

The Role of Inservice Teachers' Motivation, Learning Strategy and Social Ability Profiles in a CSCL Environment

Petri Nokelainen
Pekka Ruohotie
University of Tampere
Finland
firstname.lastname@uta.fi

Miikka Miettinen
Henry Tirri
Helsinki University of Technology
firstname.lastname@hiit.fi

Jaakko Kurhila
University of Helsinki
jaakko.kurhila@cs.helsinki.fi

Abstract: The process of employing Finnish inservice teacher's (N=54) self-rated motivation, learning strategy, and social ability profile into collaborative learning tasks of an on-line learning environment was investigated. The profile information obtained from a 34-item questionnaire was stored into a system consisting of a set of asynchronous collaborative knowledge constructing tools. Learners were expected to form a group of two, and annotate by highlighting and commenting an on-line document. The preliminary results show that annotation quality in the learning tasks was rated low on those students who like practical instructions from teacher. Annotation quality was rated high on those students who are interested in the course topic and generally prefer to study demanding subjects from which they can learn something new. Both self-made highlightings and comments were experienced to be more useful for the learning process than those made by other learners. Preliminary results of the e-mail survey indicated that all the respondents strongly agreed when asked if the system brought added value to their learning processes.

Introduction

This paper investigates the process of employing inservice teacher's self-rated motivation, use of learning strategies, and social ability profile information into collaborative learning tasks of an on-line learning environment. Main focus of the paper is to study how profiling information (Miettinen, Nokelainen, Kurhila, Silander & Tirri, 2002) is related to various tasks (such as on-line group formation, peer-to-peer highlighting and commenting of the course material) performed by adult learners in a computer supported collaborative learning system.

The Study

Information about motivation and use of strategic skills in learning was gathered with an on-line questionnaire system, EDUFORM (Nokelainen, Niemivirta, Kurhila, Miettinen, Silander & Tirri, 2001), in the beginning of a web-based university-level statistics course in Fall 2002. The sample consisted of 37 female and 17 male Finnish vocational education inservice teachers (N=54) conducting their post-graduate degree. The respondents' age range from 21 to 51 years (median = 36 years).

The relation of learner's motivation, learning strategy, and social ability information to cognitive outcomes and completion of various tasks in the EDUCOSM system (Kurhila, Miettinen, Nokelainen, Floréen & Tirri, 2002) was investigated with log file data analysis and a self-rated questionnaire. Empirical evaluation of the system in real-life collaborative learning situations was based on the results of log file data analysis and post survey via e-mail.

The user log was collected during the course from September 27 to October 26, 2002. The data file contains parameter values for numerous user activities, for example, individual time spent annotating and reading documents, number of highlightings, comments and newsgroup messages.

The questionnaire (Ruohotie, 2002; Ruohotie & Nokelainen, 2002) contained 34 items measuring three dimensions of professional learning: motivation (12 items), learning strategies (10 items), and social abilities (12 items). The response options varied in a five-point Likert-scale from "1 - Completely Disagree" to "5 - Completely Agree".

The motivation category (Pintrich, Smith, Garcia & McKeachie, 1993; Ruohotie, 1999; Nokelainen & Ruohotie, 2002) consists of three sections: (1) a value section; (2) an expectancy section; and (3) an affective section. The value section has three subscales: (1.1) intrinsic goal orientation, (1.2) extrinsic goal orientation, and (1.3) meaningfulness of study. The expectancy section consists of two subscales: (2.1) control beliefs and (2.2) self-efficacy. The affective section includes one component: (3.1) test anxiety. The learning strategies category (Pintrich, 2000; Ruohotie, 2000; Martinez, 2001) consists of four sections: (1) metacognition in learning; (2) metacognition in practice; (3) learning by doing; and (4) resource management. The social abilities category consists of two sections: (1) interpersonal and intrapersonal abilities (Tirri, K. et al., 2002); and (2) self-concept (Marsh & O'Neill, 1984).

Motivational, learning strategy and social ability profile information was embedded into the system consisting of a set of tools (i.e., "Search", "Newsgroups" and "Filters") for asynchronous collaborative knowledge constructing. The idea of learner-centered learning in the context of this study is that learners are expected to take responsibility for their own learning: The instructor gives an orientation to the topic through theoretical face-to-face lectures. She also gives few pointers to selected on-line resources. The system provides tools to process information and collaborate with peer learners. We believe that this is in harmony with modern psychological and educational theoretical perspectives based on the assumption that a learner is an active contributor in the individual learning process (Snow, Corno & Jackson, 1994).

After two face-to-face sessions covering selected theoretical issues, the course relied following two weeks solely on peer-based distance learning in the system. During this time, learners were expected to (1) form a group of two, and (2) annotate by highlighting and commenting an on-line document. The group mate was selected anonymously amongst the other available learners with a special tool. The only personalization information provided in the dynamic selection process was the motivation, learning strategy and social skill profile presented for each learner. In addition, the group mean was reported for each dimension to help decision-making. Each group worked anonymously on a different document, brought into the system by the course lecturer. The learning task had following phases: (1) establishing a newsgroup for the document, (2) highlighting and (3) annotation the relevant issues in the document, and (4) discussing about the document with peer learner in the newsgroup.

Findings

Various dependencies between variables produced from the questionnaire, log file data and e-mail survey were investigated. Statistical analysis was conducted with Bayesian network modeling (Myllymaki, Silander, Tirri & Uronen, 2002) due to fact that we could not guarantee neither multivariate normality assumption nor equal sample sizes or variances within groups. The preliminary results with small empirical data (N=54) were as follows:

- Annotation quality in the learning tasks was rated low on those students who like practical instructions from teacher.
- Annotation quality was rated high on those students who are interested in the course topic and generally prefer to study demanding subjects from which they can learn something new.
- Students who are nervous in test situations had lower scores than those who need performance related feedback from teacher.
- All the respondents strongly agreed when asked "if the system brought added value to the learning

process” and “if it changed their studying habits favourably” (when compared to the traditional university lectures).

- All the learners would recommend the system (i.e., highlighting and commenting documents) for other courses, too.
- Both self-made highlightings and comments were experienced to be more useful for the learning process than those made by other learners. This finding needs further investigations with larger empirical samples.
- Respondents made no distinction between anonymous and full name annotations. We expected that learners would be more relaxed when annotating anonymously and thus this research finding should be verified or falsified with other samples in the future.

Preliminary results of the e-mail survey indicated that all the respondents strongly agreed when asked if the system brought added value to the learning process and if it changed their studying habits favorably, when compared to the traditional university lectures. All the respondents strongly agreed when asked if they would recommend the system for other courses. One of the most interesting preliminary research finding was that both self-made highlightings and comments were experienced to be more useful for the learning process than those made by other learners. Another interesting preliminary result of the e-mail survey was that the respondents made no distinction between anonymous and full name annotations.

Conclusions

A shared document-based annotation tool, EDUCOSM, was presented and its usefulness in real-life web-based university-level statistics course was empirically evaluated. The process of employing adult learners self-rated motivation into collaborative learning tasks of an on-line learning environment and learning outcomes was investigated.

The profile information obtained from a 34-item questionnaire was stored into a system consisting of a set of asynchronous collaborative knowledge constructing tools. Learners were expected to form a group of two, and annotate by highlighting and commenting an on-line document.

This real-life use of the system convinced us that shared document-based annotation promisingly supports learner-centered collaborative learning. However, further studies are needed to investigate possible distractive effects of peer-to-peer annotation to individual learning processes as self-made highlightings and comments were experienced to be more useful than those made by other learners.

References

- Kurhila, J., Miettinen, M., Nokelainen, P., Tirri, H., & Floréen, P. (2002). *Peer-to-Peer Learning with Open-Ended Writable Web*. Unpublished manuscript, Helsinki University of Technology, Helsinki Institute for Information Technology, Finland.
- Marsh, H., & O'Neill, R. (1984). Self Description Questionnaire III: The construct validity of multidimensional self-concept ratings by late adolescents. *Journal of Educational Measurement*, 21, 153-174.
- Martinez, M. (2001). Designing learning objects to mass customize and personalize learning. In D. Wiley (Ed.), *The Instructional Use of Learning Objects*. Agency for Instructional Technology and the Association for Educational Communications and Technology.
- Miettinen, M., Nokelainen, P., Kurhila, J., Silander, T., & Tirri, H. (2002). Adaptive Profiling Tool for Teacher Education. *Proceedings of the SITE 2002 Conference*, (pp. 1153-1157). Charlottesville, VA: Association for the Advancement of Computing in Education.
- Myllymaki, P., Silander, T., Tirri, H., & Uronen, P. (2002). B-Course: A Web-Based Tool for Bayesian and Causal Data Analysis. *International Journal on Artificial Intelligence Tools*, 11, 3, 369-387.

Nokelainen, P., Niemivirta, M., Kurhila, J., Miettinen, M., Silander, T., & Tirri, H. (2001). Implementation of an Adaptive Questionnaire. *Proceedings of ED-MEDIA 2001 Conference*, (pp. 1412-1413). Charlottesville, VA: Association for the Advancement of Computing in Education.

Nokelainen, P., & Ruohotie, P. (2002). Modeling Students' Motivational Profile for Learning in Higher Education. In H. Niemi & P. Ruohotie (Eds.), *Theoretical understandings for Learning in the Virtual University*, pp. 168-196. Research Centre for Vocational Education, University of Tampere.

Pintrich, P. R. (2000). The role of goal orientation in self-regulated learning. In M. Boekaerts, P. Pintrich, and M. Zeidner, (Eds.), *Handbook of self-regulation*, (pp. 451-502). San Diego: Academic Press.

Pintrich, P. R., Smith, D., Garcia, T., & McKeachie, W. J. (1993). Reliability and Predictive Validity of The Motivated Strategies for Learning Questionnaire (MSLQ). *Educational and Psychological Measurement*, 53, 801-813.

Ruohotie, P. (1999). Growth Prerequisites in Organizations. In P. Ruohotie, H. Tirri, P. Nokelainen, & T. Silander (Eds.), *Modern modeling of professional growth*, (pp. 5-36). Research Centre for Vocational Education, University of Tampere.

Ruohotie, P. (2000). Conative constructs in learning. In P. R. Pintrich & P. Ruohotie (Eds.), *Conative constructs and self-regulated learning*, (pp. 1-30). Research Centre for Vocational Education, University of Tampere.

Ruohotie, P. (2002). Motivation and Self-regulation in Learning. In H. Niemi & P. Ruohotie (Eds.), *Theoretical understandings for Learning in the Virtual University*, (pp. 37-72). Research Centre for Vocational Education, University of Tampere.

Ruohotie, P., & Nokelainen, P. (2000). Modern Modeling of Student Motivation and Self-regulated Learning. In P. R. Pintrich & P. Ruohotie (Eds.), *Conative Constructs and Self-regulated Learning*, (pp. 141-193). University of Tampere, Research Centre for Vocational Education.

Snow, R. E., Corno, L., & Jackson, D. (1994). Individual differences in affective and conative functions. In D. C. Berliner, & R. C. Calfee (Eds.), *Handbook of educational psychology*, (pp. 243-310). New York: Macmillan.

Tirri, K., Komulainen, E., Nokelainen, P., & Tirri, H. (2002, August). Conceptual Modeling of Self-Rated Intelligence-Profile. In *Proceedings of 2nd International Self-Concept Research Conference*. Sydney, Australia.