FCA Tool

1 Purpose

The FCA Tool (FCA stands for *Formal Concept Analysis*) allows for structuring a knowledge domain, to visualize its concepts and their relations to each other in form of a concept hierarchy and to assign learning objects to concepts.

The FCA Tool consists of two main views: the *Editor view* and the *Lattice view*. The *editor view* presents a matrix that allows for the creation of a knowledge domain by defining the domains objects (e.g. *reed* or *frog* for the knowledge domain *biotope*) and attributes describing (some) the objects (e.g. *lives in the water* or *applies photosynthesis*). The *lattice view* visualizes the knowledge domain as a concept hierarchy (sub- and supra concepts).

2 User Interface

When launching the FCA Tool the initial screen as depicted in Figure 1 is presented. It consists of two main parts: the *menu bar* **[F01]** and the *workspace* **[F02]**.

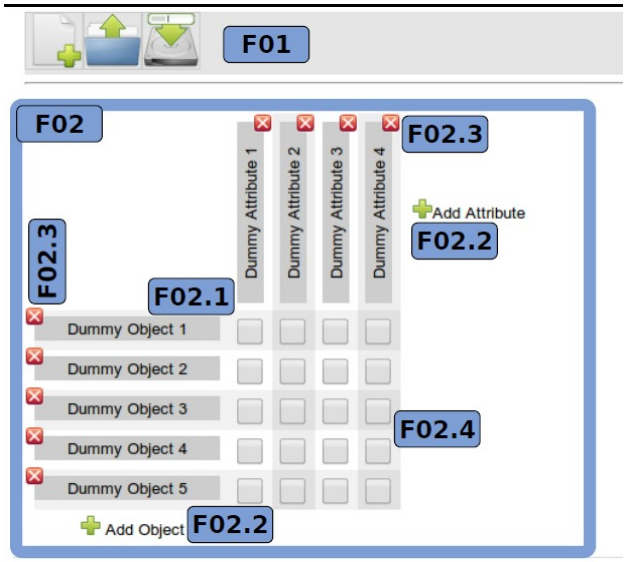

Figure 1: Initial view

The *menu bar* buttons (from left to right) allow for i) creating a new domain, ii) opening existing domains and iii) saving the current state as a new domain. The workspace shows a matrix with objects in rows and attributes in columns **[F02.1]**. New objects and attributes can be added **[F02.2]** or removed **[F02.3]**. Attributes can be assigned to objects by ticking the corresponding checkboxes **[F02.4]**.

In the following we describe how to define and edit attributes. The described principles and functionalities are the same for defining and editing objects.

2.1 Defining Attributes (Objects)

When clicking on an attribute (objects) button a dialogue **[F03.1]** as indicated in Figure 2 opens, enabling to choose from existing attributes (objects) or to create

new. A choice can be confirmed or cancelled using the control buttons at the bottom of the dialogue window **[F03.0]**.

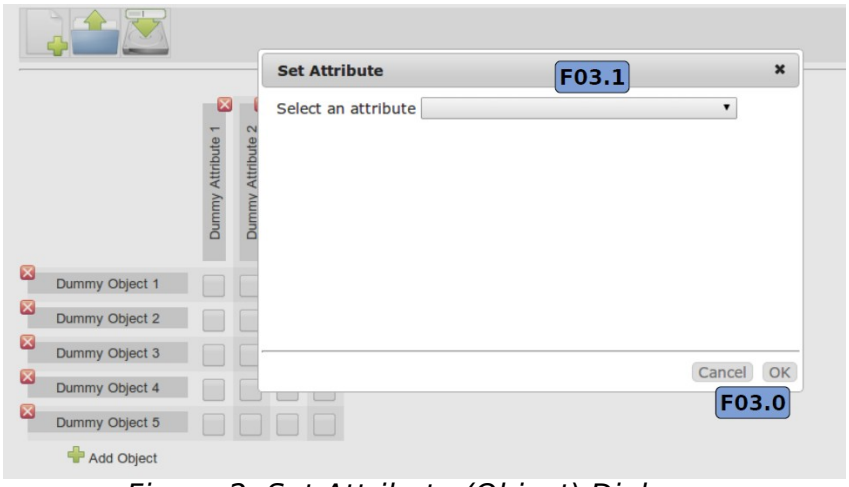

Figure 2: Set Attribute (Object) Dialogue

Creating New Attributes (Objects)

When creating a new attribute (object) additional elements become available (see Figure 3): Text fields provide the opportunity to enter an attribute (object) name **[F03.2]** and a description **[F03.3]**. The area below **[F03.4]** is reserved for learning objects.

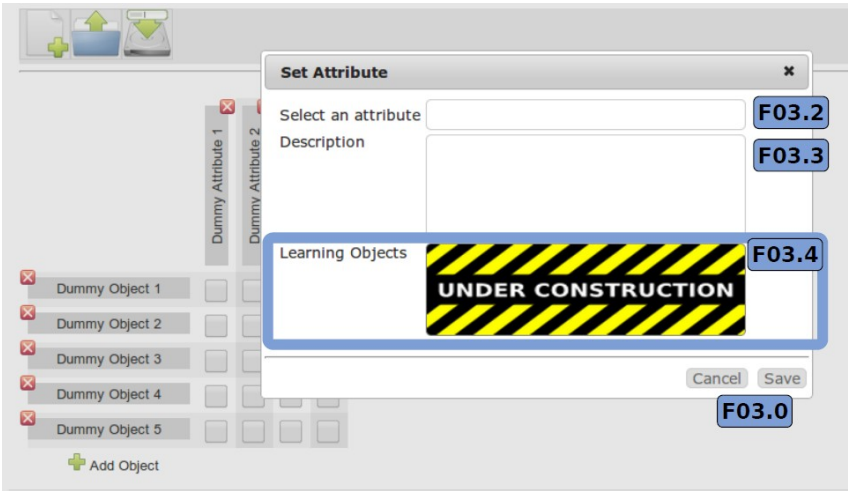

Figure 3: Creating and editing a new attribute

Choosing Existing Attributes (Objects)

When selecting an existing attribute (object) through the combo box **[F03.1]** its description and learning objects assigned to it are displayed (see Figure 4). Furthermore, a button to edit the attribute's (object's) name and description **[F03.5]** is available. Editing is performed using the same controls used to create a new attribute (object) (see Figure 3). Another button **[F03.6]** allows for assigning learning objects to the current attribute (object).

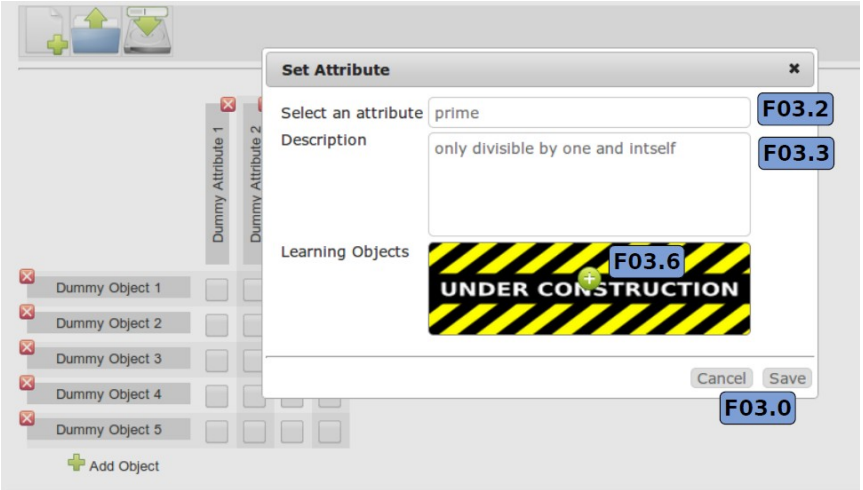

Figure 4: Selecting and editing an existing attribute (objects)

2.2 Managing Learning Objects

(under construction)

Assigning learning objects to attributes (objects) is initiated by using button **[F03.6]**. This opens another dialogue (see Figure 5) which is similar to the already discussed attribute (object) dialogue shown in Figures 2 and 3. It allows for selecting existing learning objects or creating new ones in the same manner as described above.

Figure 5: Select Learning Object Dialogue

Creating Learning Objects

When creating a learning object, a name and a URL to a learning resource (currently only websites are supported) need to be entered. Afterwards the learning object can be saved and assigned to the currently active attribute/object. When a choice was made the learning object appears as an interactive element **[F03.7]** (see Figure 6). Learning objects (i.e. websites) can be examined in a new browser tab by clicking on the interactive element.

Figure 6: Interactive Learning Objects

2.3 Lattice View

After saving or opening a domain a dialogue containing the *lattice view* is presented allowing to interact with a graph representation of the domain (see Figures 7 and 8). The lattice view itself has two parts: A graph section **[F04]** and a side pane **[F05]**. The top left check box **[F04.1]** allows for switching between a simplified taxonomy (see Figure 7) and complete lattice (see Figure 8).

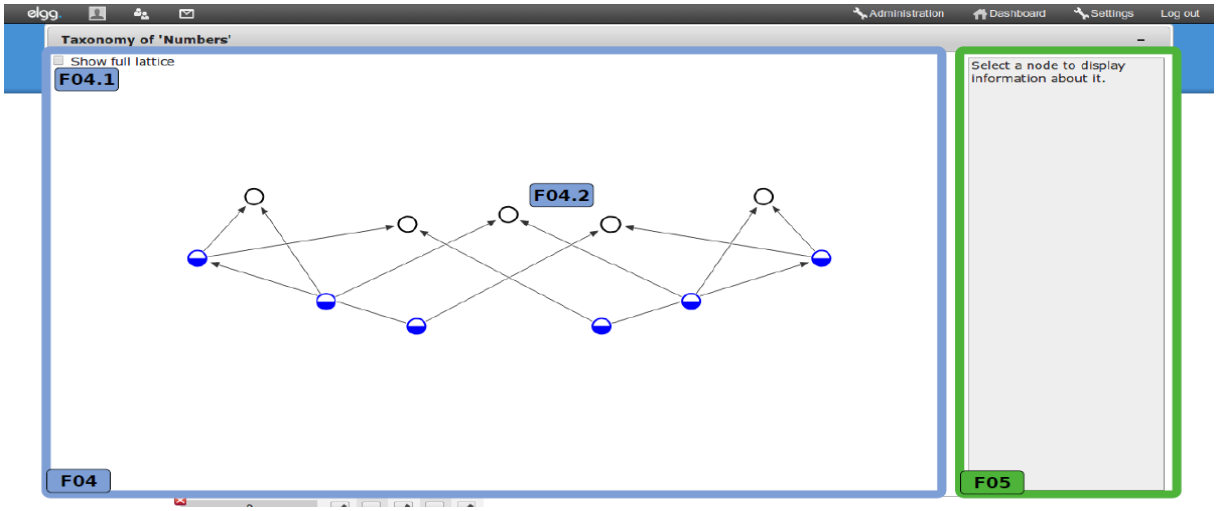

Figure 7: Taxonomy

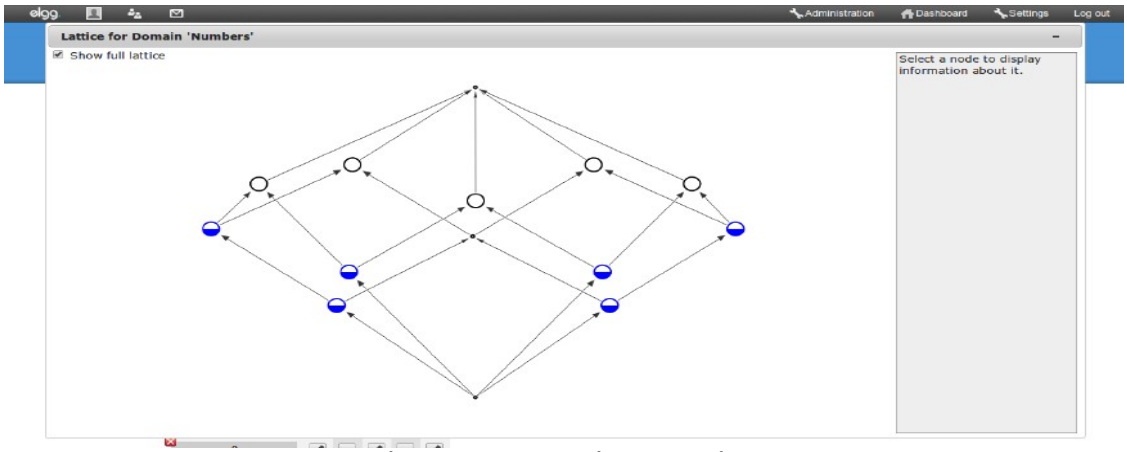

Figure 8: Complete Lattice

The individual concepts of the lattice can be dragged and rearranged at the graph section. When clicking on one of the concepts, labels are displayed and the side pane is populated (see Figure 8). The side pane features text fields with the name **[F05.2]** and description **[F05.3]** of the selected concept and a section containing a list of objects and attributes the concept consists of **[F05.4]**.

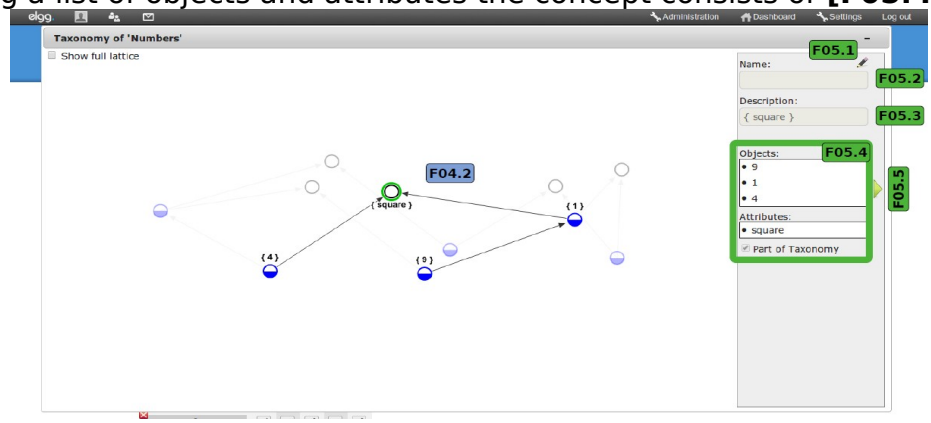

Figure 9: Examining a Concept

Clicking the triangular button **[F05.5]** displays the concept´s learning objects and the list of objects and attributes is extended into a matrix **[F05.4]** showing which learning objects are associated to which objects and attributes (see Figure 10).

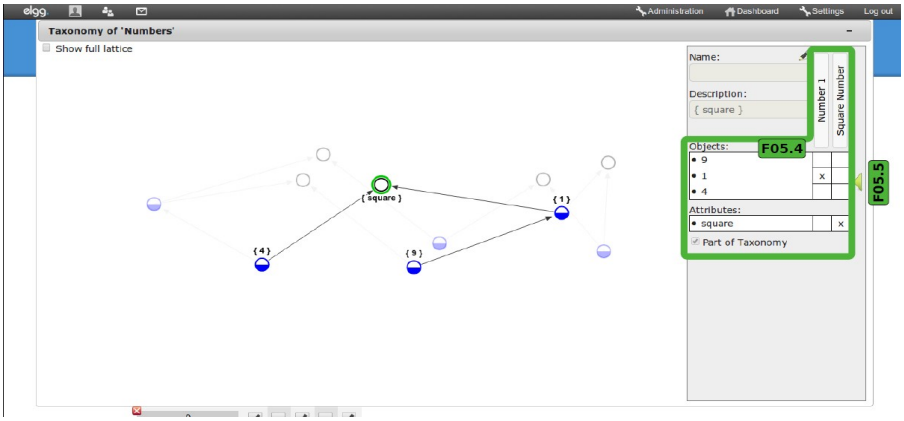

Figure 10: Concept Learning Objects