

# Collaborative Learning Content Enrichment

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Situation, in which two or more people learn or attempt to learn something together, is called collaborative learning. We can differentiate between implicit and explicit collaboration [1].

Currently there are number of approaches to improve collaboration. Here we have to mention the Web. In the context of collaborative learning, the Web has become a medium in which students ask for information, evaluate one another's ideas and monitor one another's work, regardless of their physical locations. These features are very important for the collaboration and make the web more interesting. When we use these features wisely, it can be very helpful for students.

Typical examples of the use of collaboration on the web are educational systems. There are several educational systems, such as ALEF [1], which allow the use of collaborative learning. ALEF is a system with many features that support collaboration. First is tagging. An important feature of tags is that tags in a certain way describe the document. They represent keywords and they are very similar to relevant domain terms (RDT) [3]. Students can add tags to the learning content and share it with other students [2]. In addition to tags, external sources are present in the ALEF, allowing to add interesting sources of information.

Within the educational system ALEF, our goal is to enrich learning content and support students in learning. For this purpose we want to use annotations.

When learning, students often encounter many new terms. And they want to know what these terms mean. Therefore, we need explanations, which will be linked to these terms. This is why we decided to enrich learning content using a new type of annotations – *definitions*.

Definitions constitute an explanation of terms. This is the main focus of definitions because we want to support students in learning. Students can easily add and find unknown terms and understand them.

The proposed tool for adding annotations allows students to add definitions in two ways:

1. ALEF definition (AD) - annotation, where the source of information or explanation is learning content available in educational system ALEF. Students will be able to select some text in the learning content and assign a definition to it.
2. Own definition (OD) - annotation, where the source of information or explanation is external source somewhere on the Web. Students will be able to add their own definitions, which are useful for them. Students will be able to add their own definitions that are useful to them and could also help others.

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In the context of the student learning support, our goals are:

1. Facilitation of student's acquisition of relevant and correct definitions of key terms being part of the course learned.
2. Convenient way of learning by reducing the number of actions necessary to search for term explanations.
3. Support navigation in the course through definitions of unknown terms in a document (utilizing the dedicated widget).

In addition to student learning support, we can enlarge and enrich conceptual metadata about the educational content – e.g., relevant domain terms can be compared lexically by using terms' definitions. As a result, we can improve metadata-based services in the system such as recommendation. For example, by comparing explanations of definitions we might be able to detect synonyms as a part of automated domain modeling. A more detailed description of this aspect is out of scope of our research.

In order to evaluate our approach, we will perform several experiments in real world setting of educational system ALEF. The evaluation is planned to be performed on the course *Functional and Logic programming*. We will conduct an uncontrolled long-term experiment motivating the students to use our type of annotation. After a defined period of time, we will analyze and evaluate this data. Evaluation of the experiment will follow the abovementioned goals of our method.

First, we will determine whether the definitions represent the key concepts in the document and we will also verify whether students are able to identify the correct explanation to definition. Either by adding definition explanations themselves or by rating definition explanations provided by other students. The results of students' actions we will validate by comparing them with opinions of experts.

We also want to find out how many students use the definitions, based on 1) the number of added definitions and 2) the portion of the definitions added as ALEF definitions and the portion of the definitions added as OWN definition.

We see great potential that our definitions bring into the educational system ALEF. They can greatly help students in order to understand the subject-matter. However, in the future, the definition can be used in many other areas that we mentioned above (other option). We believe that we can get a lot of interesting findings and contribute to the improvement of collaboration and learning in general.

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