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Social Ability in Online Groups

Representing the Quality of Interactions in Social Computing Environments

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***Abstract*— We propose Social Ability as a construct that will contribute to the development of social computing models. Completely online group experiences vary according to the composition of tools, tasks and individuals. This conditionality creates challenges for social computing researchers who seek to model social behavior online. We use social ability as a frame to describe how members of completely online groups (COGs) experience the social nature of their interaction and how the nature of their social computing changes over time. We show how social ability measures for COG participants change during collaboration and describe how two social ability factors – Social Presence and Perceived Written Communication Skills – are related to participation and contribution in online group activities. The findings from this mixed methods study show that members who participate in online groups experience increases in perceived written communication skills and peer social presence, suggesting that completely online group work influences social ability.**

I. INTRODUCTION

Social computing is more than the identification of multi-dimensional clusters from usage logs. Parson [16] popularly described the importance of the normative aspects of social organization. Lockwood [15] in turn critiqued this focus on normative social structure, arguing that it is the non-normative or, to use the vernacular of the day, deviant behavior through which systems of social organization evolve. Social computing systems evolve more rapidly than the systems Parsons or Lockwood studied. Social computing represents a form of social experience and a range of new computing capabilities that enable, sustain and constrain social experiences. The phenomenon of rapid change to social structure in social computing contexts calls for the development of new constructs to explicate the nexus of person, task and tools in social computing.

Laffey, Lin & Lin [12] developed an instrument to measure social ability: a way of representing students' experience and perception of social interaction in online learning settings. Social ability is defined as a person's capacity to associate with fellows and to use shared resources, including members, online tools, and learning resources, to accomplish something of value. Social ability is not a characteristic of an individual, but rather of the relationship of the individual to the context formed by task and tools. For example, someone may feel quite content in managing a face to face meeting or writing an email to a colleague, but overwhelmed by new syntax and multiple inputs in instant messaging. This report uses social ability as a frame to explicate how members of completely online groups (COGs) experience the social nature of their interaction and how the nature of their social computing changes over time.

Wang, Zeng, Carley & Mao [23] identify the representation of social context, individual characteristics and group norms in agent-based computational models as one of three vital social computing research issues. Social ability is a construct that will help build models to explain behavior and outcomes in social computing systems. The first step in building such models is decomposing the systems to bring progressively more detailed representations of system behavior into view [25]. Representing system behavior in social computing research requires consideration of the individual characteristics of participants, the technological characteristics of the tools they use to interact and the locales that emerge from this interaction [3,6]. Social computing experiences can be instantiated through a wide mix of technology, tasks and tools. For example, Facebook friends usually have some prior relationship with one another in a face-to-face setting [13] and often interact daily for purposes varying from dating to basic socialization. In this way, Facebook serves to maintain existing social relationships. In other cases, such as completely online graduate student courses, participants may know each other only through the tools used to communicate, coordinate and complete course work. Social ability has the potential to represent important aspects of the online social experiences of members and provide input to the development of models of online social behavior.

Social ability is a construct that is proving useful in the study of information and communication technologies designed for computer supported collaborative learning (CSCL). CSCL systems enable new social computing phenomena, including groups who come together online without ever meeting face-to-face. In such settings, people from diverse backgrounds typically come together for some period of time, usually consistent with an academic quarter or semester, to perform group activities, often using only online course management systems like Blackboard, Sakai or Moodle. Completely Online Groups (COGs) are sometimes conflated with studies of free and open source software (FOSS) and Wikipedia groups. Like these other types of technology-centered groups, COGs exchange information and maintain awareness primarily through shared artifacts and asynchronous communication. However, COGs differ from FOSS and Wikipedia groups in two significant ways. First, members of COGs have a common organizational affiliation, similar to work groups or student groups in face-to-face settings. Second, COG members are often assigned to their groups by an organizational leader or instructor.

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social computing changes over time. For social computing researchers, such environments share two advantages over mixed (face-to-face combined with social technology) environments. First, nearly all interactions are recorded through online logging systems, resulting in fine grained data from which we can build detailed representations of social activity. Second, CSCL social computing environments have a focused purpose that may be more easily modeled than Facebook, FOSS projects or Wikipedia, which all have significant variation in the quantity of online and face-to-face interactions among participants.

II. Social Ability

Blanchard and Markus [1] studied community formation and practice in virtual communities. They found that, as with face-to-face communities, virtual sense of community is enhanced by mutual recognition among members, informational and socio-emotional support and identification with the community. In virtual communities, however, their research suggests that identification and recognition of individual group members is more important for sustaining the community than the items related to member reported sense of community.

Sense of community, social presence, social navigation and connectedness, are factors that influence social interactions in completely online groups. Laffey, Lin & Lin [12], conducted a study of 107 students in online courses, ultimately explicating the construct of "social ability" in an online setting as the relationship between tasks, tools and individuals. Their results showed that students who participated in learning situations with higher degrees of collaboration also scored higher on the scale of social ability. Laffey et al [12] show that social ability represents the contributions of social presence, social navigation and connectedness to the ways individuals participate socially in online groups, given a particular set of tasks and a particular technology for interaction.

Social ability in a learning context is constructed from five specific factors: peer social presence, written communication skills, instructor social presence, comfort sharing personal information and social navigation [12,14]. Together, these factors measure key aspects of the social nature of the computing environment of completely online groups (COGs). Social ability is an individual's perception of the social nature of the group experience and provides a measure of the relative extent to which social interactions take place among individuals and within small groups in this study. As a result, social ability represents the social and collaborative nature of the online environment so that measuring social ability at different times during collaboration will provide insight into the relative levels of social engagement experienced by different members or within different small groups.

Laffey et al's [12,14] notion of social ability quantifies key aspects of the social nature of collaborative online learning. Social ability is highly correlated with learning satisfaction and behavior intention for courses that emphasize teacher-student dyads and courses that emphasize collaborative work among students. Social ability is also highly correlated with behavioral intentions to use technology for interaction. Weaving social ability into social computing research will contribute greater socio-technical depth and behavioral meaning to the community's algorithmic focus on clustering.

Of the five social ability factors, two have been examined in social computing literature: (peer) social presence and social navigation. Short, Williams & Christie [19] describe social presence as the saliency of a user's presence as an indication of a social computing system's social effects. Roberts et al [17,18] showed that high social presence in online groups is associated with appropriate communication, quality discussion and accuracy, though they were not analyzing social presence beyond mere awareness. Social presence theory motivates the development of tools that promote higher degrees of social interaction in online learning [9], guides numerous studies of online learning's social nature, and is typically operationalized as a characteristic of the tools or contexts and the extent to which they promote the feeling of "being there" among users [11,12]. Social navigation describes the influence of the visible actions of others in a populated information space on one's subsequent actions [5]. Updated perspectives on social navigation include collaborative awareness and the distinction between place and space [3], operationalized through recent work in recommender systems [10] and social matching [22].

The rest of this paper is organized as follows: Our mixed methods approach to this research is described in section three, the results of our research are presented in sections four and five, implications are described in section six and a discussion of social ability in a social computing context is the focus of section seven.

III. Methods

The data presented in this paper represent a subset of data gathered in a larger study conducted in the context of an online graduate student course on Computer Support for Collaborative Learning offered in the summer of 2008 at a large US university. All students were invited to participate in interviews, with an incentive of an online gift certificate of $10 for completing a series of 3 interviews. We obtained university approval for human subjects' research, and changed the names of our informants in this report to preserve their anonymity. All course participants consented to be part of the study. Fourteen students were interviewed three times. Each of the 42 interview sessions lasted between 40 minutes and one hour and 40 minutes. All interviews were transcribed. Interview questions focused on the social experiences of the members in their groups and in the online course, as experienced through technology. In these interviews informants described their social experiences within the course management system and in other online systems selected by their COGs. In addition, 24 of 25 students in the course completed a social ability survey [24] at the beginning and after the collaboration, providing a measure of changes in the social ability of members.

The social computing system that facilitated the CSCL course was Sakai, with activity awareness provided by CANS (http://www.cansaware.org) and discussion forums provided by JForum. The CANS system was used to provide activity notification and awareness information to course members, in the form of daily email activity digests, and visual feedback of relative participation of students in the course over varying

periods of time. When a student logged into Sakai and posted or read a message, CANS made a note of it and presented summary data in the digest and through an activity monitor. All assignments and discussions to support group collaboration in the course were facilitated through Sakai, using a JForum discussion board. JForum is integrated with both CANS and Sakai. Some groups elected to use other technologies in addition to Sakai for collaborating, including external wikis. So long as they granted access to the instructor this was allowed. Access to external tools was also requested for the researcher, and granted by all group members in all cases. The work conducted in those tools is included in this analysis.

Students were placed into groups at the end of week one, and remained in these same groups for the following seven weeks. At several points in the course, data were gathered in correspondence with course activities. The structure of the course was as follows:

Week 1 – Module 1 – Individual exploration of CSCL.
Week 2 – Module 2 – Structured Debate between two groups with assigned positions on a CSCL Topic.
Week 3 – Module 3 – A Group activity to construct a coherent story of past online learning success and failure.
Week 4 – Continue module 3
Week 5 – Module 4 – Groups design a 2 day online learning module.
Week 6 – Continue Module 4
Week 7 – Module 5 – Deliver the CSCL Module designed in Module 4 to two other student groups.
Week 8 – Module 6 – Group and individual reflections.

Our analysis was both qualitative and quantitative. Our qualitative data analysis included the importing of interview transcripts, discussion boards, course reflections, chat transcripts and wiki data into nVivo 8, and the performance of ethnographically informed open coding [2]. More than 500 distinct codes emerged from the coding process, with more than half of those addressing the social interactions within and between the members of the eight completely online groups (COGs) in the course. All of these artifacts and the resulting codes were then refined through constant comparison to arrive at a set of core collaborative themes within this course.

Our research was guided by two questions. First, how does Social Ability change in COGs during the course of a medium length (7 weeks) collaborative activity? Second, how does the social ability of a member influence their participation and contribution trajectory in a COG?

Top down ethnographic coding and a social ability survey were used to answer question one [24], which we report in a case study format for three of the eight groups [21] selected based on their behavioral contrast. The social ability survey was taken at the beginning of (t_1) and near the end (t_2) of group activity, with a dependent sample t test performed on the two data sets. For question one, a dependent sample t-test was used to verify statistical significance of the difference in social ability and specific social ability factors before and after group work.

Questions two was answered by placing each of the small groups into categories that emerged from bottom up coding of discussion boards, interviews, wiki edits, online chats and student reflections. We then compared social ability means, member participation and contributions to the course between groups. Qualitative analysis consisted of top down coding of the group development interviews for social ability concepts, and the subsequent integration of that data analysis with the results of the social ability surveys and CANS usage logs.

IV. How Social Ability Changes in COGs

Throughout the social ability data, higher numbers represent higher factor scores. This is consistent with likert scale mapping from 1 to 7, with 1 representing "strongly disagree", and 7 representing "Strongly agree". In the next section, each of the five factors of social ability is reviewed for three of the eight groups in the online course. Next, overall Social Ability trends in the course are presented. Table one shows the statistical measures of significance and power for the social ability survey in this course (n=24).

Table 1 - Descriptive Statistics for Social Ability T-Test

	Paired Differences			
Social Ability Factor	**Mean**	**STD Dev**	**p**	**Power**
Peer Social Presence	2.81	7.54	0.04	0.36
Written Comm. Skills	1.62	4.17	0.04	0.37
Instructor Social Presence	0.40	8.53	0.41	0.05
Comfort Sharing Personal Information	0.91	3.60	0.12	0.25
Social Navigation	-0.53	3.19	0.22	0.17

Figure one summarizes the social ability factor scores at t_1 and t_2 for the three groups we contrast closely, organized by member.

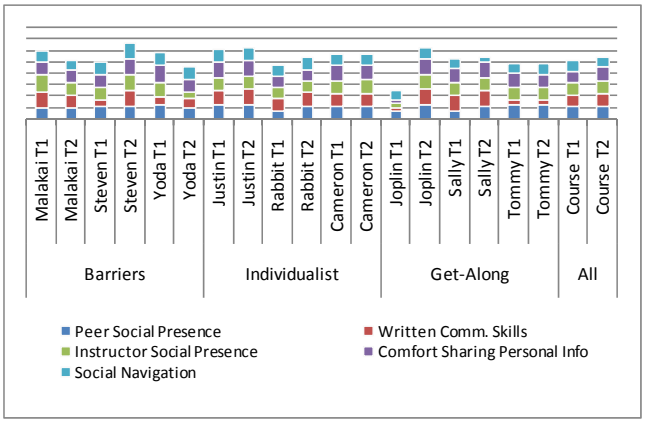

Figure 1 - Social Ability for Each Group Member at T1 and T2

Figure two summarizes these same scorces by group from t_1 to t_2. We can see from these data that Malakai and Yoda in Barriers Group decline in overall social ability from t_1 to t_2. We further see that their group as a whole declines in social ability from t_1 to t_2, while the course overall and both Individualist and Get-Along Groups show increases in social ability from t_1 to t_2.

At the course (n=25) level overall social ability increased. Two factors, peer social presence and written communication skills, increased significantly ($p < 0.05$) and our analysis shows moderate power in the results, suggesting these factors are

good candidates for future research. The next section presents three case studies to describe how each of the five social ability factors influences Barriers Group, Get-Along Group and Individualist Group. The groups were selected to maximize contrast, and given names that reflect a core theme indentified in our analysis of within group interactions. There are aspects of the groups, and aspects of individuals within the groups that emerge from this analysis to give meaning to social ability factor scores, and suggest ways to model COG practices.

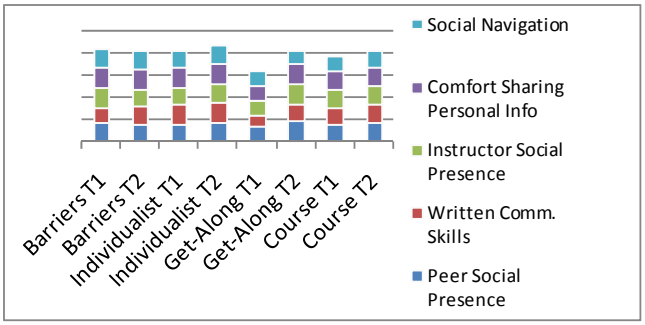

Figure 2 - Social Ability Summarized for 3 Groups

A. *Introduction to Case Study Groups*

1) *Barriers Group*

Barriers Group members are Malakai, Yoda and Steven. Malakai emerges as the group leader after two weeks, and maintains that role. Barriers Group is named to represent the obstacles faced by the group during their work together. There are three important points of diversity that became obstacles for Barriers group. First, there is age diversity ranging from a young masters student to a PhD candidate with a great deal of life experience. Second, the members are from three distinct parts of the world: Europe, Asia and the Middle East. Third, the members of this group are at different stages in their graduate education: Early Masters, Early PhD and late PhD.

The social ability scores for Barriers Group declines during the collaboration. Two members, Malakai and Yoda, experience great difficulty in the collaboration and subsequently disengage from the group. Steven's social ability factor scores track the trajectory of the rest of the students in the course.

2) *Individualist Group*

Individualist Group members are Cameron, Rabbit & Justin. Individualist group started their collaboration with four members assigned to the team, but one never participated in the group's work and dropped the course. This led members of the team to act from the beginning with the expectation that they could not rely on each other. This condition was exacerbated after a second member, Justin, showed up and disappeared shortly thereafter. Rabbit noted:

No, well you're talking about you know two people where the impetus was the stress of the group, we're having a conversation, the three of us, and then it's just the two, well we thought it was going to be four of us and then it was three of us and then it was two of us.

For all of module two, Individualist group was effectively composed of two members: Rabbit & Cameron. Completely online group members rely on early participation as an indication that members are trustworthy and reliable [8], and when it does not occur there is often a negative collaboration trajectory in the group. Individualist Group's frustrations were compounded when one of the missing members reappeared, and Rabbit's role decreased in the middle of the 7 week collaboration. After five weeks of collaboration, Cameron's observation about the group experience descended to these depths:

Well you asked about how I was doing with this class. It is the most miserable online learning experience I have ever had. There you have my update.

On all but one factor, Justin and Rabbit, who were inconsistent in their participation, aligned with the other members of the course as a whole. On three out of five factors, Cameron, who consistently attempted to coordinate group activities, diverged from the other members of the course as a whole and by implication from her mates in Individualist Group.

3) *Get-Along Group*

Get-Along Group members are Tommy, Joplin & Sally. The group begins their work together with high participation and contribution levels, and sustains those levels throughout the course. Tommy is the most active member in the course, and Sally and Joplin's participation rates, while not as high as Tommy's, are above the course mean. Tommy emerges quickly as the leader of this group.

Interviews with Tommy and survey data from all three members suggest that the group formed a very strong group identity during their collaboration. At the beginning the members were pleased with Tommy's "take charge" approach. The positive nature of this initial experience helped to solidify group identity. When one of the members, Joplin, had a brief absence from the group, the collaboration continued among Tommy and Sally, and Joplin was welcomed back by her fellows when she returned. Getting off to a good start helped Get-Along Group stay cohesive through a brief rough patch. Figures one and two show that Get-Along group members had higher social ability scores and greater positive development on each of the five factors than any other group in the course. These findings fit together with the strong group identity that emerged in interviews and analysis of Get-Along Group's discussion board posts.

The introduction of these three COGs, whose names describe the types of experiences they had over seven weeks of collaboration, is a beginning. Next, we step through each of the three group's experiences in the context of each of the five social ability factors. These descriptions move us toward clarity in our understanding of how social ability represents a qualitative, descriptive measure of COG activity.

B. *Peer Social Presence*

Barriers Group's trend on the social presence factor of social ability is a decline from t_1 to t_2. A decline in peer social presence is consistent with the difficulties encountered in the group, and Barriers Group's general tendency, evidenced in the social network data, to not hold a central position in the course network.

The member of Individualist Group who was active throughout the course, Cameron, showed a diminishment in perceived peer social presence. The members who were active only in portions of the course, Rabbit and Justin showed improvement in this factor. Rabbit's low participation late in the course did not reach the status of complete absence as demonstrated by Justin in Module Two. Perhaps this helps to explain the improvement in her sense of peer social presence, which changed from a fairly weak 3.8 at t_1 to a moderate 4.61 at t_2. In other words, Rabbit moved from substantially below the course mean for peer social presence at t_1, to effectively the same as the overall course factor score at t_2.

Get-Along Group members Joplin and Sally showed notable improvements in peer social presence from t_1 to t_2. Tommy had a nominal diminishment, but given his prolific, early participation, this may be understood as a highly present individual experiencing a regression to the mean.

C. Written Communication Skills

Barriers Group and Get-Along Group each showed some inconsistency in their written communication skills. In Barriers Group, Malakai declined on written communication skills between t_1 and t_2, which only occurred for two other course members. Steven's improvement is dramatic and Yoda's is also substantial. Malakai's decline is consistent with sentiments of frustration and despair expressed in the middle collaboration and post-collaboration interviews. Yoda's increase is corroborated by her interview as well. She expressed increased confidence toward the end of the course. In Get-Along Group, Joplin experienced a large improvement in perceived written communication skills. Tommy's written communication skills factor started low and remained low throughout the course. This is consistent with Tommy's self-defacing communication about his vocabulary and intellectual capacity in interviews. Tommy and Malakai, who show the most consistent leadership of their group throughout, also decline in perceived written communication skills from t_1 to t_2.

By contrast, all members of Individualist Group indicated equivalent or improved sense of confidence in their writing skills as they pertain to the course. The factor scores for written communication skills among Individualist Group's members are consistent with the trend in the overall course community.

D. Instructor Social Presence

In Barriers Group, Malakai and Yoda both declined in their sense of instructor social presence between t_1 and t_2. The sharpness of this decline is remarkable. Malakai diminished from "7" to 5.62, while Yoda diminished from 6.24 to 2.67 on a 7 point scale. Steven's sense of social presence of the instructor improved almost as much as Malakai's declined, going from 5.46 to 6.89. Malakai and Yoda each expressed frustration with the other during our interviews. They each held the other to account for the need to involve the instructor to mediate a mid-collaboration conflict, and did not express satisfaction with the outcome of the mediation. The instructor does not have an interventionist style and clearly they each wanted the other's behavior to change. This is the most likely explanation for a sense of declining instructor presence. Upon looking to an authority figure to rescue their difficult situation, they were forced to address the uncomfortable challenge of completing their assigned tasks.

The other two case study groups showed trends of increasing instructor social presence. Individualist Group's members all indicated an improvement in perceived instructor social presence from t_1 to t_2. In Get-Along Group, Joplin's sense of instructor social presence improved dramatically from t_1 to t_2. Tommy's diminished slightly. Sally's improved almost as slightly as Tommy's diminished. As a group, Joplin felt a greater sense of instructor social presence at the end than at the beginning, while Tommy and Sally are fundamentally unchanged.

E. Comfort Sharing Personal Information

Not surprisingly COG members who experienced difficulty with their group mates showed a decline in comfort sharing personal information. For example, in Barriers Group, Malakai and Yoda experienced conflict with each other, while in Individualist Group, Cameron experienced inconsistent participation from her group mates. All three declined on this factor. Interviews with Cameron, Malakai and Yoda highlighted the diminishing trust they had in other group members. Cameron's experience of being part of one dyad (with Rabbit), then needing to switch to another dyad (with Justin) required her to form two individual trust relationships instead of a single, group trust relationship. Malakai and Yoda experienced a decline in trust based on explicit conflict with each other. Considered from this perspective, diminished comfort sharing personal information from t_1 to t_2 takes shape in Cameron's case as a side effect of the manner in which Individualist Group did their work, and in Barriers Group's case as a direct effect of interpersonal conflict.

In Get-Along Group, Joplin and Sally experience significant improvements in their comfort sharing personal information from t_1 to t_1. Joplin, especially, moves from a position of strong disagreement toward a position of strong agreement with her comfort sharing personal information. This, combined with Joplin's other improved social ability factor scores suggests that Joplin's comfort working with completely online groups is improved by her experience with Get-Along Group. The contrast of these experiences shows us that in a time compressed, task focused COG, good experiences can increase comfort sharing personal information, just as swiftly as difficult experiences can diminish it. The overall trend in the course was increased comfort sharing personal information.

F. Social Navigation

Social navigation diminished from t_1 to t_2 across the whole course. In Barriers Group, Malakai and Yoda declined in social navigation, while Steven's factor score improved from 5.38 to 7. In Individualist Group, Cameron and Rabbit also showed diminished social navigation from t_1 to t_2. Justin's use of social navigation improved from t_1 to t_2. Barriers Group and Individualist Group each experienced difficulty working together, and in each group one of the members increased their use of social navigation – the referencing of the actions of others in an information space to make choices about what to do. The social navigation factor may tell us something about members who "check out" of low functioning groups.

Cohesive groups also had members whose social navigation increased. In Get-Along Group social navigation improved for Tommy and Joplin, but diminished for Sally. The fact that Tommy and Joplin both bucked the course trend and increased social navigation portends something about this group and groups like it. From our data, we know that Tommy is curious, and likes to participate in the course both broadly and extensively. Joplin started the course with timid participation, but her experience in Get-Along Group made her comfortable exploring. From these three cases, we can see that social navigation, while not a statistically significant social ability factor across the class, may vary according to the qualities of small group experience in a course.

V. Social Ability as Representation

Comparison of the three case study groups provides a descriptive answer to the question about how social ability changes in COGs over a medium length collaboration. This section addresses question two. We look at all eight groups and discern possible relationships between the social ability of a member and participation of that member in a group. Two Social Ability factors show significance for the overall course and all its members between t_1 and t_2: Peer Social Presence and Written Communication Skills. A third factor, social navigation, corresponds with participation at t_1.

Table 2 - Module 1 & 2 Usage

	Adams	Barriers	Canada	Catskill	Get-Along	Individualist	Orange	Police
Module 1	181	125	802	406	358	147	610	331
Module 2	562	396	4,005	966	1,475	891	1,140	478
Grand Total	743	521	4,807	1,372	1,833	1,038	1,750	809

At t_1, the relationship between participation and social ability reflects member responses and behavior in modules one and two. Table 2 shows the combined (reads & posts) total participation and contribution of each group in modules one and two. Participation is visibly greater for all groups in module two. Canada Group's participation stands out in module two, suggesting very active collaboration in that group, which is validated by our ethnographic data. There is no correlation in our data between early collaboration activity and social ability in general. However, higher levels of social navigation at t_1 are correlated with higher initial participation and contribution. This confirms an intuition – That people who participate and contribute more in a COG setting will be influenced by others. Table 3 shows the combined participation and contribution counts for each member in modules one and two, along with a plus or minus symbol indicating if they are above or below the course mean for social navigation at t_1 and t_2 .

Social navigation factor scores at the beginning of collaboration provide a clue about a group's likely participation trajectory. In contrast, reviewing participation and contribution data along with social ability toward the end of a COG activity suggests a relationship between these two data points that is an outcome of the collaborative group experience. Comparing the trajectory of t_1 social ability factors scores to t_2 social ability factor scores for the two factors that showed statistical significance and power between t_1 and t_2 shows us how this relationship evolved. Table 4 shows the module four and five combined participation and contribution counts for the members of all groups along with the same two factors of social ability.

Table 3 - Participation, Contribution and Early Social Navigation compared to the course mean (+/-)

				Social Nav.	
	Mod 1	**Mod 2**	**Grand Total**	**T1**	**T2**
Individualist	**147**	**891**	**1,038**		
Cameron	20	397	417	-	+
Justin	16	43	59	+	+
Rabbit	111	451	562	+	+
Canada	**802**	**4,005**	**4,807**		
Alice	13	748	761	+	+
Dora	401	1,197	1,598	+	+
Kylie	323	1,592	1,915	+	+
Liz	65	468	533	-	-
Adams	**181**	**562**	**743**		
Jessica	123	147	270	-	-
John	43	295	338		
Winston	15	120	135	+	+
Police	**331**	**478**	**809**		
Cora	83	224	307	-	-
Genny	220	191	411	-	-
Jonas	28	63	91		
Orange	**610**	**1,140**	**1,750**		
Agnes	329	548	877	-	+
Ginny	140	133	273	+	-
Lolly	32	141	173	+	+
Poncho	109	318	427	-	-
Barriers	**125**	**396**	**521**		
Malakai	10	169	179	-	-
Steven	56	121	177	+	+
Yoda	59	106	165	+	+
Catskill	**406**	**966**	**1,372**		
Colina	191	418	609	-	+
Nellie	27	97	124	-	+
Sandy	188	451	639	-	-
Get-Along	**358**	**1,475**	**1,833**		
Joplin	60	211	271	-	-
Sally	8	372	380	-	-
Tommy	290	892	1,182	-	-

Table 4 shows groups with the highest combined total participation and contribution in modules four and five also have a majority of members with high Peer Social Presence at t_2. This is the case for Get-Along Group, Canada Group and Catskill Group. It is most pronounced for Get-Along Group, whose participation and contribution levels are four times those of the next closest group, and have all members with above the mean peer social presence. This group is particularly notable because peer social presence was below the mean for two members at t_1 and moved above the mean at t_2. The association is less conclusive at the low end. The expectation that higher levels of participation during a collaborative team project (this course) would result in higher levels of peer social presence is supported in this completely online context. This is noteworthy because similar hypotheses

could be made for other components of social ability, but we did not find correlations between participation levels in later modules and other social ability factor scores.

Table 4 - Module Four & Five Participation & Contribution with Social Ability Trends (plus or minus compared to course mean) on Two Factors with Statistical Significance (p<0.05)& Power (.42)

				Peer Social Presence		Written Communication Skills	
	Mod 4	**Mod 5**	**Grand Total**	**T1**	**T2**	**T1**	**T2**
Individualist	**1,329**	**391**	**1,720**				
Cameron	467	113	580	+	-	+	+
Justin	274	157	431	+	+	+	+
Rabbit	588	121	709	-	-	+	+
Canada	**1,139**	**876**	**2,015**				
Alice	170	96	266	-	+	+	+
Dora	354	203	557	+	+	+	+
Kylie	495	446	941	+	+	-	+
Liz	120	131	251	-	-	+	+
Adams	**693**	**478**	**1,171**				
Jessica	199	158	357	-	-	+	-
John	305	195	500				
Winston	189	125	314	+	+	+	+
Police	**303**	**201**	**504**				
Cora	112	42	154	-	-	+	+
Genny	99	130	229	+	+	+	-
Jonas	92	29	121				
Orange	**1,200**	**679**	**1,879**				
Agnes	524	430	954	-	-	-	+
Ginny	22	24	273	+	-	+	+
Lolly	299	108	407	+	+	+	+
Poncho	377	141	518	-	-	+	+
Barriers	**466**	**1,156**	**1,622**				
Malakai	182	380	562	-	-	+	+
Steven	142	376	518	+	+	-	+
Yoda	142	400	542	+	-	-	-
Catskill	**1,101**	**835**	**1,936**				
Colina	560	361	921	+	+	+	+
Nellie	149	215	364	+	+	-	-
Sandy	392	259	651	-	-	-	-
Get-Along	**5,373**	**3,925**	**9,298**				
Joplin	1,429	883	2,312	-	+	-	+
Sally	1,310	1,008	2,318	-	+	+	+
Tommy	2,634	2,034	4,668	+	+	-	-

VI. Implications for Social Computing

Social computing includes software systems, tasks and people working together in a myriad of social and technical configurations. Social ability provides a measure of the social nature of completely online experiences that is portable across contexts and by implication a useful construct for comparisons of social computing models and representations. If model A is compared against ground truth experiences in environment A, how will we know if the model applies to environment B with a different population? One possibility is a social ability measurement across the environments. Social ability provides a rich measure of the social computing experience that may be leveraged to evaluate or design models and other representations of social computing environments by factoring in the social computing environment, user tasks and a specific population of users.

We showed that high levels of social navigation in early collaboration correspond to active groups whose narratives are cohesive, while the same measure following a collaborative period is not predictive of group trajectory. The overall decline in social navigation in this course, while not statistically significant, may be an indication of student familiarity with the tool in the study. Another possible explanation for the decline of social navigation toward the end is that students knew what to do and relied less on others as guides than they did at the beginning. Both are suggested by the structure of the course, and the fact that 20 of the 25 students had taken five or more online courses in the past, using the same tool. Dourish [4] observed that social navigation practices diminish as users become familiar with a specific social computing environment, and develop practices within it, echoing some of Goffman's [7] earlier observations about practices that emerge from the roles we play as we participate socially in everyday life. In this way, social computing environments offer a parallel to Goffman's observations [7] of the fine grained practices of social interaction in the physical world, but they are not the same. Social ability is one measure of the effects of fined grained social interaction in a virtual space, or, as Smith [20] suggests, a component of eGoffman.

Integration of Social Ability's five component parts in a single construct provides social computing researchers the opportunity to start with population level aggregate scores, and subsequently drill into each factor, each subgroup and each usage pattern in a particular social computing context to explore the social nature of computing in a specific context. In this study, social presence and written communication skills changed significantly and there are narratives to explain the non-statistically significant variations for instructor social presence, social navigation and comfort sharing personal information. Implications for design of social computing environments emerge from these specific findings. The increase on the written communication skills factor through participation in small groups in this context suggests that support for non-text-based communication may increase participation and social ability in this context.

Finally, the relationship between social ability and participation is not clear. Those responsible for managing COGs or other activity-centered and computer-mediated teams should note that variation in the rates of participation when people are completely online is great. The variation in their experiences is greater. Importantly, this study suggests that the qualitative nature of online experiences is not discernable from activity logs or data-mining-for-clusters alone.

VII. Discussion

Tommy, Malakai and Cameron were all the main coordination workers in their groups. Each of them experienced a decline in social ability from the time prior to collaboration to the conclusion of the collaboration. Tommy's decline was the least significant, possibly a side effect of his group's cohesiveness. Malakai and Cameron experienced greater declines, which may reflect the challenging trajectory their groups followed.

Members who are not primary coordination workers in COGs experience the collaboration differently. Get-Along

Group member Joplin, for example, shows a dramatic increase in social ability factor scores from t_1 to t_2, belying her initial timidity and subsequent emergence as a contributor within a supportive completely online group. Tommy's role ensuring a fluid and friendly collaboration experience is a likely contributing factor to Joplin's improvement. Those responsible for monitoring completely online groups must balance the experiences of those who assume coordinating roles, as well as the benefits to those participants whose efforts are more effectively coordinated because a member takes that role on.

Yang et al [24] did not find a relationship between the social ability factor, *perceived written communication skills*, and intrinsic motivation, self-efficacy or perceived task value. Our focus on moderate duration small group processes distinguishes our work from Yang et al's [24]. In this study, we find that members who participate in online groups experience increases in perceived written communication skills and peer social presence, suggesting that completely online group work influences social ability. The increase in perceived written communication skills may emerge out of group members developing comfort with each other, resulting in a decrease in concerns about appearing ineffective to one's mates. While the Yang et al [24] study looked at students across a range of courses, the focus of this study on a single course with group work at the center shows how social ability factors may change as the result of a completely online group experience.

The improvement in perceived written communication skills and peer social presence following group work among members of this course suggest that group work can positively influence social ability in group members. It is possible that changing the structure of activities could affect changes in the other three social ability factors and establish group work as a mechanism for actively developing social ability in completely online settings. Tools that provide more, specific social information within groups may also affect changes to the other social ability factors in completely online groups.

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