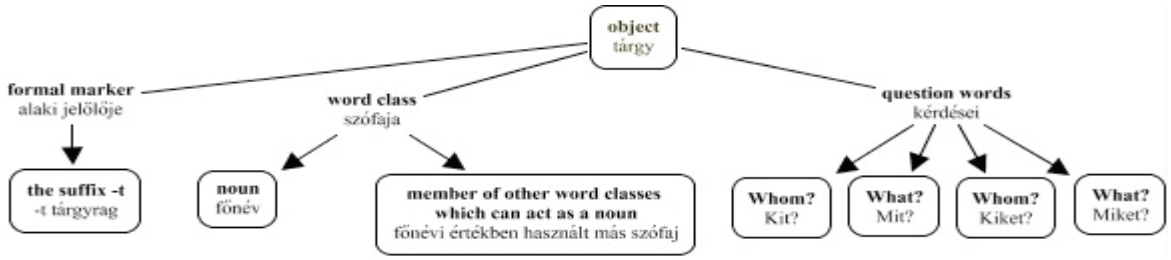


Figure 2. Sample task for 4th graders: Completing a map by filling in the nodes

The object

The suffix -t is the formal marker of the object in the sentence. As regards word class, an object in a sentence can generally be a noun or a member of other word classes which can act as a noun. Question words: whom? what?



3.2.1.1.1.1.1.1 Figure 3. *Sample task for 7th graders:* Constructing a map

4th and 7th graders were administered different tests. The pre-test was based on the subjects' previous knowledge, in accordance with N. C requirements. After the testing, the experimental group worked on a series of concept mapping tasks, while the control group was taught with traditional methodology. The post-test targeted new knowledge acquired after the pre-test.

3.3 Feedback for the students

The teachers' workbook included the completed maps as well, serving as expert maps, unified starting-points for all teachers. The students were presented the correct map after having completed their own. Each exercise was followed by feedback in different forms. (1) The teacher and the students discussed the solutions of the mapping task; the students could not consult their own maps. (2) The teacher and the students discussed the solution without the consulting the workbooks. (3) There was no feedback. – The teacher did not give instructions and help until the exercise at hand was completed. Having solved their task, the students could discuss it with the teacher and clarify any unclear details.

4 Results

4.1 Tests

On the grammar pre-test, there were no significant differences between the performances of 4th grade experimental and the control classes. However, differences could be found between the experimental and control classes among the 4th graders; the experimental groups performed better. We found significant differences between the Hungarian grammar pre-test and post-test in the experimental 4th grade classes, however, there were no significant differences between the control classes. Regarding the 7th graders, the experimental classes performed on the test the most successfully. Significant differences could not be detected between the pre-test and the post-test between the experimental and the control groups. It can be concluded that students with significantly poor pre-test results showed substantially higher achievements in both age groups after taking part in our concept mapping programme. This applies to both groups.

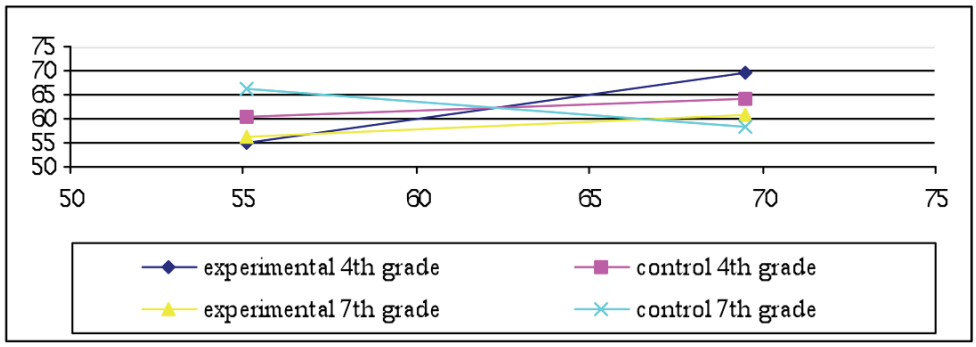


Figure 4. Pre-test and post-test performances in Hungarian grammar (%p)

4.2 Concept mapping exercises

The results of the concept-mapping program showed no significant differences between the 4th grade classes. In the 7th grade classes, the 2nd group achieved lower results, and the individual differences between the students were greater. The two task types showed significant differences: completing a map by filling in the nodes and defining the linking words proved to be easier. An explanation may be that this needs only surface understanding, while the construction of maps requires organization.

We investigated students' learning habits (12 items), targeting learning activities, memorization, concept map construction, summarizing. There are significant differences between the 4th and 7th classes concerning learning activities. The control group reported locating the most important concepts from a text, underlining the main concepts and taking notes significantly more often. However, no significant differences were found between the experimental and control groups as regards constructing concept maps and figures after the training program. Further research in this direction is necessary. The goal of our programme was to make students adopt a conscious use of learning strategies and techniques which promote meaningful learning as opposed to rote learning.

5 Conclusions

We carried out our research on concept mapping and its relation to grammar lessons in three primary schools. Our findings showed that concept mapping exercises are useful educational tools that clearly help to improve the efficiency of the researched subject.

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