Analysis of Student Decision-Making in Online Collaboration

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Abstract

In this paper we analyze decision-making through asynchronous computer mediated discussion. The theoretical framework of our study understands discussion as communication in which the students contribute to the construction of a common opinion by taking positions. Position taking is described by applying Positioning Theory. In this study students were engaged in a small group discussion in an online environment in which they were required to debate on their proposals and take a vote at the end. We provide quantitative and qualitative analyses of their discussion and those issues that describe the winning proposals. The analyses show that the quality of the original proposal is indeed closely related to winning. However, our results indicate that students can influence the success of the decision process by taking an active part in the discussion. The positions the students take in the decision-making discussions seem to be first order self positions deliberately assumed by the discussants. The influence of the conferencing system scaffolds for the position taking is also considered. The paper examines the relations between the system provided comment types (scaffolds) and students' discursive positions.

Keywords: Web-based learning; Positioning Theory; Online Decision-making; Asynchronous Conferencing Systems

Introduction

Web learning has gained increasing popularity in university level institutions. Online group assignments are very common in almost every discipline. However, learning in small groups on the Web demands a lot from the students. They should engage themselves in group work and discussions, although they seldom know their fellow group members. Typically discussion groups are also formed for a rather short period of time (Hiltz & Turoff, 2002). Recognizing these narrowing boundary conditions for Web study we wanted to analyze the nature of discussions and particularly student position taking in online asynchronous discussions involving a joint decision-making assignment.

We studied students' Web discussion in a small group setting where each student proposed an outline for a Web course and the group discussed the pros and cons of each contribution. After this the students voted for the best proposal in the group. We analyzed

students' discussion with regard to the Positioning Theory proposed by Harré and colleagues (van Langenhove & Harré, 1999). We wanted to shed light on the following questions:

- Does the quality of the original proposal affect winning?
- Do the students whose proposal wins take a more active part in the discussion?
- What kind of positions do the students take in the decision-making discussions?
- How should the conferencing system be designed to help student position taking?

One of our long-term goals is to develop online learning environments that encourage students' participation and position taking. In this study we used our in-house conferencing and groupware system which incorporated a very straightforward decision-making facility, voting. We report our first analysis of the students' decision-processes in making a choice between several proposals.

Positioning Theory and Analysis of Online Discussions

The theoretical framework of the study is constructed around three aspects. First, we note that we study and analyze student communication in a computer mediated and supported environment. In this kind of computer-mediated space, people cannot build individual interaction and exchange on the aspects of their physical presence, but on information they deliberately present on the matter and themselves. We understand communication in computer mediated environments as the co-construction of reality using a system of signs and mutually accepted principles and rules which make interaction possible and provide the rules needed for governing it (Riva & Galimbert, 1997). In our study environment the mode of communication was asynchronous discussion by writing. The study environment also included the system and rules for decision-making in competitive conditions in which the students had to choose one proposal out of several by voting.

We assume that just as in everyday discussions students take positions to express their opinions and influence each other; they also apply similar positioning in computer-mediated discussions. "Positioning theory is the name given to recent attempts to articulate an alternate way of reading and understanding the dynamic of human relationships within a social constructivist paradigm. ... [It] attends to the problems inherent in the theatrical metaphor of "role" by working the much more dynamic metaphor of "position."" (Luberda, 2000).

Position and positioning in a conversation "can be understood as the discursive construction of personal stories that make a person's actions intelligible and relatively determinate as social acts and within which the members of conversation have specific locations" (van Langenhove & Harré, 1999). People position themselves and others and there are different modes of positioning. First order positioning refers to the way people locate themselves and others. Second order positioning refers to an act in which a person who has been positioned questions the first order positioning (van Langenhove & Harré, 1999). We have applied the Position Theory to analyze study situations in teacher education (Vuorikoski & Ropo, 2003).

Although positioning theory has typically been applied in the analyses of longer conversations, we also found it an interesting approach in the analysis of conversations in computer-supported environments. We specifically wanted to know how appropriate this kind of approach might be in analysing student online conversations dealing with idea creation and decision-making.

As we said in the above position is a relatively new approach in analyzing discussions. In the analysis of social situations the concept of position is proposed as an addition to the concept of a role (van Langenhove & Harré 1999). Role as a concept refers to a person's permanent 'place' in the social situation, whereas position changes from time to time. People take and give positions by expressing their opinions, perspectives or thoughts. Those opinions are not positions. Positions are the result of discursive opinion taking. With the opinion a person changes his or her social position in relation to others.

Pre-defined roles as an instructional method in online conferencing have proved to be beneficial in several studies (see e.g. Sugar and Bonk, 1999; Zhu, 1999). For example, de Bono's Six Thinking Hats method has been applied successfully (Belfer, 2001). In our opinion, student positions and Positioning Theory provide fresh avenues to pursue in the analysis of discussions on Web courses. Although students can be guided to positions by scaffolding, positions can be seen more as a tool for the analysis the content of the discourse. Positions provide more fine-grained insight of the discussions than roles.

Online Decision-Making

We are interested here in decision-making in asynchronous online environments, which are more problematic than synchronous environments. For example, Dufner *et al.* (1995) take the view that one of the challenges for designers of conferencing systems is to provide effective coordination tools (such as agenda, voting, and polling) for structuring asynchronous interaction and overcome the inherent limitations of the medium. In a recent study, Farnham *et al.* (2000) found that groups were more likely to reach a consensus and to make higher quality decisions in *structured* chat discussions. In addition, groups applied the structure they learned to subsequent regular chat sessions.

Voting is one way to structure decision-making. Voting is a useful tool in online group work: it helps, for example, to rapidly have a compact summary of what a large group thinks about a particular issue (see e.g. Harasim *et al.*, 1995), or anonymous voting can reduce bias of dominant individuals (Chang *et al*. 2001). Moreover, voting should be used not only to end the decision process but also to reveal the lack of consensus, and to enable the group to explore the issue more, at a deeper level.

There are various Group Support Systems (GSS) available for online group work. While many of these have incorporated voting tools, published research seldom analyses them (Chang *et al*. 2001). Our asynchronous conferencing system emphasizes argumentative discussion, but also incorporates a very straightforward voting method, which can be characterized as a plurality method - everyone has one vote, and the majority wins (Chang *et al*. 2001).

The Study

In this section we describe the task and group work on our course and outline the conferencing system within which the collaborative decision-making experiment was carried out.

The Course

The course we analyze here is entitled "Computer Aided Instruction". There were 57 students on the course, of which 26 female and 31 male students. The students were mainly first year computer science majors. The second biggest group were mathematics majors, but there were also students majoring e.g. in education, psychology and foreign languages. The students were randomly assigned into 8 groups, each with the same assignment.

The Task

The collaborative Web discussions form part of the course requirements. During this assignment the students, each with the goal of producing a solution for a given task, are divided into small groups. They are working using a Web discussion forum called Dyn3W that we describe in more detail below. The task of each group is to create a short description for a Web course that expresses both authenticity and virtuality. These two concepts had already been the topics of two face-to-face exercise sessions where additional readings and videos were presented. The goal of this Web assignment was to encourage students to produce and discuss their own contributions regarding these two difficult concepts.

Table 1. Schedule for the course

	Time	Group Work
Phase 1	Week 1-3	Initial contributions from all participants in small groups, then discussion on pros and cons of each contribution
	Week 4	Vote for best contribution in each group
	Week 5	Winner improves his/her contribution
Phase 2	Week 5	Winner publishes group's contribution for entire class
	Week 6-7	Entire class discusses winner suggestions together

Student groups have their own private discussion areas in Dyn3W and each member of the group is first required to prepare his/her own solution to the task. Then the small groups are advised to carry out discussion on the strengths and weaknesses of the suggestions and to pay attention to argumentation. The schedule for the entire group work period can be seen in Table 1. In this paper we describe the discussions in weeks 1 - 4, especially those issues that led to the winning contributions during that time period in Table 1.

The reasons for using voting as a decision-making method in our case were:

- To motivate students to develop creative ideas for a good web course
- To motivate students to discuss and defend their own proposals
- To give reasons to students to compare and discuss different proposals, thereby helping in constructing conceptions of a good online course.

The Dyn3W Conferencing System

The system used in the Web-based discussions, Dyn3W, is a lightweight conferencing system that has been developed by the CoWoGLe (Conferencing on the Web for Group Learning) project at the University of Tampere. Courses using an earlier version of the Dyn3W have been reported e.g. in Hietala et al. (1997), Hietala and Koivunen (2002), and Koivunen (2002). The current version of Dyn3W (which was also used on the Spring 2003 course) has a revised user interface and is built on database. However, the main features are the same as in earlier versions.

One of the design principles of the Dyn3W system has been to guide students towards argumentative and disciplined Web discussion by structuring the way discussion is carried out. Our goal is to provide students with ideas of how to give constructive criticism and how to build one's messages on the work of others, resembling theory refinement. Similarly as in the works of other researchers, e.g. Scardamalia *et al*. (1989); Muukkonen *et al*. (1999), our system insists that the students should attach to their discussion entries specific labels that characterize the content of their contribution. We call these labels comment types, but they are sometimes also called thinking types as they guide the thinking of the students in the discussion to reflect upon what they are writing. From the instructional point of view these comment types can be seen as scaffolds (Scardamalia 2004) that direct a student's thinking by requiring him/her to respond in specific way to somebody else's point. We propose that this kind of scaffolding is mediated by the position taking of a student. The opinion a student expresses by selecting one of the ready-made comment types positions her/him. We argue, however, that taking a position by choosing a ready-made comment option is not as deliberate and enhancing for learning as position taking by discursive actions. These discursive actions may be written or oral expressions in which the student is allowed to express freely her/his associations, opinions or arguments of the topic.

In this version of the Dyn3W system the comment types are two-level: at the first level, they are attached to comments referring directly to the initial contributions of fellow students. Only directly supportive or directly unsupportive comments are possible here (*Plus* or *Minus* comment types). This is intended to direct the students to "take a stand" to the contributions of their peers in the group. After that, at the second level, a wider spectrum of comment types is available to encourage the ensuing discussion to be more varied. The 8 comment types now are the following: *Question*, *Support*, *No-support*, *I want more info*, *I give more info*, *I give feedback*, *New idea*, *Neutral*. Figure 1 illustrates these issues.
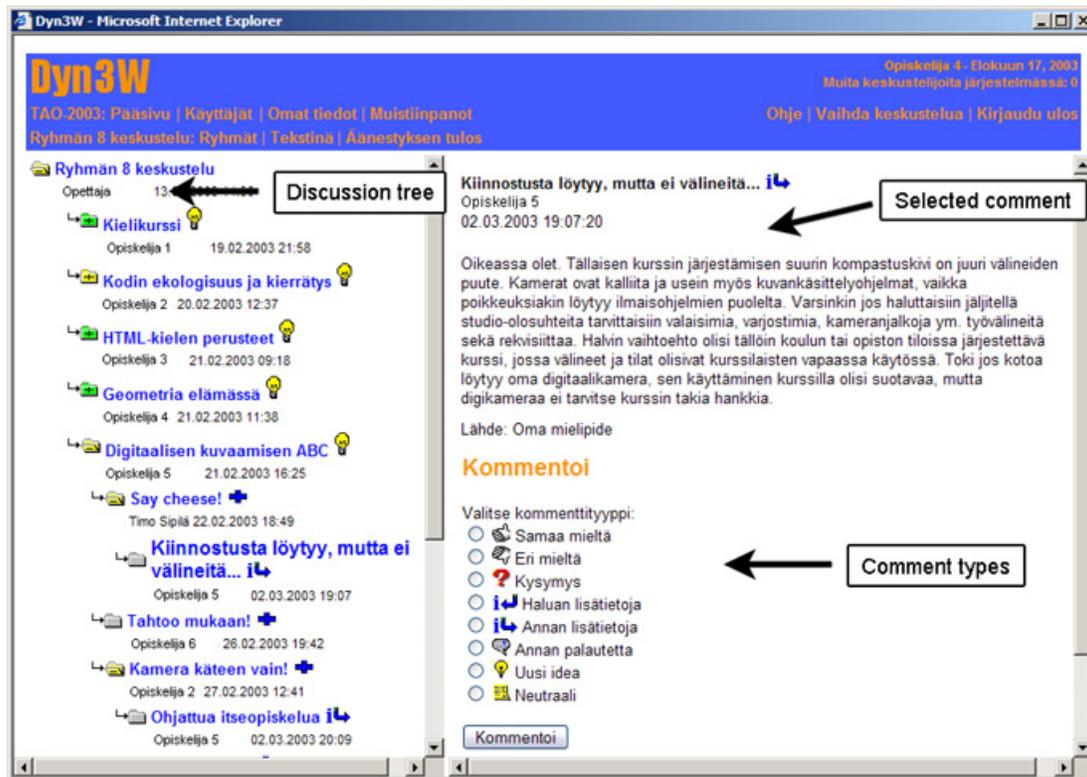
Figure 1. Screenshot of the Dyn3W conferencing system

Figure 1 shows a working area of a small group (Group 8) on the course. The system divides this area into frames. On the left hand frame there is the discussion tree. By clicking the comment titles the student can see the corresponding comment on the right hand frame. If the student wants to reply to this comment he or she has to choose first a comment type for a new contribution. These types are shown on the right hand frame below the comment.

After writing their contribution students should also explicate the source of their contribution: there are 6 source types available: *Own idea*, *Own opinion*, *Discussion with others*, *From lectures*, *Written material*, *From Media* (TV, Newspapers, ...) These types are drawn from the research of argumentative discussion (see e.g. Mason, 1991; Newman *et al*. 1995) with the intent of leading the students to better grounded contributions.

As mentioned earlier in this paper, the comment and source types can be seen as "ready-made positions". The students are guided, for instance, toward having *questioning* or *support positions* when they select comment types *Question* or *Support*. Besides the role of positions in students' decision-making process we are in this paper interested in the relations between the discursive positioning and commenting related to the idea of scaffolding.

Analysis

We analyze first the overall discussion activity in all student groups quantitatively. Second, we focus on the quality of students' initial proposals in the discussions. These results are used to select the most interesting groups for further investigation in which we provide a qualitative analysis on the discussions and student positions. For the purposes of this paper we are interested in groups evincing the most active and intense discussion activity.

Table 2. Discussion activity

Group	Members	Number of comments	Number of sessions
1	8	20	97
2	7	39	89
3	7	27	110
4	7	24	82
5	7	44	112
6	6	14	78
7	7	56	165
8	8	42	135
Total	**57**	**266**	**868**

General Activity in the Groups

As shown in Table 2 the activity in groups varied quite widely. In the most active group (Group 7) students wrote 56 comments during phase 1 (reference period) and in the least active group (Group 6) only 14 comments were written. We also use information about the sessions to determine how active different groups are. Sessions are counted from the logins to the students' system. The session counts in all groups are clearly higher than the number of comments, which indicates that students do not make new contributions to the discussions in every session. Obviously, they also need time to read other learners' comments, reflect upon them, and prepare new comments. This type of activity is ignored if we only look at the number of comments.

Looking at Table 2 we can see that groups 5, 7 and 8 were most active while groups 1,4 and 6 were least active. The group variable had statistical significance with respect to the number of comments posted ($p=0.01$, one-way analysis of variance) but not to the number of sessions ($p=0.14$, one-way analysis of variance). Calculating the average number of comments and sessions in each group (Figure 2) shows also that the most hard-working group seems to be group 7. In groups 1, 4 and 6 both average numbers are quite low.
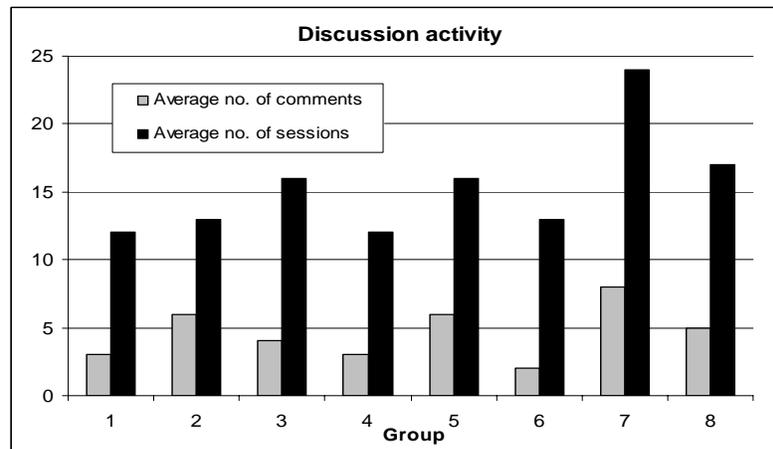
Figure 2. Discussion activity in groups

Discussion Intensity and Temporal Concentration of Commenting Activities

We also analyzed the time elapsing in each group before someone responded to the new course proposal or otherwise commented. The focus of this analysis is only on comments to which a response was made. Moreover, we do not take into account the time period during which the discussion takes place. This means that if members in a group wrote all their comments in a couple of consecutive days and were silent all other days of the reference period, this group will appear favorably in this analysis.

By looking the median response times (Figure 3) we can see that in groups 2, 3 and 7 it took less than 48 hours to get a response to the comment. This indicates how intensive the discussions have been. Forty-eight hours (2 days) might seem quite a long time to wait for an answer but we think that in asynchronous discussion this is not long. Students have some other ongoing studies and so they cannot focus solely on this online discussion. The period also includes weekends, which probably make the response times longer.

Intensity is an important ingredient of a good discussion. From this analysis and comparing to the discussion activity values (Figure 2) we can deduce that in groups 2 and 3 the discussions were intense although they did not produce as many discussion contributions as groups 5 and 8 (see also Table 2).

In sum, the above results show that the Group 7 proved the most active according to all features studied. The next interesting groups in this quantitative analysis seemed to be groups 2 and 3.
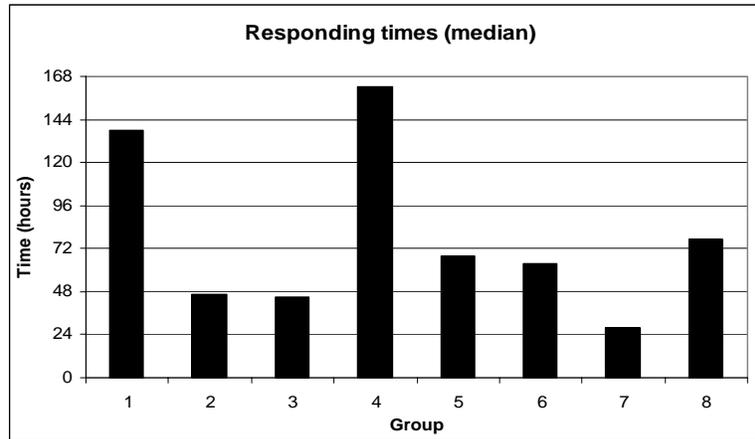
Figure 3. Response times in groups

Analysis of the Students' Initial Proposals

We studied how the students' initial contributions to fulfill the online assignment influenced their success in the vote that followed after a discussion period. Each student was required to produce for his/her group's private Web area a written suggestion - a description of a virtual course on a topic of each individual's own choice. This suggestion was required to contain three parts: a general outline for a course, evidence of how it could be implemented as a virtual course, and evidence of how well the suggestion reflected authentic learning. The concepts of "virtuality" and "authenticity" were covered earlier during regular weekly face-to-face exercise sessions. Moreover, the students had articles and written material dealing with these concepts. They were also encouraged to produce more than one suggestion; in fact, it turned out that only two students actually submitted two suggestions.

We graded the initial suggestions on a scale (1, 2, 3), 3 being the highest grade. This grading was based on how well students' suggestions conformed to the definitions of the concepts, that is, how well the students had assimilated the ideas and information presented during preceding lectures and exercise sessions.

It turned out that the winning suggestions were of high quality – 5 out of the 8 winners were graded 3 (Groups 1, 3, 4, 5, and 6), while the remaining 3 were graded 2 (Groups 2, 7, and 8). In two of the groups the winners were the only ones with the highest grade in the group (Groups 4 and 6), while in three others (where the winner got grade 3) there were also other grade 3's (Groups 1, 3, and 5). In three groups the average of the group proposals was either exactly 2 (as was the grade for the winner, Group 7), or higher than the winner's (Groups 2 and 8).

This analysis shows that the quality of the proposal is related to winning. However, there were several groups in which the quality of the winning proposal was equal or lower than the other proposals. These groups call for closer qualitative analysis.

In addition, if we analyze the length of the student initial discussions with respect to the winning suggestion, we can state that on average the suggestions that won the vote were longer than the average length of the other suggestions (154 words > 141 words; 1431 characters > 1277 characters). In 4 groups the winner was above the average number of words in the suggestions, but below in 4 groups, namely 2, 4, 7, and 8 belonged to the latter. Table 3 summarizes this analysis.

Table 3. Grading of the winning suggestion with relation to the other suggestions

Group	Grade of the winning suggestion	Average grade of the group	Other suggestions as good or better than the winning suggestion	Length of the winning suggestion less than the average
1	3		yes	
2	2	> 2	yes	yes
3	3		yes	
4	3		no	yes
5	3		yes	
6	3		no	
7	2	= 2	yes	yes
8	2	> 2	yes	yes

Selection of the Groups for Further Content Analysis

The above analysis of the quality of the initial proposals provided further understanding of dynamics of the decision-process. It identified several groups where additional analysis was needed. These were groups 2, 7, 8. For example, in these groups there were other suggestions that were as good or better than the winning one, so it was not clear why the group selected the winning suggestions. The discussion content needed to be analyzed.

In the earlier analysis of the group activity, we found out that groups 2, 5, 7 and 8 were the most hard-working groups with most discussion entries posted on the discussion area. On the other hand, the intensity of the discussions was most intense in groups 2, 3 and 7. All these indicators point out groups 2 and 7 to be the most interesting ones for our analysis. Next interesting ones are groups 5 and 8, mainly because of their good discussion activity.

Thus, combining these criteria together, we selected groups 2, 5, 7 and 8 for further study of student positions in the discussions.

Content Analysis of the Positions in the Selected Group Discussions

Analyses of the content of the group discussions were done qualitatively. Four groups were analyzed using the content analysis method. We wanted first to know if the participants take positions in the web discussions. Second, we wanted to categorize the positions. Third, we were interested in the ways the deliberate positions interact with the comment types students selected when beginning the discussion.

Group 7

There were eleven turns in the discussion on the winning proposal. The participants formulated questions and the author of the proposal responded. It was typical that the discussion was dialogical, meaning that the participants addressed questions to the author and she replied. About half of the entries came from the author. The position types that the discussants applied can be classified as self-positioning. No one positioned anyone else than her/himself. The original proposition was not evaluated as the best in the group. It dealt with teaching information search in the Internet. It was quite short and lacked important details.

The discussion is an interesting one. The first person expressing his opinions regards the course as beneficial for everyone, young and old.

> *"This would be a needed course for all who search information from Internet. This would fit both young and old. The tasks should be comprehensive, it is not enough to find some detailed pieces of info from the net."*

This is can be seen as a *support* position in which the person wants to appear as an advocate of this proposal. However, he also adds an idea concerning the extent of the task given to students. By his question he shows that the proposal is not clear enough. The author responds to this by agreeing with the person about the tasks and explains what kind of tasks she will design. She positions herself in this reply therefore as a *developer* and not, for instance, as a *defender*.

> *"I thought these assignments rather extensive so that the person should think the truthfulness and objectivity of the information. For instance, searching 'homeopathy' would give you quite contradictory results and it would be difficult to make distinctions between true and false. Making essays would be the right type of an assignment."*

Next a second discussant asks a question and the author adopts the same type of position, giving more details of her plans. A third discussant takes an example of her earlier experiences as a teacher and criticizes the workload for the teacher in checking students' homework. She thinks the workload is going to be huge. This position we call *questioning*.

> *"In one of the discussion groups we counted the time a teacher has available for one student. It was only a few minutes per student. During this time the teacher should check if a student has found information on the topic and verify the references. Sounds too laborious for the teacher."*

It is typical that the person wants to challenge the original ideas, but hides the criticism behind politeness strategies, such as a question. The author takes this question seriously and responds to it arguing that the teacher does not need to do as much work as the questioner thinks. She also takes a position of *hiding behind an authority* by mentioning the course instructor as a source of information concerning workloads on such courses.

> *… "The few minutes you mentioned was counted in a face to face instruction and (name of the teacher) said that in web teaching there's more time".*

After this the person who criticized responds and agrees with the author admitting that she had missed the course instructor's point. This position we call a position of *being wrong*.

> *"… Oh I think I have missed the point of a teacher having more time in web teaching…sorry my mistake."*

To this the author responds that the person is also right in the question of information reliability. Making a thesis with evidence and references compared to publishing searched information is different. The student also takes a position of *disagreeing with the instructor* in a specific question. The conversation continues with the same way, group members asking a question or commenting a detail in the proposal and the author responding precisely.

The positions taken by the group members and the author could be categorized into several types. It was quite obvious that the discussion in which the author actively assumed the positions offered by the group members. In discussions concerning other proposals there were fewer entries and the discussion was not as dialogical (entries were not directed as much to the author of the proposal). Another difference was the passivity of the other authors of proposals.

Group 2

Discussion in this group about the winning proposal was shorter comparing to group 7. A total of eight entries were expressed. The proposal was an idea of a driving school in Internet. The first discussant criticized the idea arguing it is expensive for the participants. This is a position we call *questioning*.

> *"Sounds good, except that it would very expensive to buy such pedals and wheel to homes… but if the driving schools had more than one equipment then students could go to there and use their facilities to practice when they had time."*

The author responded to this by agreeing that the driving school is expensive, but she would like the idea of hiring the home equipment from the driving school. The author uses the question to enlarge her proposal in the response. Therefore, this position can be called *developer*. The next discussant continues by starting to act as a *developer*, too, adding details to the plan.

> *"… in the beginning students should have theory classes, like today, and there should be a test after each theory session. If the student fails s/he could repeat lessons as long as necessary. Students should be required to drive a certain amount of virtual routes to proceed to real driving. This would make sure that the student would not feel unsure and helpless first*

time as a car driver. Having a driving simulator would an addition to school equipment (many driving schools have this already)."

The next discussant continues as a *designer*. He adds the idea of trying out drunken driving with a simulator. To this the author responds by agreeing (*support position*) that driving while intoxicated is safer with the simulator. She also continues as a *designer* by adding a few more details to the plan. This mode of positioning continues in the two last entries in which the discussants bring something new to the original proposal.

In the winning proposal the length of the discussion is seven entries that is the same amount as for the proposal that came second in the vote. Both of those discussions were dialogical in the sense that there were questions and responses and that the author took an active part in the discussion. In both cases the author takes the *developer* position while others question.

Group 5

The winning proposal in this group dealt with virtual driving school. The discussion consisted of ten comments. This first discussant was in favor of the proposal (*support position*).

"Your idea is very much needed on my mind. We all drive a lot and have had not enough time to introduce ourselves to traffic rules. A traffic portal could be of great help in this."

Second discussant adds to this and develops the idea further (*developer*). She reminds that after getting the driver's license the first check of a person's abilities as a driver will take place when the driver is 60. She proposes a refreshing course for elderly drivers and *supports* the idea of a simulator.

"This kind of refreshing course could be mandatory for elderly drivers. For instance, we could test all drivers over 50 every now and then. Many people would benefit of the simulator because driving would then be easier"

The next student supports the idea of a virtual traffic school, but questions the proposal of requiring people over 50 to participate (*support* and *questioning position*). He arguments with economical reasons saying that costs would be too high for this kind of system. He supports voluntary participation.

The fourth discussant takes the discourse from the idea to arguing about the need for regular check rides (*questioning position*). He also says that using virtual driving people could experiment crazy driving that is too dangerous in real life. He develops the original idea by proposing that the module of ecological driving would be added to the simulator (*developer*)

"You could add ecological driving to the simulator. This is something older drivers may not have ever heard of."

The next discussant questions the Internet as a place for traffic school. He asks how this would help those who have slower connections or older computers (*questioning position*).

The originator of the idea responds to this admitting that he did not think this when proposing the idea and continues developing this original idea (*developer position*).

> *"All other parts of the portal except the Traffic Simulator would be easy to execute in Internet. The simulator would be used only in the traffic school local network. It is no problem to make it work in a local network. However, this same Simulator would be easy connecting from home, too."*

In this group the originator of the idea did not participate the discussion as actively as the originators in other groups (2, 7 and 8). One reason for this may be that the discussion does not direct questions to the designer as much as in other groups. It seems to us that instead of direct questions students took *questioning positions.* In further analysis it would be interesting to investigate the relations between direct and indirect questioning positions.

Group 8

This group discussed digital photographing as the winning proposal. The first comment *supports* the idea and addresses further *questions* about the equipment and students of the course.

> *"I am not sure if I understood who would be the students in this course. The target group might be adults in a community college or something like that."*

In the following message the proposer of the original idea responds concerning the equipment needed for the course.

> *"You are right. Lack of computers is typically the biggest obstacle for this kind of a course. Cheapest alternative would be to have a course in a school where you could have all the equipment available freely."*

The proposer is first *agreeing* and then taking a *designer* position in which he develops the course plan. A third person taking part of the discussion agrees and *supports* the proposal. Her comment is short but she is able to elaborate authentic learning and virtuality as good aspects of the proposal. The fourth discussant mentions the proposal as interesting and original. She also asks a few questions (*questioning position*).

> *"Would you have a mentoring teacher at the course or would it all be self-directed? Would a teacher increase flexibility and would s/he tutor the students if necessary?"*

The proposer responds in the next message to the questions raised. He ponders about self-regulation in learning and the significance of a teacher.

Fifth discussant starts with a statement that she would herself participate this kind of a course. After this the discussant raises some questions (*questioning position*) that the proposer addresses in his next message (*developer*). In the last message the proposer develops the course further (*design position*) developing his evaluation idea for the course. This statement by the proposer ends the discussion.

The discussion in this group did not add new position categories compared to the groups analyzed above. Overall, the discussions on other proposals were shorter than the discussion concerning the winning proposal in this group.

Summary of Position Analysis

In summary the results show that in the conversations the discussants seem to be active in adopting positions. All the positions identified in this short analysis were *first order self positions* which the discussants take deliberately. We did not find evidence of *second order positioning* in which someone assigns a position to somebody else and this person resists the positioning (see van Langenhove & Harré, 1999). This may be due to the short time the students had for this phase of the discussions and also of the nature of the task the students had to fulfill. They had to decide upon a proposal for a Web course, therefore their contributions concentrated mainly on congratulating the proposer for the good elements and suggesting improvements. This kind of a "design" conversation (Jenlink & Carr, 1996) might not entice second order positioning as much as, for example, discussions on controversial daily life topics. Moreover, the nature of asynchronous Web discussion may not provoke second order positioning as much as face-to-face situations. However, this question needs further analysis.

We were able to recognize a few typical positions taken by the authors of winning proposals in the discussions (see Table 4). The most advantageous seemed to be the position of a *developer.* The discussants took such positions as *questioning* and *designer.*

Table 4. Summary of Positions in the analyzed groups

Position	Explanation
developer	The person enlarges the proposal in the response
designer	The person explains what kind of tasks she/he will design.
questioning	The person wants to challenge the original ideas.
support	The person wants to appear as an advocate of this proposal.
being wrong	Admitting that she/he had missed the point.
hiding behind an authority	Mentioning the course instructor as a source of information.

Although we did not find exact instances of the other position categories suggested by van Langenhove and Harré (1999), we can say that e.g. discussion in group 2 in a topic on Virtual Driving School, contained discussion on simulating drunken driving, included utterances that were rather close to "*moral positioning*" (cf. van Langenhove and Harré, 1999). Here is an excerpt of a discussion.

Student A marked his contribution with a positive comment type (*Plus*).

> *"This drunken driving is an excellent idea. There one could really try out how hard it is to stay on the road, but would that be also fun? I wonder if one might try that in real life. Would it be a good idea to add some modeling of the car damages, so that if one gets into an accident one might see the tragic consequences?"*

Commenting the above, Student B (the one who had suggested the topic in the first place) labeling her contribution as "I give more info":

> *"Drunken driving might seem fun for somebody, but anyway it would be better to try it on the computer than in real-life. Or one might make it tragic so that little children would be overdriven and so on, but that might not help because there are already many games with the purpose to overdrive people…Well, anyway it would bring more color to the program and I think that sensible people do not drive drunken even if one had tried that out in a virtual world. Then we should think the same of the killings in the shooting games and to my knowledge there are not so many people raving at the streets thinking that people do not die really [when shot at]. About the modeling it is the one idea and actually modeling the speed. So that if one drives 100 kilometers per hour, so how long is the breaking length. If for example there is a moose in front of you. I do not know if it possible to model slippery road or getting into hydroplaning".*

Overall we may conclude that although the above discussion did not go deep into the moral aspects of human behavior, this kind of position types may appear despite of rather strict task assignments. Also, we think that the conferencing system should allow free commenting in addition to pre-defined comment types.

Relationship between the Positions and the Comment Types

The Dyn3W platform structures the discussion through the mandated use of specific scaffolds, comment types and source types. The students are required to label their postings with these types that seem to suggest already a specific position. For example, a *questioning* position should be labeled with *Question* type, obviously. However, a *developer* position statement might start with an "*I give more info*" comment type (but as well with a *Support* comment type) and then contain a detailed improvement idea. Thus comment types give the student ideas of some "desired positions". Source types justify and clarify the contribution by defining the basis for the suggestion, e.g. *My own idea* or *From lectures*.

However, often the positions taken in the student postings do not exactly correspond to positions provided by the comment types. The next excerpt illustrates this. In a topic where the initial suggestion proposed a Virtual Driving School, the preceding posting had mentioned that the suggested virtual driving course should be compulsory for elderly people, e.g. those over 50 years. Responding to this, Student C, labelling his comment as *Neutral*:

> *"I think that virtual driving school is a very good idea. I myself do not necessarily think that people over 50 years should be forced again to driving schools. At least driving schools with charges seems a nasty idea because one has already payed a lot of money as a fee of one's first driving licence. [Then the student goes on fantasizing how much more the driving licence would cost in the future because the fee has risen so much lately... Then he comes back to the original idea] I think that the old and experienced drivers do not constitute the greatest risk in the traffic, but rather those alcoholics driving, and those young drivers who are insecure of themselves. On the other hand, with many people one might draw the line to 80 years concerning driving, at the latest. After that one's conditions starts to weaken so much that one's daily chores are already enough to take care of. For people over 80 years, a suitable vehicle to move might be a four-wheel moped".*

We can see here that the comment type selected, "*Neutral*", does not describe exhaustively the positions the student takes, or considers, in his contribution. He starts with *a support position,* then goes on with criticizing the earlier posting and the age boundary set there (*a questioning position*), after which he comes back to the time boundary issue again and suggests his own upper age boundary for having a driving license (*a designer position*). We believe that this is very typical, also in the Web discussions, that a person starts his/her contribution with one position, and while elaborating the issue, the position evolves to a new position, which might be rather far from the starting position.

This above example shows also that having only one comment type for the student to choose from can be problematic. It might be better to have several of them to describe one's contribution. This is also supported by findings of Muukkonen *et al*. (1999), who have analyzed Web discussions using a conferencing system similar to ours. They note "it would be important to further develop the functioning and the types of scaffolds by allowing, for instance, categorization within a message." Muukkonen *et al*. (1999). On the other hand, the need to select only one label for one's contribution is intended to encourage the students to short and on-the-topic postings which is one generally accepted guideline for good Web discussions (Harasim *et al.*, 1995; Salmon, 2000). Long and winding contributions tend not to be read, indeed, sometimes students say that they omit long messages (see e.g. Ross *et al.*, 2004).

Finally, there are theoretical underpinnings concerning the idea of comment types as scaffolds fostering desirable knowledge processes. Scardamalia (2004) notes that these kinds of scaffolds (comment types) give ideas as defined roles in such processes of theory refinement and constructive criticism. These processes are essential in academic discourses. Scardamalia (2004) also notes "The opportunistic rather than mandated use of scaffolds helps students to embed these forms of discourse in their everyday work of ideas". It is also hoped that the forms in these academic discussions become forms of the thinking of the students.

Although the above examples show that some students use these scaffold supports very opportunistically (and rather verbosely), they show also that comments facilitate position taking and development. Students utilize comment type as a starting point for their positioning. Typically it is difficult for a student to start commenting others' contributions. In our case they have scaffolds in this phase, however, our system give them also opportunity to expand their

ideas in writing after that. Our data show that thinking related to comments includes differing perspectives that we have called positions. We argue positioning to be a theoretical concept is fruitful for analyzing student activities in the conferencing system.

Concluding Remarks

In this paper we have investigated small-group decision making in an asynchronous computer mediated discussion. The task for each of the student groups was to produce a justified proposal for a suitable Web course. We were especially interested in the factors affecting the proposal selection. Particularly, we wanted to know whether the positions taken in the discussion influenced the winning.

To recap, the analyses in this paper show that the quality of the original proposal is closely related to winning. Moreover, our results indicate that students can influence the success of the decision process by taking an active part in the discussion. Positions were applied to both direct the discussion and affect the decision-making. On the basis of the discussions analyzed we may suggest that taking a developer position the originator of the proposal may enhance the success of his/her proposal. There are also indications that winning proposals need support positions from other discussants.

A more profound understanding of the relationship between the initial proposal and the discussion requires further analysis, also on other similar Web courses. The positions identified in this paper also need refining. However, we feel confident that the Positioning Theory can be applied to analyze discussions in web-based environments. Online decision-making with voting worked well in our case, and compared to face-to-face situations seemed to be free from social pressures from others. This encourages us to use it in other similar online courses.

An issue we have not taken into account earlier is cultural differences. For example, concerning the Web culture of Finns related to some other nationalities (e.g. U.S., Canada, Korea), it has been shown that both discussion activity and content of comments differ (Kim & Bonk, 2002; Hakkarainen *et al.,* 1998). We assume that also positions will vary accordingly.

The online activities described in this paper can be characterized as "design conversations" with elements of "dialogue conversations" (Jenlink & Carr, 1996). In other words, the overall goal of the online conversations was rather "open", to produce a new artefact based on ideas from the group member proposals, an idea which then was to be acknowledged by the entire group after an exchange of comments and a vote. We would also like to note that the entire interactive process had a rather restricted timetable.

It would be interesting also to analyze other kinds of online conversations; mainly those described as "closed" in Jenlink and Carr's (1996) typology. For example, they name conversation "dialectic" if the nature of the conversation is one of debate and logical argument within a context of limited negotiations for change. In this kind of conversation, typically of seminar type academic work, the small group is to get to the bottom of the topic being examined. In fact, we will next focus our research to an analysis of a seminar-type course where no voting takes place and a more argumentative way of discussion is to be expected.

We believe that the system characteristics of a conferencing platform can have an influence in the discussions. From the pedagogical point of view, scaffolds directing the student commenting are valuable. However, the system should allow also possibilities for dynamic discursive position taking. We continue to develop our conferencing system towards this direction.

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