

# Collaborative Knowledge Construction in Online Vocational Teacher Education

Raimo Mäkelä, Marjatta Myllylä & Hanna Torp

TAMK University of Applied Sciences / Teacher Education Centre  
Tampere, Finland

## Abstract

The purpose of this paper is to build a picture of knowledge construction models in online education. The study describes the knowledge construction process of a group of vocational teacher education students in an online learning environment. In the online studies, a model of progressive inquiry was applied. The students worked in small groups throughout the learning process. The phenomenon in question has not been previously researched very widely.

The student group was heterogenic, so the learning strategies were also individual. The students had varied backgrounds with Master's level or PhD degrees on very different fields. The field of specialisation also has its effect on the preferred learning strategies. The vocational teacher education programme consists of 60 credits and it can be completed within one academic year.

The research consists of three phases, in accordance with the hybrid model introduced by Schwarz-Barcott and Kim (2000). During the theoretical phase, information regarding knowledge construction was sought in literature and practical teaching work. In the empirical phase, a narrative approach was applied to compile information regarding the collaborative knowledge construction and knowledge processing of the teacher students during the online discussions of their online teacher education study programme. The narrators are 20 writers in a UAS (University of Applied Sciences) environment in Southern Finland. The material has been collected during the academic year 2007-2008. In the analytical phase, knowledge construction in e-learning is described as a synthesis of the theoretical and the empirical material.

The results gained in the analytical phase suggest that the collaborative knowledge processing in the online discussions is affected by a knowledge construction theory that will be introduced in this article. The knowledge construction process is dependent on various factors, such as cultural and social matters, learning strategies and features of the learning environment. Another crucial aspect revealed by the analysis is that the complexity of the learning content should be faced already at the beginning of the studies. At this point the need for guidance is also at its greatest.

The results of this study are preliminary and at this point we have only concentrated on knowledge construction in online discussions. The applications of e-learning are however increasingly versatile and deepening pedagogical understanding in different online educational contexts will require further research. Our purpose is to extend the knowledge construction study towards social media applications during next academic year.

**Keywords:** collaborative knowledge construction, narrative method, online discussions, hybrid model, vocational teacher education

## 1. Introduction

During the recent years, online discussion forums have become an increasingly used tool for educational purposes. However, the full potential of this tool has not been very widely studied. Very often the use of the discussion forums in teaching is limited to individual assignment submission, agreeing on practical matters, or it is used in a minor pedagogical role, as an attraction of novelty. While all the aforementioned undoubtedly serve their purpose, the interest of this study lies in online discussion forums as enriching knowledge-

building communities where the learning does not just include, but is based on collaborative knowledge construction.

The purpose of this paper is to describe the knowledge construction process of a group of vocational teacher students at the Teacher Education Centre of TAMK University of Applied Sciences. In order to gain understanding of how an online knowledge-building community is formed, how it works, and how the approach could best be used in teaching, the phases of the collaborative knowledge construction process were sought in the online discussions. A narrative research method was used for studying the data.

## **2. Methodology**

The narrative philosophy derives from the problem of comprehending the uniqueness of human experience and existence (MacIntyre 1981, Taylor 1985). The concept of a narrative (lat. *narrare*) is understood as presentation of a story in form of symbols. According to Gudmundsdottir (1996), one narrative can consist of various stories that can be interpreted in different ways. When the narrative is understood as a research approach, we are referring to the ontology of the phenomenon being researched, the nature of knowledge and epistemology (Munhall 1993). According to the ontological grounds of the narrative, the narrator is an active, meaning-creating person, in this case a teacher student. The conception of an individual narrator modifies the common experience. Therefore the interest in this study lies in the phenomena brought up by the teacher students during the collaborative knowledge construction process. (Nilssen et al. 1998).

According to Rauhala (1981e), experience is the relation of the mind to the world or itself. It is conveyed to the consciousness through perception in a given time and place. Vygotsky (1962) sees the development of inner speech as a fundamental step in the development of the psyche. When language is used for communication with others, it can also be consciously used as a tool for individual thinking. Vygotsky's idea of communication between outer and inner speech can be applied to describing the relation between the narrative and inner story.

The narrative is intertextual communication between the sender and the receiver. It can also be identified as spoken and written discourse on a phenomenon. (Magliola 1970, Burgos 1988, Cohan & Shires 1988, Genette 1990). Linguistic expressions form a window to the mind (Rauhala 1995). It is also the basis of human interaction and knowledge transfer. Knowledge is not restricted to what an individual person knows, but it is a composition of overlapping and nested knowing of various persons (Webb & Blond 1995, 624). Through this window one can also observe the experience that in this study evolves around knowledge construction.

## **3. Knowledge construction – adaptation to the environment**

The findings of the study are also supported by Piaget's adaptation theory and his ideas regarding the significance of social interaction in knowledge construction. According to Piaget, knowledge construction takes place through assimilation and accommodation, the two complementary processes of adaptation. In assimilation, new information is adapted to the existing knowledge structure of the learner. Sometimes, however, the new information is contradictory, and does not seem to fit in the old knowledge structure. This leads to a cognitive conflict. In such cases the knowledge structure must accommodate itself to the new evidence and adapt to it. This process involves reflection, i.e. testing "what if" assumptions

in order to find an explanation to the new perceptions. (Piaget, 1985, Von Glasersfeld, 1997).

Piaget believes that social interaction activates individual thinking processes. He sees peer interaction as an especially effective tool for this as it creates cognitive conflicts. Relying on each others' feedback and interaction, learners work as a part of the mutual construction process. Not only is the experience shared, but the meaning of the experience becomes the product of joint construction (Youniss & Damon, 1992).

Sagan (1980, in Bielaczyc & Collins 2006) describes the early development of modern science among the Ionians who formed one of the first knowledge-constructing communities. Sagan sees three key characteristics in the Ionian society that enabled this development: 1) freedom and encouragement to inquire; 2) conflict of cultural perspectives and 3) the importation of writing as a tool for thinking (In Bielaczyc & Collins 2006, p. 39).

These characteristics can be found in the knowledge-constructing community of teacher students of our study. Based on progressive inquiry, the studying methods required active question-setting. Moreover, the diverse background of the students brought varying viewpoints to the discussions - not to mention the elemental role of writing as a tool for thinking and reflecting in online discussion forums. As Bielaczyc & Collins (2006) mention, an online discussion forum offers a space where ideas are visible for everyone and available for discussion and improvement. Thus a social context is formed, where, according to Glaser (1991, in Von Wright 1992), the thinking processes of the learners are displayed, enabling individual as well as collaborative reflection.

#### **4. Analysis of the data**

The analysis of the data was started immediately once the narratives were received. The data consists of 162 discussions, the number of entries varying from 6 to 34.

The analysis methods of studies applying narration derive from the sociolinguistic tradition, where the narrative is seen as a form of discourse. The aim is to convey the original narrative to the reader as accurately as possible, enabling the reader to evaluate the interpretations of the researcher (e.g. Riessman 1993).

The data was studied applying the analysis of narrative data in a holistic-content perspective manner described by Lieblich et al. (1998). The texts that were read repeatedly both as individual parts and as a whole resembled a dialogue where the data itself was telling its story. We formed thematic areas, searching for more exact themes concerning the knowledge construction. Conclusions were drawn on this basis, first from individual narratives and furthermore from the combination of narratives. The classification of the main themes enabled the observation of the constructed image from the viewpoint of similarities and differences.

At the beginning of the studies the knowledge construction through the online discussions was not yet fully used. The students mainly used the discussion forum for practical arrangements, e.g. agreeing on schedules and working methods. However, quite soon the group work became a topic that evoked more discussion and led to knowledge building by sharing experiences and ideas. The discussions always started by introducing opinions.

*"I think it's good that the groups are formed randomly. This develops team work skills much better than working with a familiar group. The students must learn to work with all kinds of people."*

At the beginning, when the students did not know each other yet, the entries added after the expressing of opinions tended to agree with the previous comments or add something that was in line with them.

*"I find Student X's comment realistic. I've been to many job interviews and have always been asked the same question: what's your educational background. No questions about skills or grades, it's always about the title."*

Later, as the students learned to know each other better, contradicting opinions were introduced more freely, which led to deeper knowledge construction.

*"I don't really agree with Student Y about cognitive and written skills being so inseparably connected. Of course if you can't write you can't convey your message to others, but I believe a person can have very profound ideas of things even if he or she can't write at all."*

Another feature that became more and more prominent as the studied proceeded was asking different types of questions. The questions enhanced knowledge construction in three ways:

1. General questions for introducing new aspects for everyone to ponder.

*"Can the activities of a school be dependent on grades? What if a school is closed because of bad results? The resources of the teachers are already too limited for improving results just by teaching!"*

2. Questions for finding out more and seeking for better understanding.

*"There's something about the idea of constructivism that I don't quite get... even if a teacher had the most constructivist approach, will the teaching be meaningful if the student just isn't interested in it?"*

3. Personal questions asking for further clarification of an opinion.

*"You said you don't believe there's competition in all subjects, for example in reading. But don't you think that the pupils might like to compete against themselves, or that the better grade would be a great joy and a prize to the pupil that has been working harder than before?"*

Typically, the discussions that covered topics that all participants found interesting ended up as long dialogues where the participants tried to understand the topic together. In discussions like this general questions were frequent. Also these discussions always started with the expression of one's own opinions.

The students had diverse backgrounds and varying background knowledge on education. Some students used the discussion forum for actual studying, which led to a great number of questions for finding out more information. However, the more typical strategy of the students was *"knowledge is generated by action, i.e. the individual seeks information*

*independently and then communicates it collectively to other learners*”, as one of the students expressed it. Often the students had first e.g. tested some teaching methods or studied literature independently, after which they shared their experiences in the discussion forum for the benefit of all participants.

Sometimes the students were already familiar with the topic being discussed. In cases like this the discussion was used for knowledge construction by organising and classifying concepts. The discussions often revealed that the learners were using concept maps for the organisation of knowledge.

*“How about drawing another arrow and adding a box in “recognizing and creating opportunity”? I was just thinking that this aspect should be included.”*

Some topics aroused emotions. Such cases involved a great amount of personal questions and arguing. This became more frequent towards the end of the studies, probably as a result of the learners getting to know each other better and becoming more unconstrained.

It was remarkable that the discussions never came to a conclusion or a summary of any kind. They just died out and were left open so that they could be continued later if needed. This was seen as a clear advantage of online discussions: *“this asynchronous online studying very well enables the flourishing of even impulses like this!”* With this the student referred to sudden perceptions and ideas that come to mind while being engaged with her favourite hobby.

## **5. Conclusion**

The aim of the study was to find out how the collaborative knowledge construction process is expressed in online discussion groups.

The analysis revealed regularities in the proceeding of the online discussions. Typically the discussions started with the expression of individual opinions, which were then developed to a dialogue or even a debate on the question at hand. During this stage different types of questions were used for constructing knowledge. The discussions never came to a definite end or a conclusion, but were left open.

It could also be noted that the discussions became longer and deeper towards the end of the study programme, probably due to the learners knowing each other better. This finding supports the idea of the efficiency of a knowledge-building society. A society like this cannot be formed at once, but it is developed over time. Online discussions seem to be a useful tool for knowledge construction especially in a longer run. As the dialogues are saved in the discussion forum, they remain available for completing ideas developed during the studies.

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