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Using Concept Maps and Vee Diagrams as a Teaching and Learning Tool on the Unit of Functions

Kavram Haritalarının ve Vee Diyagramlarının Fonksiyonlar Ünitesinin Öğretilmesinde ve Öğrenilmesinde Kullanılması

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ABSTRACT

In this study, it is explained why Concept Maps and Vee Diagrams, which are recent developments to help students produce meaningful learning and be active, are essential tools for teaching and how we can make and use Concept Maps and Vee Diagrams in mathematics education. Concept Map and Vee Diagrams, which were made for the unit of functions, are presented.

Key Word: Concept Map, Vee Diagram, Mathematics Education, Functions.

ÖZET

Bu çalışma son zamanlardaki gelişmelerden biri olan kavram haritası ve Vee diyagramının matematik eğitiminde anlamlı öğrenmeyi sağlamada ve öğrenciyi aktif hale getirmede nasıl kullanıldığı açıklanmaktadır. Fonksiyonlar ünitesi için hazırlanmış olan kavram haritası ve Vee diyagramı örnekleri sunulmuştur.

Anahtar Kelimeler: Kavram Haritası, Vee Diyagramı, Matematik Eğitimi

1. Introduction

To learn a concept can be in different ways. But the important thing is how did it done and the method of teachers use while the student has been learning. In recent years according to the most useful approach to make meaningful learning called constructivism; learning must be meaningful, appropriate atmosphere must be prepared for the students to make researches, for sharing the information they collect and discuss about them. The teacher must not be imitated blindly; taking into consideration the students' knowledge, experience and opinion must supply learning.

One of effective way among the important ways to supply meaningful learning is to use concept mapping and Vee diagrams together. In this study, concept maps and Vee diagrams are used together with the aim of providing meaningful learning about the functions unit. A concept map is a scheme, which is used for seeing sub concepts of one concept and relations between them in hierarchical order. In other words, showing names of the concepts, which are related with a subject from general to special and related with relations between them as a diagram (Gowin, Novak, 1984; Senemoglu, 1998). Vee diagram, Gowin developed it in 70s, is a V shaped diagram (Gowin, Novak, 1984) and developed firstly for explaining nature and aim of laboratory studies to teachers and students. But it was limited so there are not many study on the other branches.

We can see some studies in literature, a concept map is used the unit and Vee diagram is used for subjects.

2. Forming Vee Diagrams

A Vee diagram consists of three main parts (Ayranci, 1986). It starts drawing a large 'V' and a focus question is placed at the middle of the 'V'. Focus question is like a bridge between methodological part (on the right) and conceptual part (on the left). Left part and center of the diagram is filled before the lesson, right part is filled after the lesson. Vee diagram is shown in figure 1 (Gowin, Novak, 1984).

Forming Titles in Vee Diagram:

Focus Question: It is a passing part between theorem and proof, exercise and problem, comprehend and synthesis (Kaptan, 1998). Because of its place it should be related with two parts and no more than two. It should be chosen carefully because it synthesis concepts in a subject are understood or not. One of the important subjects is that it should be placed in the middle of the Vee diagram.

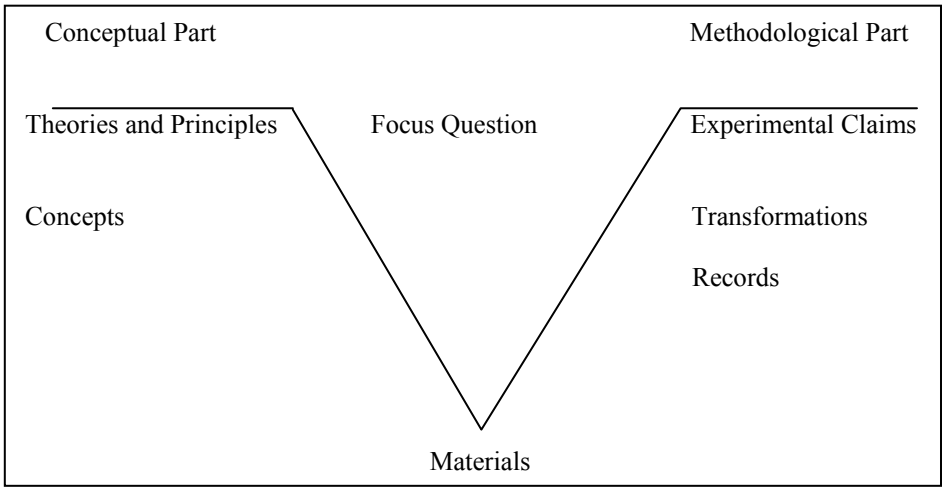

Figure-1: *Vee Diagram and its parts.*

Materials: All materials for the lesson are placed on the lower and the sharpest part of the diagram.

Theories and Principles: Whole theories and axioms related with the subject are written in this part. It should be a guide for understanding the subject. This part is placed on the left of the Vee diagram.

Concepts: Concepts, related with the subject and its terms are collected in this title. So, they take parts in students' mind before the lesson.

Experimental Claims: It is practical side of the focus question. It can answer the focus question.

Transformations: It is presenting event more meaningful by using shapes and diagrams. With these data, students can answer the focus question.

Records: Solution of the question and all results are placed at this part.

3. Method

In this part of the research by using scanning method, the concepts are related function and its contents are tried to bring out to light. Remembering time in school curriculum for functions, for five (5) weeks programmed, one (1) concept map and five (5) Vee diagrams are prepared. Before preparing them, how to make concept maps and Vee diagrams are examined and settled on the functions unit.

4. Result and Opinions

After a few units, the teacher should fill some parts of the conceptual map and students should fill other parts. If it is necessary, for the next unit, concept map and Vee diagram are asked to prepare from the students by their teacher. So, students make a research and teacher-centered education turns to student-centered education and students can make connection between whole and part. So, it helps student while learning and teacher will be as a guide.

5. References

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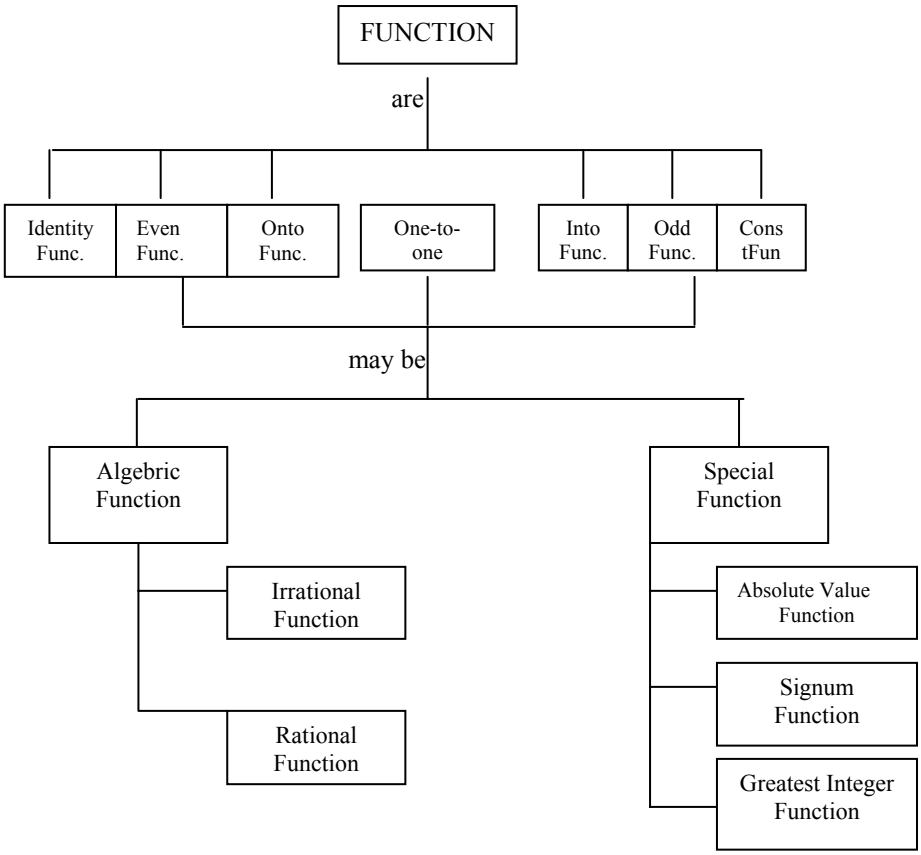

Figure-2: *Concept Map of Functions Unit.*

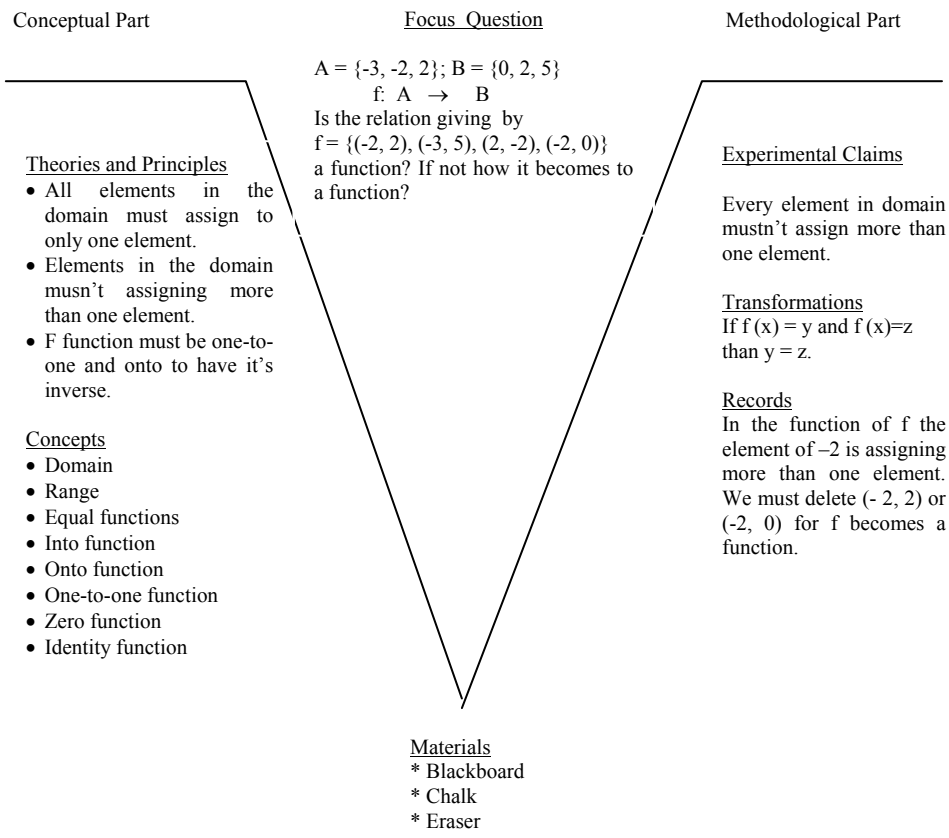

Figure-3: *First Vee diagram for the unit of functions*.

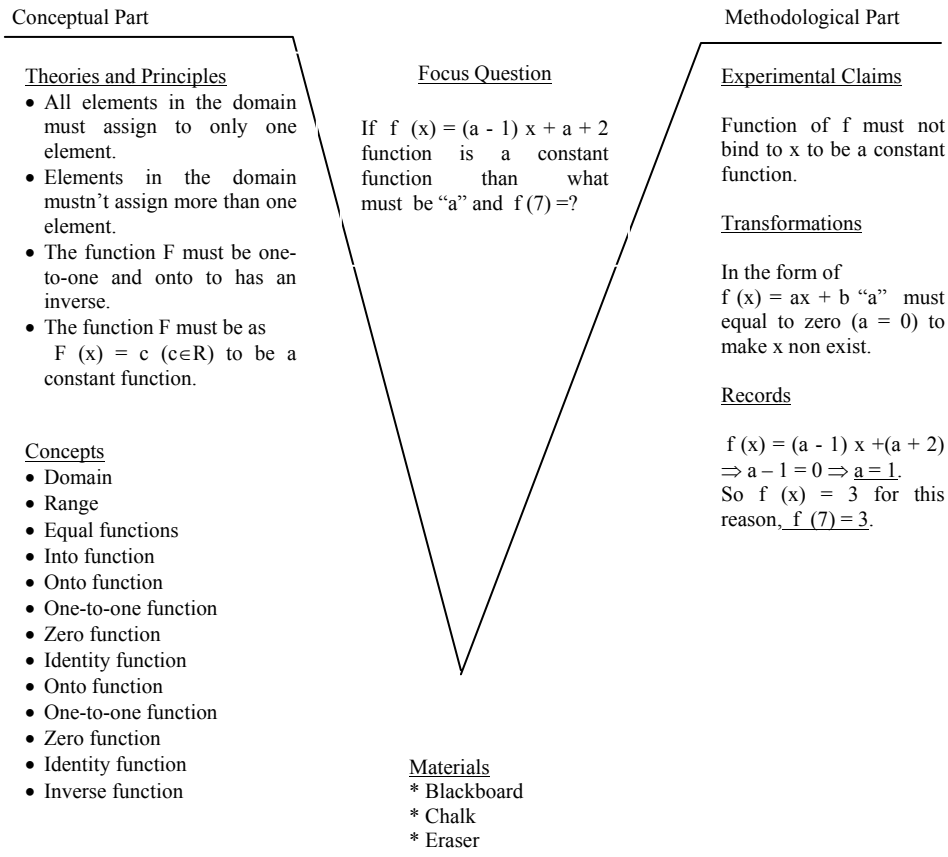

Figure-4: *Second Vee diagram for the unit of functions.*

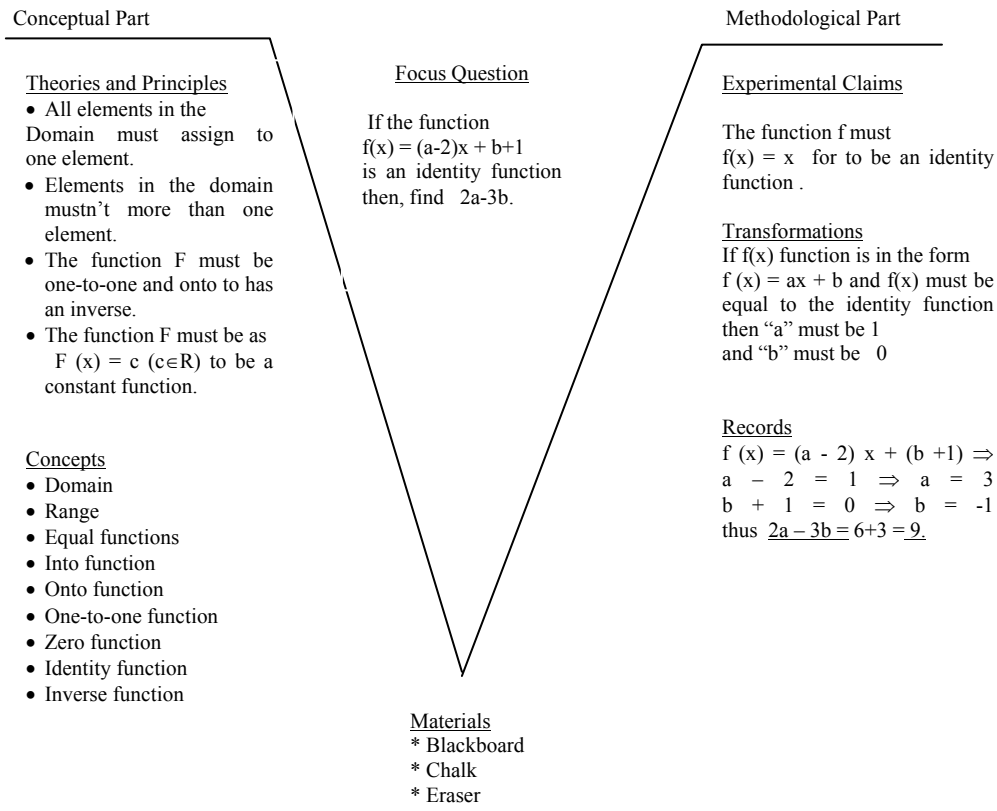

Figure-5: *Third Vee diagram for the unit of functions.*

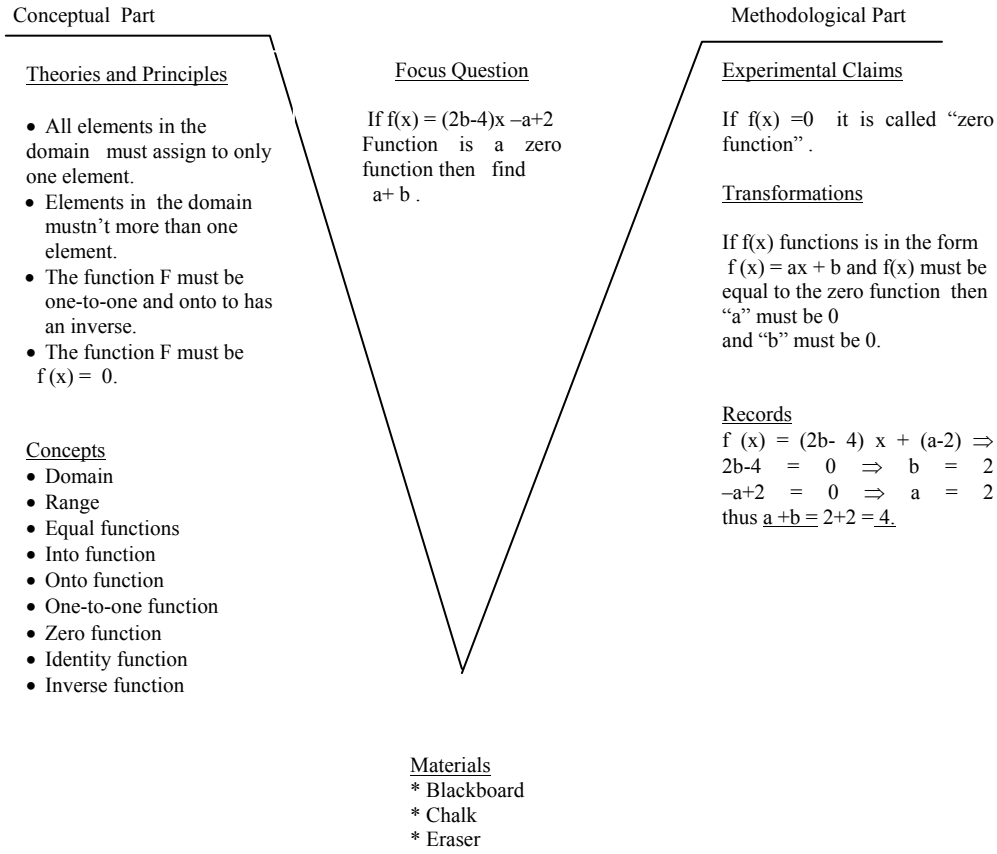

Figure-6: *Fourth Vee diagram for the unit of functions.*

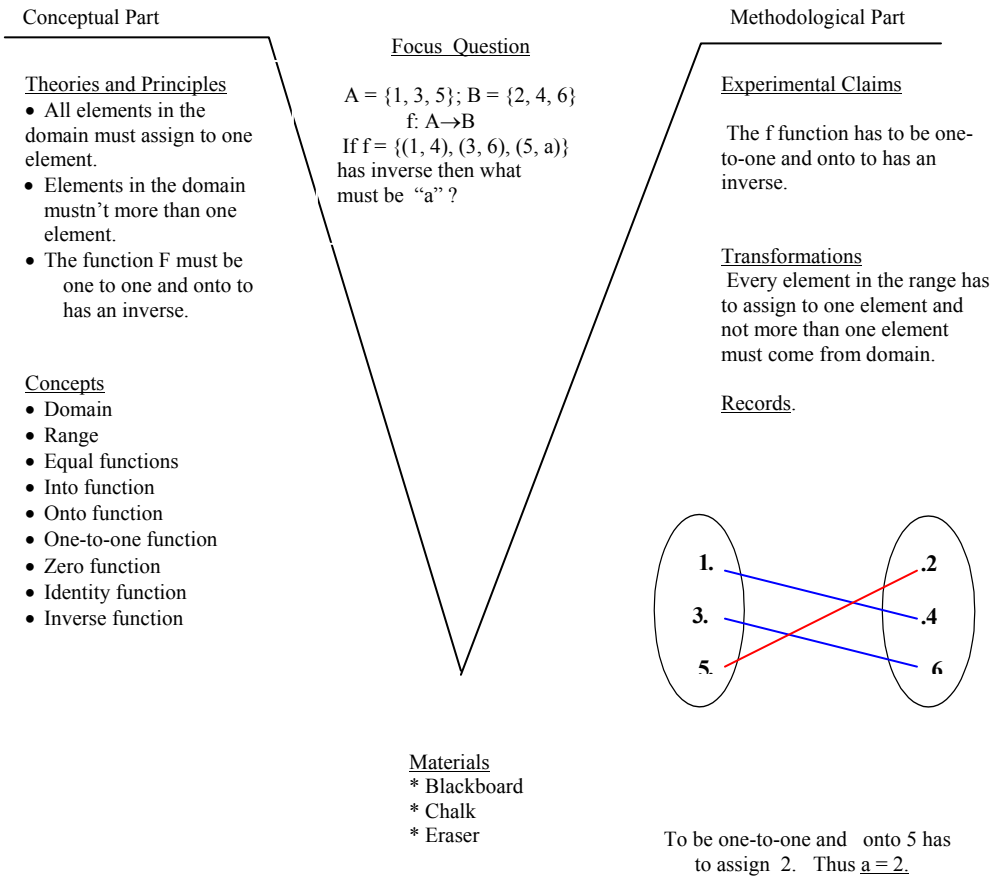

Figure-7: *Fifth Vee diagram for the unit of functions.*