

# Social phenomenon of Community on Online Learning: Digital Interaction and Collaborative Learning Experience

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*Abstract:* - Digital interaction in e-learning offers great opportunities for education quality improvement in both - the classical teaching combined with e-learning, and distance learning. Zagreb School of Economics & Management (ZSEM) is one of the few higher education institutions in Croatia that systematically uses e-learning in teaching. Systematically means that all courses are developed combined with e-learning and all these courses use the same LMS (Learning Management System). Discussions are very important part of each e-learning system. The study focuses on the importance of the social phenomenon of community on online learning. The phenomenon of digital environments and social experience in education is examined through discussion boards of two different freshmen courses offered at ZSEM. Effectiveness and communication dynamics of discussion boards is analyzed through comparison of students' participation rates according to the topic, discussion type and quality of discussion. The goal of the study is to analyze the potential of online communication tools in creating student-centered digital communities of inquiry. However, the focus is not on the individual student learning and achievement outcomes, but on the collaborative learning and student digital interaction from a pedagogical perspective. Based on social constructivist principle and the assumption that knowledge creation is a shared, rather than individual experience, the study examines how and why digital environments enhance online collaborative learning experience.

*Key-Words:* - discussion boards, e-learning, quality, collaborative learning, online communities of inquiry, communities of learners, information and communication technologies, sociology

## 1 Online Discussion Practice

*I believe that all education proceeds by the participation of the individual in the social consciousness of the race... I believe that the only true education comes through the stimulation of the child's powers by the demands of the social situations in which he finds himself. [1]*

Effectiveness of online learning primarily depends on interactivity.[2] Many authors dealing with online learning environments [3]-[8] frequently point out that discussion boards are an important part of every e-learning system, since an effective online communication is „at the heart of all forms of educational interaction.“ [9]. Social component, besides cognitive and teaching presence, is one of the key factors that need to be taken into consideration when evaluating an online learning experience.

Unlike the traditional, teacher-led classroom discussions which are limited in terms of time and number of participants, online asynchronous discussions enable all the students to be active and choose the conditions that best fit them. [10, 11] Besides managing their own time which helps students to create better work habits and attitudes toward learning, discussion boards provide opportunity for collaboration. Students can work together in their own artifact construction with the goal to understand and explain what they are learning. Based on long-term, interdisciplinary and student-centered activities, online discussion practices create an inquiry-based environment in which teachers are facilitators of learning rather than “vessels of knowledge.” Therefore, discussion boards are valuable tools that promote understanding over knowledge and enable teachers to help students in the process of discovering knowledge themselves.

### 1.1 Discussion types

Figure 1 displays different discussion types depending on who is the moderator of the discussion, who are the active participants and whether the discussion is open or closed.

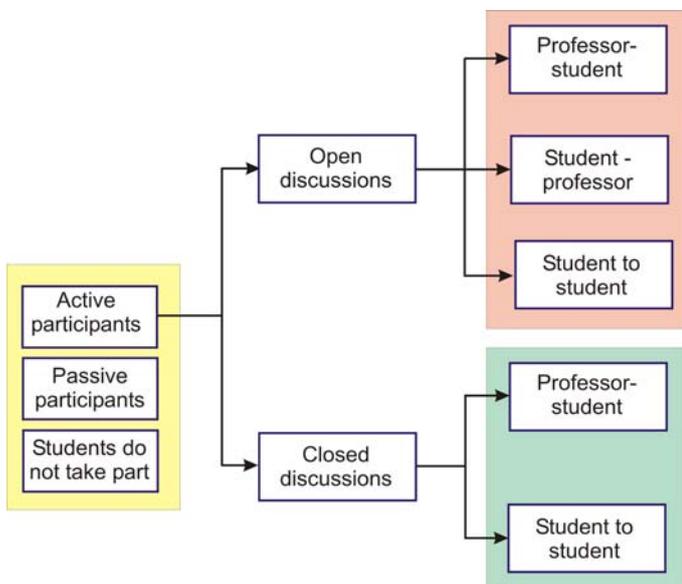


Figure 1 Discussion types

In their research, Steinberg & etc. analyze three groups of participants in online discussions: active participants that write posts, passive participants that read posts, but do not reply to them, and students who do not take part in discussions.[12] This study divides active participants into those that reply to posts and those that are moderators. Almost all LMS systems (Learning Management System) have the possibility to detect not only active, but also passive discussion participation. [13]

The study „Important role of asynchronous discussion in e-learning system“[14] the authors have defined two types of discussions:

- Open discussions – not obligatory, both students and professors can be moderators. Topics reflect different issues within class materials, but also real and relevant examples from the students everyday lives. There are three types of open discussions: professor-student, student-professor and student-to-student.
- Closed discussions – related to course materials and directed by professors. Besides closed student-professor discussion, the authors of the paper „The Development of the E-learning Course Sociology“ [15] have also defined closed student-to-student discussions.

### 1.2 Discussion as an important standard in the development of an e-learning course

According to Aleksic-Maslac etc. [16] at Zagreb School of Economics and Management has developed 11 standards that measure the quality of e-learning courses. Those standards may be categorized into three groupings:

- Static – connected with the basic elements of the e-learning course: Syllabus, lectures, web layout and design (in Table 1 shown as S1, S2, S3 and S4)
- Dynamic – related to the communication between the professor and the students – discussion boards, e-mail, chat, calendar and online tests (in Table 1 shown as D1, D2, D3, D4)
- Administrative standards – involve managing the student database (in Table 1 shown as A1 and A2)

Table 1 shows comparison of those standards in two courses; Information and Communication Technologies (ICT) and Sociology. Both courses use online technologies in addition to traditional course setting and both have been taught to the same groups of students at Zagreb School of Economics and Management in the Fall semester 2008/2009. According to the notion that “a community of learners is an essential, core element of an educational experience when higher order learning is the desired learning outcome,” this study compares online discussion activities of the two “communities of learners” [9] represented by students attending these two courses.

Standard	ICT	Sociology
<b>S1</b> – Syllabus	10	5
<b>S2</b> – Lectures	10	10
<b>S3</b> – Part Time Students	10	5
<b>S4</b> – Design	10	5
<b>D1</b> – Calendar	10	10
<b>D2</b> – E-mail	10	10
<b>D3</b> – Discussion	15	15
<b>D4</b> – Online tests	10	10
<b>A1</b> –Students Database	5	5
<b>A2</b> – Self-registration	5	0
<b>O</b> – Other	0	0
<b>Total</b>	<b>95</b>	<b>75</b>

Table 1 Distribution of quality standards for ICT and Sociology courses

During 2008/2009, the total sum of the quality standards for ICT course was 95, while Sociology had 75 (using the scale from 0-100). However, according to dynamic standards, both courses have reached maximum of 45 points and were positioned on the top of the list among 108 courses that were evaluated within graduate and MBA programs at ZSEM in 2008/2009. For that reason, the study focuses primarily on the analysis of dynamic standards. Examining the potential of discussion boards in providing the environment for collaborative learning, the intention is to point out the importance of social phenomenon of community on online learning.

## 2 Open discussions

Open discussions enable constant interaction between students and professors, as well as communication among peers. There are typically three kinds of open discussions:

- Professor-student discussions. These discussions are opened by professor, while students comment or ask questions. They may include comments on class exercises, seminars, tests, in-class discussions etc.
- Student-professor discussion. This type is characterized by students opening the discussion and asking the professor questions related to the course materials or organization of the course. Besides constructive comments, it is common that less attentive students and those who are not using much the course website seek for the information that already exists on the web.
- Student-to-student discussions are those discussions opened and commented by students.

Among all the students enrolled in the ZSEM Fall semester 2008/2009, around 19% has taken part in open discussions in ICT course, and 36.6% in Sociology course (Figure 2).

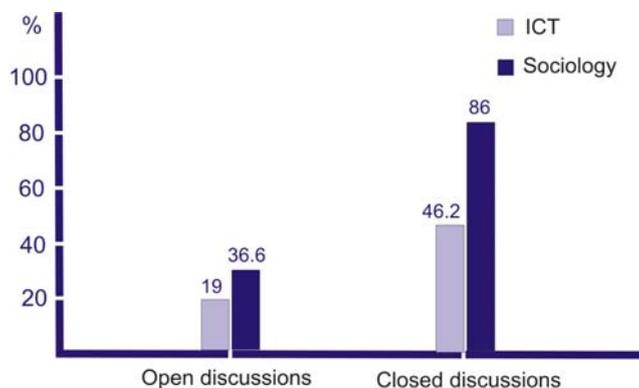


Figure 2 Student participation in open and closed discussions in ICT and Sociology courses.

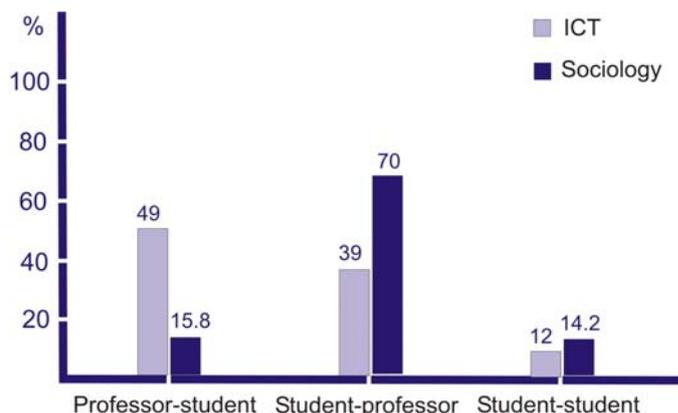


Figure 3 Distribution of posts in open discussions according to the discussion type in ICT and Sociology course

Distribution of posts in different types of open discussion depends on the nature and organization of the course. ICT course had 49% of open professor-student discussions while Sociology course had only 15.8% posts in this category. As much as 70% of open discussions in Sociology fall in the student-professor discussion, compared with 39% in ICT. Although professors continually answer student questions, it is interesting that in 12% up to 14% of these discussions other students provided answers by thus offering help to their peers.

## 3 Closed discussions

### 3.1 Introduction

Communication dynamics for ICT and Sociology course at ZSEM is analyzed through comparison of closed discussions in both courses. Table 2 displays discussion types depending on whether discussions are mandatory or not.

Discussion type	ICT	Sociology
Closed Professor - student	Not mandatory	Mandatory
Closed Student-to-student	Not mandatory	Not mandatory

Table 2 Closed discussions types

This distinction is important because similarly to traditionally taught classes, students often treat mandatory online discussion as a means to complete a particular task, rather than as an opportunity to engage in rich discussion and debate with their peers and

instructors. In this sense, it is useful to make a note that although students are generally motivated to participate in online discussions, this activity must be viewed through the course organization and Syllabus prescribing such activity as obligatory or not. ICT closed discussion is optional and active students may get up to 5% of their final grade for professor – student discussion and up to 5% for student-to-student discussion. [13, 17]. Closed professor-student discussion is mandatory in Sociology class and makes 30% of the final grade while the closed student-to-student discussion is optional with maximum of 8% of the final grade. [18]

Figure 4 shows students' participation in specific discussions. 43.4% of students have participated in professor-student discussion in ICT course while having this activity as a mandatory, Sociology course had as many as 85.5% students that participated in this type of discussion. The questions in professor-student discussion were structured and included open questions such as „make a suggestion“ or „propose a solution“ and more specific questions. Unlike those, closed student-to-student discussions were unstructured and optional in both courses. This is reflected in smaller percentages compared with professor-student discussion. 29.3% of ICT and 61.7% of sociology students have participated in student-to-student discussion. Although this was an optional activity, in many cases in student-to-student discussion, certain topics remained active long after the semester was done and the students had already received their grade. This exhibits change and growth in student interaction patterns over time suggesting that instructors must continually think about pedagogical structure and advantages of using technology to create a shared space among learning participants.

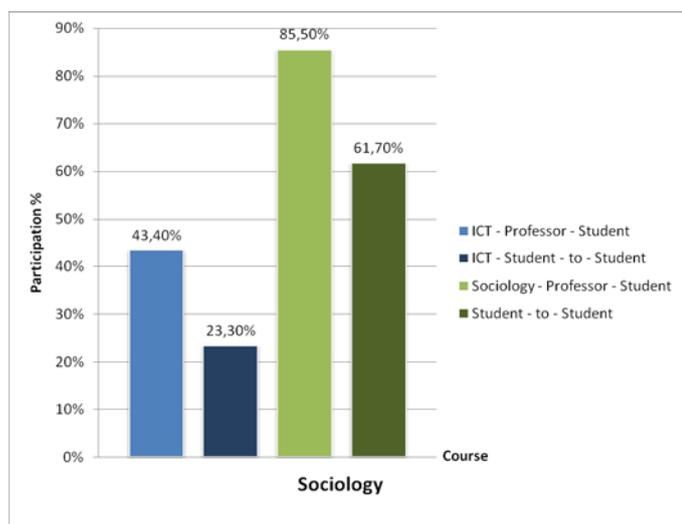


Figure 4 Student participation in the closed discussion

### 3.2 Online activities

It is interesting to compare the ranking of students according to the number of posts in both courses.

Student	Active discussion participant	Passive discussion participant	Moderator
<b>S1</b> (S10)	96	1113	4
S2	84	2515	2
<b>S3</b> (S2)	82	1060	17
S4	78	992	1
<b>S5</b> (S3)	67	420	7
S6	66	882	5
S7	57	884	0
<b>S8</b> (S7)	53	2299	4
<b>S9</b> (S5)	45	1395	2
S10	44	2400	3

Table 3 Ranking of students according to their discussion activity in ICT course

The same five students make up the top ten most frequent participants in both courses. Although there is no significant correlation between the number of active and passive discussion [18] (see Tables 3 and 4), students that read what the others have written are not necessary going to reply and participate. However, unlike those who have not been active at all, students that have been active in discussions tend to also be moderators.

Student	Active discussion participant	Passive discussion participant	Moderator
S1	145	1941	1
<b>S2</b> (S3)	119	1669	9
<b>S3</b> (S5)	101	499	34
S4	100	1889	11
<b>S5</b> (S9)	89	1996	0
S6	78	1596	7
<b>S7</b> (S8)	74	5139	12
S8	65	2983	9
S9	64	2227	4
<b>S10</b> (S1)	63	1120	10

Table 4 Ranking of students according to their discussion activity in Sociology course

### 3.3 Passive and active participant analysis

Active participants participate in discussions either as moderators with the original post or they get engaged through commenting an already opened discussion.

Table 5 shows the activity of passive and active discussion participants. Average number of new post opening by passive participants in all ICT discussions is 498.11 with the standard deviation of 537.21. Active participants that have just answered in an already opened discussion do that on average 7.79 times with the average deviation of 13.8 posts. Average number of new discussion openings is bellow one with the average deviation of 1.78.

	Passive discussion participant	Active discussion participant	Moderator
ICT	498.11	7.79	0.46
Standard deviation	537.206	13.808	1.783
Sociology	1095.78	15.82	1.84
Standard deviation	1044.37	19.902	4.103

Table 5 Passive and active participants – standard deviation

Average number of passive participants participation in Sociology discussion is around 1096 which is twice more than the average in ICT course. This could be linked with the fact that closed professor-student discussion is mandatory and it makes up to 30% of the final grade in Sociology. Average deviation in the number of read posts is in this case 1044.37.

Each student in Sociology course has been active in an already opened discussion on average 15 times. This is almost twice more than the average in ICT course where the average deviation is 19.9.

## 4 Research Hypotheses

The research was taken among 290 students of ICT and Sociology courses at Zagreb School of Economics and Management in Fall semester 2008/2009. The three hypotheses that are the focal point of this research are as follows:

- There is bigger correlation between student activities within closed student-to-student discussion then professor-student in two different courses - ICT and Sociology.
- Students are more motivated to participate in the discussion if the discussion is mandatory component of the grade which is stated in the course Syllabus.
- Dominant participants are active in discussions in different courses. However, there is no significant correlation between moderators in student-to-student discussion and dominant participants.

## 5 Research Results

### 5.1 Hypothesis 1

Although Garrison etc. have developed several methods of content analysis, [19, 20] this research relies on traditional methods. Figure 5 shows scatter diagram in professor-student discussion for ICT and Sociology courses. The focus of the analysis is not participation in the discussion, but the quality of the discussion.

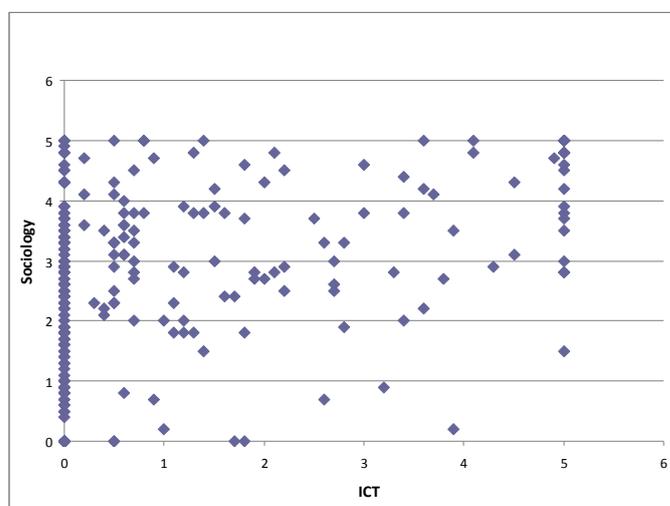


Figure 5 Scatter diagram – professor-student discussion

Calculated Pearson's correlation coefficient of the contribution student-professor discussion is 0.3896. The result reveals a weak link between students' discussion contribution in the ICT and Sociology course. This implies that students with more interest to discuss in one course do not necessarily show the same interest for the other course. This suggests that the activity largely depends on student's individual motivation. Also, it is important to point out another strong motivational factor and that is the organization of the course which directly influences the participation; professor-student discussion

being obligatory in Sociology, while ICT had it as optional.

Research has shown that there is a significant difference when discussion is lead by professor or student. According to Kremer & McGuinness [21] it is less likely that imbalance between the knowledge among discussion participants (professors and students) will contribute to an open discussion. At the same time, authors claim that discussions lead by students create a special atmosphere in which the students openly ask questions and confront each others' opinions. Figure 6 shows discussion quality scatter in student-to-student discussion.

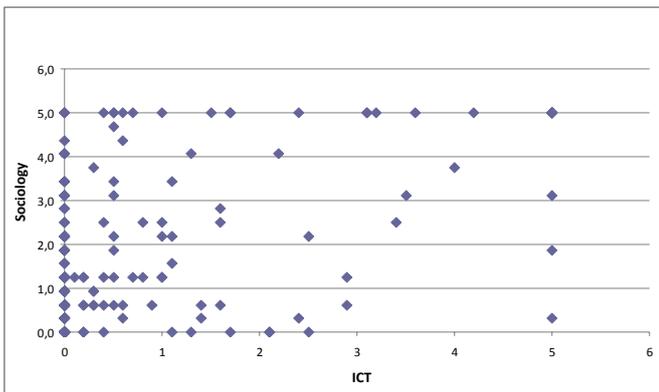


Figure 6 Scatter diagram – student-to-student discussion

Correlation coefficient in student-to-student discussion has increased compared with professor-student discussion and is 0.5387. Students that take part in discussions in one course, are more likely to freely express their opinions in other courses too.

## 5.2 Hypothesis 2

The following text analyses whether there is a relationship between discussion quality and a final grade. Regression is set up so that the total discussion score is an independent variable (predictor), while % of the final grade is a dependent variable. Figure 7 shows the regression for ICT course.

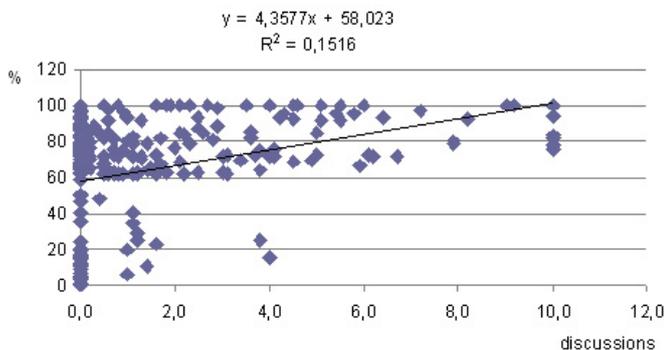


Figure 7 Link between the total discussion and the final grade expressed in % - ICT course

Figure 7 shows the information grouped in the upper left corner. Coefficient of determination is extremely low with only 15% ( $R^2$ ), while correlation is 38.9%. Such results suggest that there is no link between the students discussion score and a final grade. Absence of this link is logical since discussions are not obligatory part of the Syllabus and represent added activity in which students may earn up to 10% of the final grade.

Figure 8 shows the link between total discussion and a final grade, expressed in % for the Sociology course. It is evident that the discussion score is in a strong positive correlation with a final grade. This correlation is 81%, while coefficient of determination is 65.85%. Such results suggest that larger total discussion score in Sociology course will „cause“ a higher final grade. Therefore, the motivation of students for discussion participation largely comes from their awareness about this correlation.

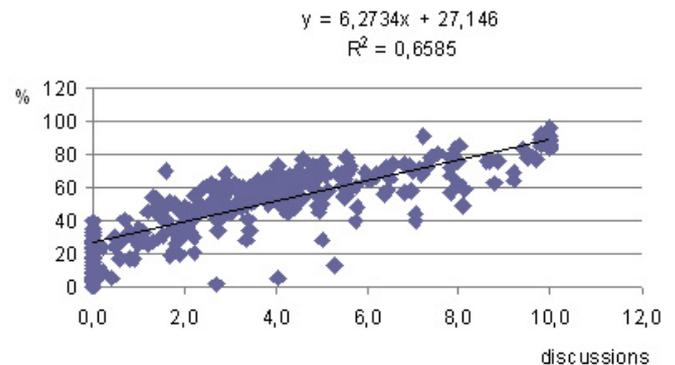


Figure 8 Link between the total discussion and the final grade expressed in % - Sociology course

Total discussion in Sociology course is analyzed through single contributions in a closed professor-student and student-to-student discussion.

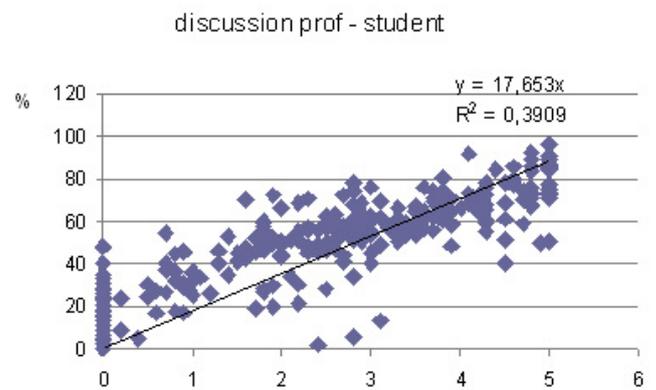


Figure 9 Link between professor-student discussion and the final grade expressed in % - Sociology course

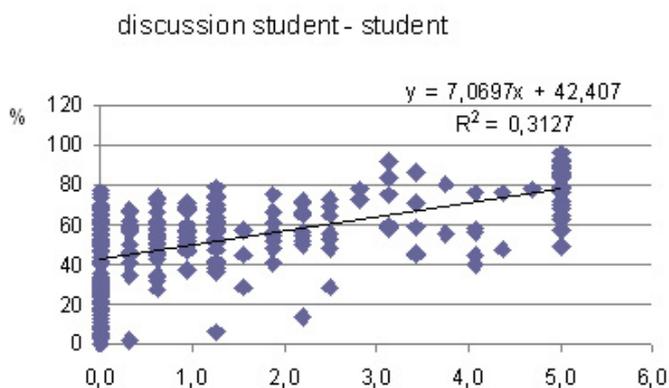


Figure 10 Link between student-to-student discussion and a final grade expressed in % - Sociology course

Correlation in the closed professor-student discussion which represents obligatory part of the syllabus is 82.8%, while coefficient of determination is 39%. Correlation in the closed student-to-student discussion which is not obligatory is 55.9% with the coefficient of determination of 31.3%. This is another confirmation that the students are more motivated to participate in the discussion if it is an important part of their grade.

### 5.3 Hypothesis 3

#### 5.3.1 Dominant discussion participants

According to Dixson & Kuhlhorst [22] the presence of dominant participants in an online discussion increases the quality of discussion. It is interesting to see if there is a correlation between dominant discussion participants in both courses, ICT and Sociology. Table 6 shows all dominant participants in both courses. The focus of the analysis is the quality of discussion in both open and closed professor-student and student-to-student discussions. Only 5.5% students were dominant participants in both courses.

Student	ICT	Sociology
S1	10	10
S2	10	10
S3	10	10
S4	10	10
S5	10	9.8
S6	10	9.8
S7	10	9.6
S8	10	8
S9	10	7.8
S10	10	7.8
S11	10	6.8
S12	10	3.4
S13	5.5	10
S14	3.8	10
S15	2.3	10
S16	1	10

Table 6 Dominant participants

25% of dominant participants had minimum participation in another course up to 4 level of quality. Within 5 to 8 interval, there were 31.25% participants and 9.5-10 18.75% participants. 25% of dominant participants were dominant in both courses. Students that were dominant in discussions in one course were more motivated to participate in discussion in another course. Student dialogue and ownership over the learning process is the key for greater student comprehension and processing of information. According to Palicsar [23], this method is similar to reciprocal teaching wherein the student takes on the role of the instructor in presenting the information for their peers to digest.

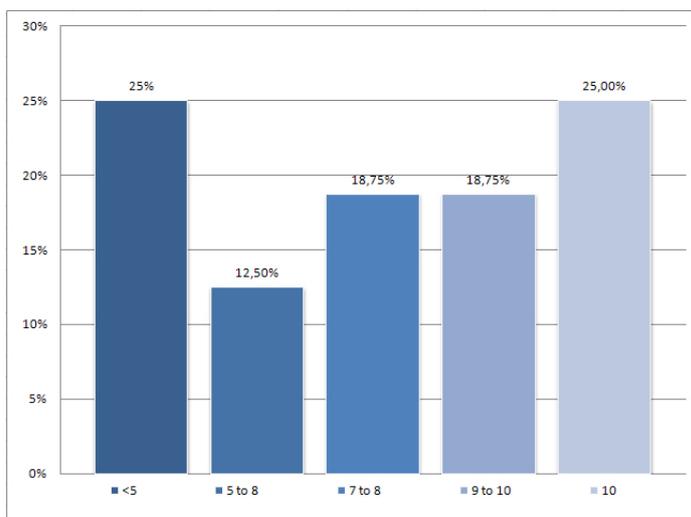


Figure 11 Dominant participants distribution according to the quality of discussion

### 5.3.2 Moderators in student-to-student discussion

Numerous research studies point out the significance of moderator's role for electronic interaction process. In the student-to-student discussion, moderators have a specific role since they are trying to open potentially interesting topic that will attract fellow-students to participate. During the Fall semester 2008/2009, ICT students have opened around 70, and Sociology students around 100 different topics. Topics that had less than 5 posts, were not taken into consideration.

Figure 5 shows the number of posts for each topic. It is interesting that both courses had up to 20 students with participation in most topics (in ICT that was the case with 89.8% topics, while in Sociology they participated in 81% topics). 20 to 40 students were active in only 5.7% ICT discussions and 14% Sociology discussions. More than 40 participants were attracted only by the most interesting topics such as the Facebook or media diary (ICT – 4.5%, Sociology 5%). The fact that interaction patterns change over time is evidence of why teachers have to continually find new ways to enhance two-way interaction and opportunities for extended dialogue and knowledge negotiation. It is not possible to confirm whether moderators and dominant participants were connected. They both make up the group of most active students, but the fact that they are the most active students in one course does not necessary mean that they will initiate online discussion in that course.

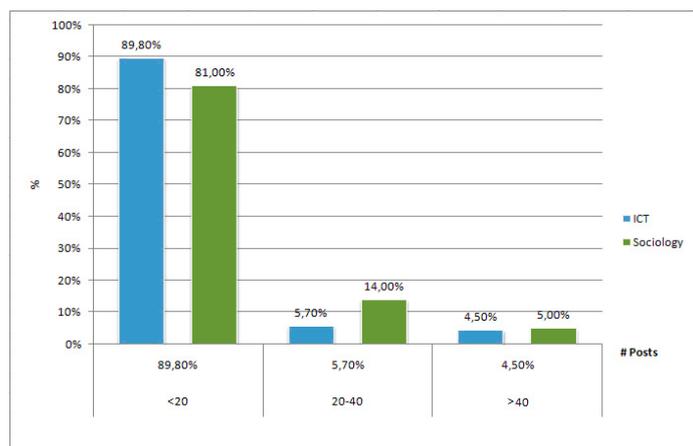


Figure 12 Number of posts within different topics in closed student-to-student discussion

### 5.3.3 Link between total discussion score and the final grade using dominant participants sample

Figure 13 shows the link between dominant participants in Sociology and ICT course.

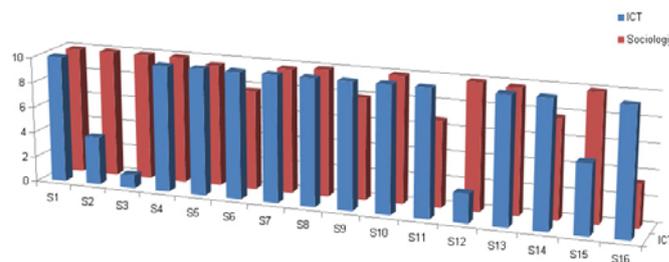


Figure 13 Dominant participants in both courses

The influence of discussion participation on the final grade is analyzed on the dominant participants sample. As it was expected, the analysis done on this sample suggested the same pattern proved in the previous analysis. Dependence between the discussion score and the percentage of the final grade greatly differs in Sociology and ICT course (Figure 14 and 15).

It is clear that the correlation is significantly higher in Sociology course and it is almost 90% compared with 26.7% in ICT course. Therefore, the same principle is present in dominant participation. Discussion score is strongly linked with the final grade. This means that students have better reaction to discussion participation if they are motivated by the possibility to get a higher grade.

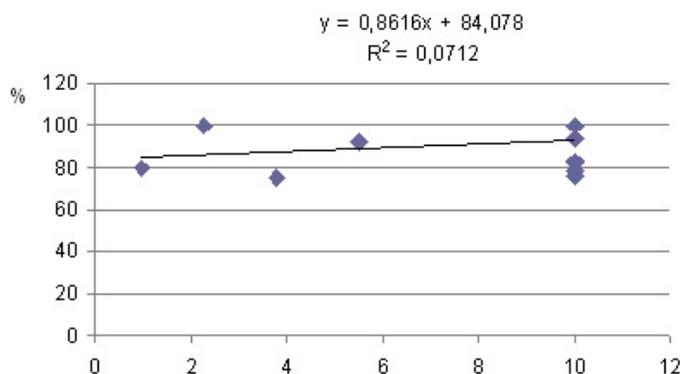


Figure 14 Link between the total discussion score and the final grade expressed in % and measured in dominant participants sample – ICT course

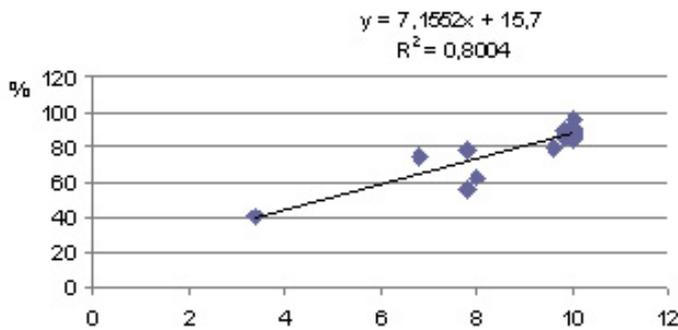


Figure 15 Link between the total discussion score and the final grade expressed in % and measured in dominant participants sample – Sociology course

## 6 Conclusion

Asynchronous online discussion is analyzed as an effective communication tool that facilitates creation of collaborative learning experience. The content and communication dynamics within two different courses online discussion boards, ICT and Sociology, show how online discussions foster student social interaction and dialogue. Research results point out the social phenomenon of community on online learning because they exhibit focused and deep discussions outside of normal class time. Furthermore, comparison of electronic participation in both classes demonstrates that students dominate the discussion, not the instructors. This confirms the potential of digital interaction as a rich instructional system that enables creation of communities of learners.

Different types of discussion boards analysis done for the purpose of this study demonstrate that the students take the role of instructors and discussion participants. This creates a student-centred learning environment in which collaborative learning experience is nurtured. Taking these roles, students become more motivated and comfortable within a learning setting that gives them control in managing the learning process. Each student has the opportunity to be a regular contributor to the class while participation is largely freed from time constraints. Offering such flexibility and valuable peer feedback, discussion boards document how digital environments encourage collaborative learning experience. For these reasons, numerous educators and experts in the field of online learning agree that discussion boards represent a valuable source where some of the most important learning takes place.

In their 2003 publication *E-Learning in the 21st Century: A Framework for Research and Practice*, Garrison and Anderson have underlined that “the

idealized view of higher education, as a critical community of learners, is no longer just an ideal, but has become a practical necessity in the realization of relevant, meaningful and continuous learning” [9]. Interactive environments such as discussion boards go beyond traditional delivery of information and the emphasis on the content and by thus support social constructivism and the idea from the opening quote for this study. The fact that digital environment enables collaborative group learning points out the importance of the social phenomenon of community on online learning. Here the challenge of the extended role of teachers as facilitators of learning becomes to find out how to manage new possibilities for interaction and further motivate students to actively engage in them. The nature of online interaction poses a demand on teachers to continuously reconsider their teaching approaches and seek opportunities for students to reflect, construct and confirm meaning.

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