

AUTHENTIC PROBLEM SOLVING AND CONCEPT MAPPING

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1 Introduction

Authentic problem solving is a form of situated learning, learning in a situated context. Learning is effective when it occurs in meaningful everyday activities (Lave, 1988). In such situated learning contexts individuals apply knowledge practically and routinely to solve everyday problems. In formal economic learning in schools, however, this is often not the case. In school, students learn more abstract knowledge (Brown, Collins, & Duguid, 1989).

The answer to everyday economic problems depends heavily on the context in which the problem occurs. Retrieving the abstract knowledge, relevant to the concrete problem, is necessary (Bransford, Brown, & Cocking, 1999). Thus, connecting concepts and contexts demands the ability to link abstract economic concepts with concrete phenomena in practical contexts (Kneppers, Elshout-Mohr, Van Hout-Wolters, & Van Boxtel, 2007).

2 The Experiment

In the experiment we used concept mapping to improve this ability. The task concerned a complex social problem related to an economic topic:

“Kok’s quarter” refers to the raising of the price of petrol by a supplementary duty of 25 cents (in Dutch guilders) per liter, a raise that was carried out by the Dutch government under prime-minister Kok to discourage motorized traffic. The tasks for the students was to discuss the possible economic effects of returning this supplementary duty to the costumers. They had to make a concept map in which they combined the conCcepts (C) and the conText (T).

Figure 1 represents a concept map made by a student of the pre-final year of pre-university education in The Netherlands.

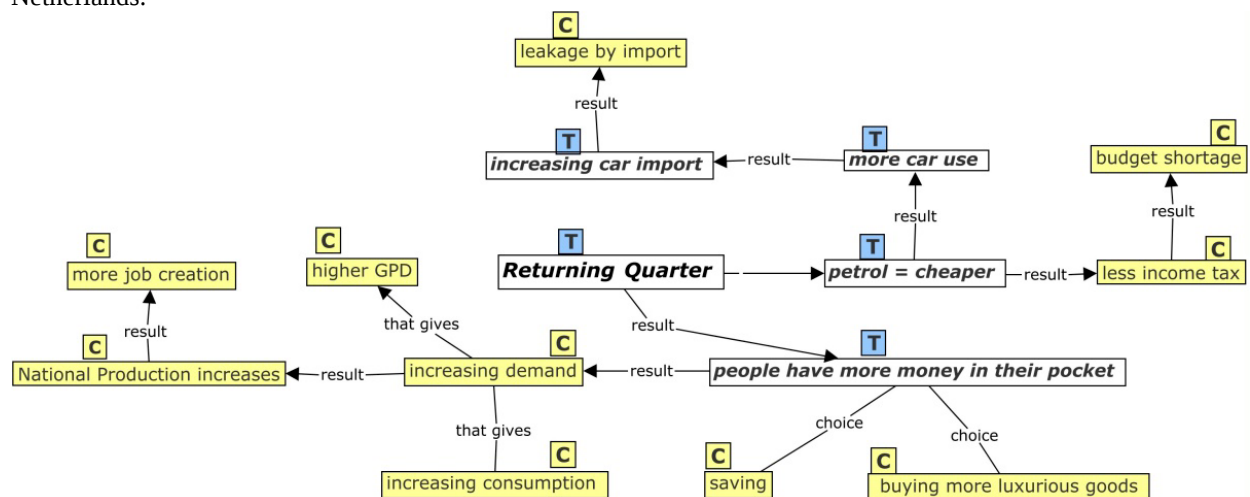


Figure 1. Concept map showing concept and context relations

In the concept map you see related to the original problem ‘returning the quarter’ context labels T, e.g. petrol = cheaper → more car use → increasing car import linked to the concept label leakage by import. This shows situated knowledge. However, most of the other links were abstract economic concepts links.

This was the case in most of the concept maps made by the students. Students were falling back to their general economic knowledge. In their economic lessons it is expected from them. It is also possible that they were

not able to put themselves in the position given the context. But they recognized the problem and were very interested. What is needed to connect context with concepts? From the context view they have to recognize the underlying economic knowledge. It can be seen as a form of transfer. But the farther the transfer the more it requires deeply understood domain knowledge (Perkins & Salomon, 1989). Mayer (2002), Krathwohl (2002), and Anderson and Krathwohl (2001) mention in their improved taxonomy of Bloom (1968) that deep understanding can also be developed by solving context problems. The students in this experiment never before learned economic concepts by studying a context. But the context in this experiment brought them to discussions that in some cases was leading to construction or reconstruction of knowledge. In figure 2 shows an example of a discussion where students switch from context to concept and vice versa and come to construction.

Kelly: people get the quarter back.
 Quido; yes and they are going to buy a new car
 Kelly: but, you can say they are consuming more
 Quido: they can also save the money
 Kelly: but I think that with returning the quarter.. than you have less income
 Quido; you mean National Income, there is more National Income
 Kelly: But there is less National Income, I think?
 Quido: I think more
 Kelly: If consumers pay less for their fuel then there is less National Income.
 Quido: Oh, you are wright!

Figure 2. An example of a discussion between Kelly and Quido.

3 Discussion

Some questions arise seeing the concept map.

- Is combining context and concepts in a concept map a useful contribution to support students in retrieving more situated knowledge, appropriate to the problem?
- Is the problem task used here adequately? Is the context, although an authentic problem, perhaps too general to provoke more relations between context and concepts?
- Was, for example, the need to make more relations T and C if it had been asked for the effects of the returning for a specific group for example a family with young children or for an elderly couple with specified conditions?
- What are, in general, the conditions for the task?

We like to discuss these questions!

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