

Influence of Personality on Online Discussion

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Abstract

Online collaborative learning has typically been studied within the context of learning communities. Little is known about the potential influence of students' personalities on online communication, group interaction, and task engagement among members of a learning community. This study used a mixed-method, triangulation design, involving the collection and analysis of both quantitative and qualitative data, to investigate the effects of personality on communication type and pattern, message length, task engagement, and student attitude toward online learning. Seventy students were organized into four personality-profile groups based on their Five Factor Personality Test scores, for the discussion of assigned case studies. Discussion messages were analyzed using Logistical Regressions for communication type and pattern, ANOVAs for message length, and Z-tests for pairwise comparisons for task engagement. The results indicate that personality affects communication type, pattern and task engagement but not message length. Students' attitudes toward online discussion were generally positive. The results provide guidelines for forming groups and designing activities for online collaborative learning.

The educational value of collaborative learning experiences has been established in many contexts (Johnson, Johnson, & Smith, 1997; Johnson & Johnson, 1989, 1999, 2004; Roberts, 2004). Online collaborative learning has typically been studied within the context of learning communities (Harrison, Zappen, Stephen, Garfield, & Prell, 2001; Sherry, 1996; 2000; Solloway & Harris, 1999; Zieger & Pulichino, 2004). A learning community is a social organization of individuals working together, sharing knowledge, attitudes, and values, to achieve mutual goals. Effective communication brings community members together (Depew & Peters, 2001). Though communities are composed of people with common interests (*American Heritage Dictionary*, 1997), individuals within communities bring unique personalities, a stable feature of individuals that affects behavior (Fleeson, 2001). Individuals with different personalities may prefer different styles or methods of communication. As a result, personality may affect group dynamics, performance, and production, either supporting or impeding a group's success as a learning community. Studying online discourse can help us understand how students with different personalities interact with each other during the learning process (Ingram & Hathorn, 2004; Sorensen, 2004).

The purpose of this study is to investigate the effects of personality on online communication and task engagement and to seek guidelines for organizing groups and designing online collaborative learning activities.

Related Literature

Personality

Personality has been consistently studied for more than a hundred years (Craik, Hogan, & Wolfe, 1993). Personality trait theories, advocated by Allport (John & Robins, 1993) and refined by Cattell, established a context for interpreting behavior in terms of specific personality characteristics (Digman, 1996; Ewen, 1998). The Five-Factor Model (FFM), based on the “Big Five” traits, has been the framework for much research relating personality and behavior (Wiggins, 1996).

The FFM reflects empirical traits conceptualized and measured along five continua reflecting differences in behavior that distinguish individuals. Placement along each of the continua expresses a kind of “personality profile.” Research evidence, including self-report questionnaires, anecdotal records, and peer ratings, supports the claim that individuals’ personalities can be adequately described with these five traits (Ewen, 1998). Table 1 describes the typical behaviors, which reflect the five traits based on 5-factor personality inventory scores.

Table 1

The “Big Five” Personality Traits

Factor (Trait)	Low Score on Factor	High Score on Factor
<i>Extraversion</i>	indifferent, quiet, reserved, serious, withdrawn	energetic, fun-loving, sociable, talkative
<i>Neuroticism</i>	calm, relaxed, secure, stable	emotional, insecure, worrying
<i>Agreeableness</i>	manipulative, selfish, suspicious, uncooperative	cooperative, friendly helpful, trusting
<i>Conscientiousness</i>	careless, lazy, negligent, unreliable	dutiful, hard-working, methodical, organized
<i>Openness</i>	conventional, down-to-earth, practical	broad-minded, creative, nonconformist

Note. Adapted from Ewen (1998, p.140) and Saucier (2002, p.13-15)

Many studies have demonstrated links between personality traits and behavior. Personality has been empirically evidenced to be stable over time in its influences on behavior. For example, Haukoos and Penick (1987), studying the relationship between personality and achievement in science classrooms, demonstrated that dynamic classroom interactions influenced achievement. Paunonen (2003) showed the predictive validity of the Big 5 for a variety of complex behaviors, such as grade point average. The FFM seems to effectively describe behaviors of both normal and disordered

personalities (Fleeson, 2001; O'Connor & Dyce, 2001; Robins, Fraley, Roberts, & Trzeniewski, 2001; Ross, Stewart, Mugge, & Fultz, 2001). Research such as this supports the use of the FFM as a basis for both predicting as well as interpreting a variety of observed behavior.

Online communication and social interaction

Human communication has been interpreted in terms of both cultural and social processes. As a cultural process, communication involves learning and using language conventions that have shared or agreed-upon interpretations. As a social process, communication becomes the principal way in which human beings experience meaningful interactions. Through such interactions, people learn to play roles, understand social norms, recognize and apply social sanctions and evaluate each other's actions according to systems of shared values and beliefs (DeFleur & Bal-Rokeach, 1982).

The focus of online communication research has shifted from evaluating communication systems and technologies (Hiltz & Turoff, 1978, 1993; Quarterman, 1990; Klemm & Snell, 1994) to analyzing online message content for the effects of social interaction (Herod, 2000; Sproull & Kiesler, 1991; Walther, 1992, 1996) and cognitive effort on learning and communication (Nara, Bonk, & Angeli, 2000; Chan, 2001; McKlin, Harmon, Evans, & Jones, 2002).

Different but interchangeable terms have been used to address online communication. Typically called Computer-Mediated Communication (CMC), such systems are considered as social-technical systems because they connect and facilitate human interactions. Pea (1993) asserted that communication, learning, and activity should be tightly linked. Koschmann (1996) indicated that Computer-Supported Collaborative learning (CSCL) is a new educational paradigm, in which students construct their knowledge by socially sharing ideas through ongoing communication with group members. In a two-way communication process, members of learning community initiate, share, interpret, negotiate, and modify ideas through successive and progressive dialogue. Research investigating the influence of text-based CMC on social interaction has yielded inconsistent conclusions: CMC may hinder vs. may promotes social-emotional online communication. Cues-filtered-out theory and social information processing perspective have been used to explain such claims (Boudourides, 1995; Kim, 2000).

According to the cues-filtered-out theory, the absence of regulatory social cues and feedback, such as gesture, tone of voice and facial expression, may produce social coordination problems in a text-based CMC discourse. Sproull and Kiesler (1991) reported that CMC groups took longer time to reach group consensus and exchanged less information while having a lower inhibition rate compared to face-to-face (F2F) meetings. Herod (2000) also found differences between F2F and online experiences in ability to convey appropriate interpersonal cues that facilitate online interactions.

On the other hand, the lack of physical and social contextual cues may liberate individuals from social hierarchy and thus may engage in more democratic group dynamics and thus results in a more equal participation of members in online discussion. As Baron (1984) indicated, CMC could impede the dominant communication behaviors and thus favoring women and minorities.

Contrast to the cues-filtered-out theory, the social information processing (SIP) perspective claims that CMC can support socio-emotional communication. According to SIP, CMC message senders tend to present themselves in a more socially favorable manner in order to gain the attention of message receivers and to promote potential future interaction. Message receivers, in turn, tend to idealize the image of message senders (Kim, 2000). In addition, SIP research indicated that CMC users adapt computer-generated textual signals such as “emoticons” or “smileys” to express affective and socio-emotional information. The self-presentation and idealization and the use of emoticons may enhance the loop of social interaction to a degree greater than that of F2F communication.

Online communication and cognition

Studies have analyzed the content of online messages to examine the effects of cognitive investment on communication and learning. In their study, Nara, Bonk, and Angeli (2000) found that for the required commentary, students tended to write long messages demanding deep cognitive processing and embedded with peer references. Students’ comments became more interactive over time but were highly directed by the discussion starter. This research concluded that students would apply high-level cognitive and metacognitive strategies if tasks called for them. In the same line of research, Chan (2001) explored influences of peer collaboration and discourse patterns on conceptual change in high school biology learning. Though peer collaboration tended to result in a higher interaction levels, the level was not necessarily cognitively deep enough to result in conceptual change. Students that engaged in a deep/problem-centered approach to their discussions demonstrated greater levels of conceptual change. The findings also indicated that putting students in groups did not necessarily lead to high level of interaction; teachers need to attend to the interaction processes of groups.

Despite the broadening scope of online collaboration and communication in the recent years, little literature addressing the effects of personality on online communication and task engagement exists. Questions regarding how students with different personalities interact during online discussions and how instructors can use personality to promote effective online learning have yet to be answered.

Specifically, this study attempts to address the gap presented in the literature by investigating the following questions:

1. Does personality influence communication type and pattern, message length, and task engagement during online discussion?
2. Do communication pattern differences exist among personality groups?
3. Do communication patterns change over time due to personality influences on group interaction?
4. What are students’ feelings, attitudes and opinions about their online discussion experiences?

Methods

Research Design

A mixed-method, triangulation design was used, involving the collection and analysis of both quantitative and qualitative data, to answer the questions addressed in this study (McMillan, 2004).

Participants

Seventy undergraduate education majors enrolled in three sections of an educational psychology course participated in the study. The majority (80%) of students were white females from southeastern area of the United States; most were traditional undergraduates between ages 18-22. Several minority and non-traditional students were enrolled and participated.

Instruments

The Five Factor Personality Test (Buchanan, 2001; Goldberg, 1999) was used to classify the students' personality profiles with respect to three traits, which might influence students' participation in online collaborations: Extraversion, a tendency to seek and engage in social interactions; Agreeableness, reflecting the quality of continuing interaction; and Openness, reflecting an interest in intellectual and imaginative experiences. High personality test scores relative to the norming population indicated greater tendencies toward these traits (see Table 1) (Saucier & Goldberg, 2002, 2003). Students scoring at or above the 67th percentile of the sample on these three traits were identified as "High;" those scoring at or below the 33rd percentile were classified as "Low." All others were considered "Neutral." Students' attitudes and feeling about online learning were measured using a 6-point Likert scale survey (6=strongly agree, 1=strongly disagree).

Procedure

Based on their personality scores, students were assigned to one of the four personality profile groups: High (n = 16), Low (n = 9), High+Low-mixed (n = 10), and Neutral (n = 35) to participate in three asynchronous WebCT discussions about three case studies reflecting course concepts and content. Each discussion lasted for approximately a month. Although each student was required to post a minimum of three messages to each discussion, some failed to do so; therefore, message numbers varied across discussions due to different participation rates. Students completed the attitude survey at the end of the course.

Data and Analyses

The unit of analysis was a discussion message, defined as the written text of one individual intended for other group members. The content of each message was

analyzed and coded for communication type (one-way vs. two-way) and task engagement (fully-engaged, somewhat-engaged, disengaged). Only those cases containing three messages in a discussion, a total of nine messages for three discussions, were used in the analyses.

Two-way communication (coded 2) involved messages engaging other members through questioning, commentary, statements or opinions explicitly responding to previous messages or directly inviting, encouraging or soliciting replies. One-way communication (coded 1) involved messages expressing questions, comments, statements or opinions, without inviting, encouraging, nor soliciting reactions.

Task engagement was interpreted as the degree to which messages related to course concepts and content. Being “Fully engaged” (coded 3) involved message content that specifically and consistently focused on instructional or assignment issues. “Somewhat engaged” (coded 2) was used to code content that clearly but inconsistently reflected instructional or assignment issues, and “Disengaged” (coded 1) reflected content that was either marginally related or unrelated to instructional or assignment issues. Inter-rater reliability for communication type was .94 and for task engagement was .91.

Table 2 shows examples of message coding based on the above criteria. These excerpts were taken from the second discussion forum addressing a case study about Tina, a cheerleader with a problem at her high school.

Table 2

Examples of Message Coding

Communication Type	Engagement Level	Message Content
2	3	“Mary [pseudonym], I think counseling is a good solution with the parent and the Tina. But I also think that the teacher of cheerleading the previous year needs to do a better job than she could have. I believe cheerleading is a sport and like all sports you can't allow yourself or your students to become complacent... So I think a coach has a lot to do with her behavior? (sic) What do you think?”
2	2	“... Okay, first, if you read the case study, there is NO mention of Tina's class background. I'm assuming you think she is rich because the way she acts and that her parents are trying to sue the school... Second, personally, I am very displeased with schools in general today, mostly in the areas of discipline and content... I'm not going to get off on the content part (well, yeah I am, but I'll try to keep it to a minimum)...”
2	1	“I agree, John's [pseudonym] soccer situation was unfair, and I probably would have left too if I were in his place. If something like this ever happens to your kid, I suppose you would just have to tell him or her that as Linda [pseudonym] said, life isn't fair, and hopefully they will realize that what happened was not just or honest, and that they shouldn't behave like that...”

Table 2 (continued)

Examples of Message Coding

Communication Type	Engagement Level	Message Content
1	3	“I wanted to address the question in the case study characterizing Tina's attributions in regards to her failure to make the cheerleading team. Tina does not blame herself at all for her irresponsibility and less than acceptable performance at tryouts. Instead, she blames her coach for not informing her of the rules, which every one else knew of, and the judges, who she calls idiots. Her attributions are very wrongly placed...”
1	2	“In today's high schools, sports have become very political and now a days it is not based on really your skills, but who you know and who you are to make a team. I was very athletic in high school so I saw this sort of thing take place a lot. It really stinks, but that is just how some people work.”
1	1	“I've been trying to wait for someone to reply to my postings. I know this closes at midnight, so I need to send another message now, instead of waiting for a response. So: here's my posting: I enjoyed reading this case study. But, I wish it was more closely related to academia. Perhaps I should have taken this class right after EDN 200. But, I waited a while. Now, I am in methods classes, and my focus has really changed. But oh well!”

Descriptive analyses were applied to all data sets. Logistic Regression (LR) procedures followed by pairwise comparisons (Z-tests) were conducted to determine effects of personality on communication and task engagement (“SPSS,” 2004). Communication pattern was analyzed in terms of proportion and probability of two-way communication used by each group. ANOVAs were employed to test for the effect of personality on message length. Student attitude was analyzed in terms of average response rates.

Results

Communication Type

Table 3 displays the within group frequency and percentage of one-way and two-way messages posted by each group. High-profile (H) and High+Low-profile (H+L) groups exceeded the Low-profile (L) and Neutral-profile (N) groups in percent of messages engaged in two-way communication. Both H and H+L groups engaged in more two-way communication as compared to L and N groups. In addition, the L group engaged in twice as much one-way communication (68%) than two-way communication (31%).

The Likelihood Ratio Chi-Square showed a significant main effect of group on communication type (LR = 22.095, df = 3, p < .001). Consequently, pairwise comparisons between groups were performed. Table 4 shows the comparison results. The upper number in the cell is the odds ratio and the lower number represents the significance level (p-value) associated with the contrast.

To perform the pairwise comparisons between groups, contrasts were used which yield odd ratios as informative output. An odds ratio near one means equally likely, less than one means less likely, and more than one means more likely. According to Table 4, the comparison of groups H and L yielded an odds ratio of 3.221. This can be interpreted that the H group is 3.221 times more likely to engage in two-way communication than the L group. The pairwise comparison results yielded significant differences between groups H and L (Odds = 3.221, $p = .0001$), H and N (Odds = 1.921, $p = .002$), L and H+L (Odds = 0.313, $p = .001$), and H+L and N (Odds = 1.906, $p = .011$). The H group is more likely to use two-way communication for online discussion than either H or N but not H+L group. Furthermore, the H+L group is more likely to engage in two-way communication than both the L and N groups. However, the N and L groups are apparently not different from each other. In all, the effect of personality grouping on two-way communication can be presented in such order: $(H=H+L) > (L=N)$.

Table 3

Crosstabulation of Communication Type by Group

Group	# of messages % within group	Communication Type		Total
		One-way	Two-way	
H	n %	53 40.8	77 59.2	130
L	n %	51 68.9	23 31.1	74
H+L	n %	34 41.0	49 59.0	83
N	n %	160 41.0	121 59.0	281
Total	n %	298 52.5	270 47.5	568 100%

Table 4

Results of Pairwise Comparisons of Communication Type Between Groups

Group	H	L	H+L	N
H	-	3.221	1.008	1.921
		0.0001	0.978	0.002
L		-	0.313	0.596
			0.001	0.064
H+L			-	1.906
				0.011
N				-

Note. Upper number = Odds Ratio, Lower number = p-value.

As Tables 3 and 4 show, in terms of the percent of total messages within and across groups and the likelihood to engage in two-way communication, students categorized as high personality profile demonstrated statistically more group-based interpersonal communication and interaction than students categorized as low personality profile.

Communication Pattern

To identify communication patterns exist in each group, the percentage of two-way communication used in each of the nine messages by each group was plotted in a line graph. The upper graph in Figure 1 reveals communication patterns that distinguish the four groups as the percent of two-way communication used in each of the nine messages by each group.

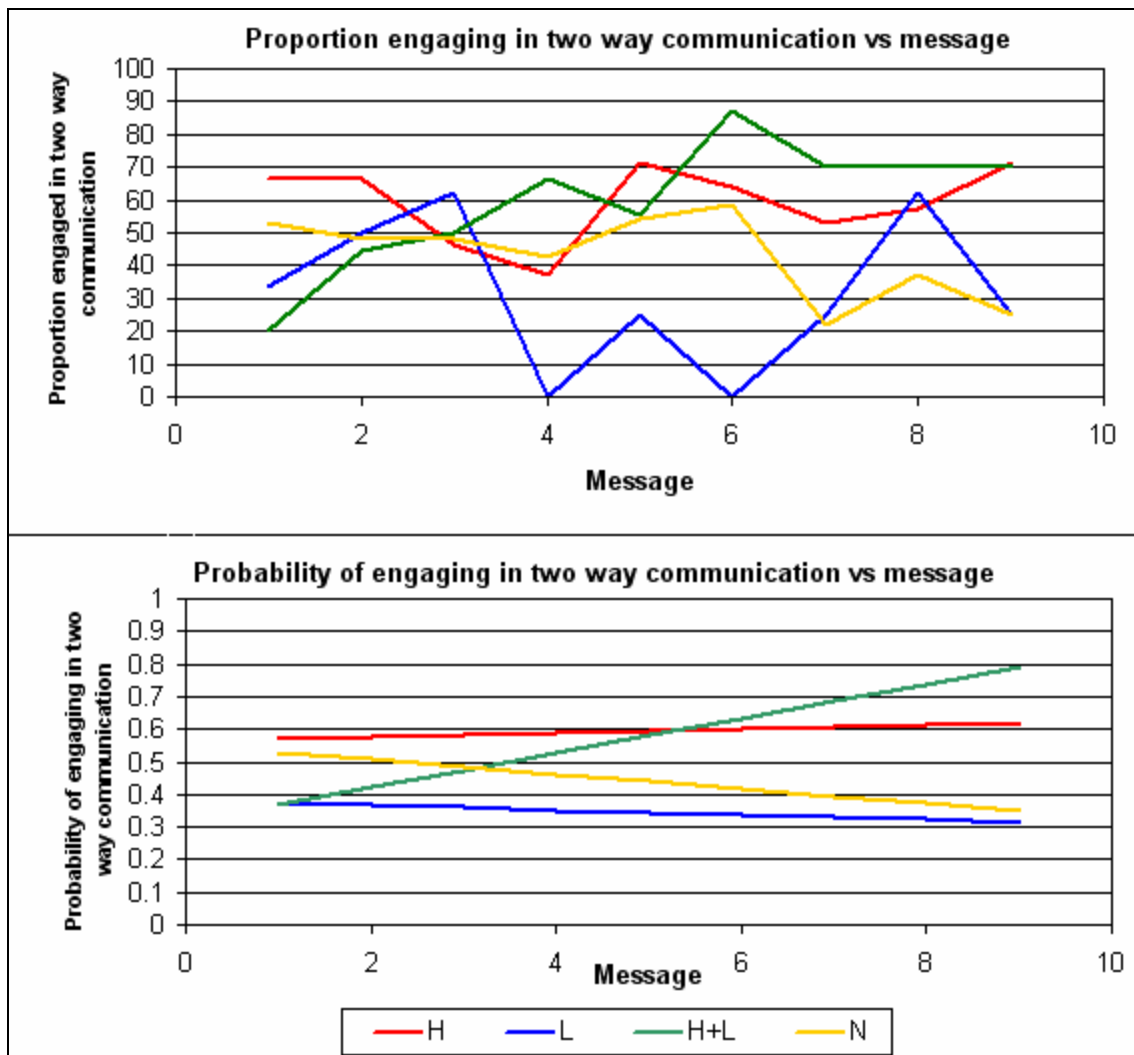


Figure 1. Patterns of communication type for four groups

Table 5

Odds Ratio for Two-way Communication as The Number of Messages Increased

Group	Odds Ratio	P value
H	1.044	0.549
L	0.950	0.598
H+L	1.280	0.011
N	0.890	0.017

A Logistic Regression procedure was conducted to predict the pattern of two-way communication each group would engage as the number of messages increased over time. Table 5 shows significant findings in the H+L and N groups. The result indicates that for every one message increase, the H+L group is expected to be 1.28 times more likely to engage in two-way communication (Odds = 1.28, $p = 0.011$). Similarly, for every one message increase, the N group is expected to be 0.89 times as likely to engage in two-way communication (Odds = 0.890, $p = 0.017$). However, the patterns for H (Odds = 1.044, $p = 0.549$) and L (Odds = 0.950, $p = 0.598$) groups would remain unchanging.

The lower graph in Figure 1 shows the predicted probabilities of two-way communication for each group. This visual presentation depicts that the H+L group is increasing in probability for two-way communication as the number of messages increases and the N group is decreasing in probability for two-way communication as the number of messages increases.

Message Length

The potential impact of personality on message length was measured by the word count of each message; descriptive statistics were applied followed by three analyses of variance (ANOVA). Overall, the High-profile students wrote longer messages than students in all other groups. The average message length (number of words) for each group is H = 137.29, L = 92.59, H+L = 105.35, and N = 109.99.

Despite the longer messages of the High-profile students, ANOVA results show no significant differences among the groups for any of the discussions ($p > .05$). Apparently, personality had no influence on message length.

Task Engagement

Table 6 presents the number and percentage of messages across three discussions at each level of task engagement for each group.

Table 6***Crosstabulation of group by task engagement***

Personality Group	Message	Task Engagement Level			Total
		1	2	3	
H	n	23	68	39	130
	% within group	17.69	52.31	30	
L	n	22	22	30	74
	% within group	29.73	29.73	40.54	
H+L	n	4	31	48	83
	% within group	4.82	37.35	57.83	
N	n	46	117	118	281
	% within group	16.37	41.64	41.99	
Total	N	95	238	235	568
	% within group	16.73	41.90	41.37	

Chi-Square analysis indicated a significant main effect for group and task engagement ($X^2 = 30.54$, $df = 6$, $p < .0001$). Pairwise comparisons of homogeneity for all groups across all levels of task engagement were statistically significant ($p < .05$) except H vs. N groups.

Table 7***Within Task Comparisons Across Groups***

Group	Task Engagement Level 1		Task Engagement Level 2		Task Engagement Level 3	
	Z-score	p-value	Z-score	p-value	Z-score	p-value
H vs. L	-1.7604	0.0783	2.3344	0.0195	-1.2445	0.2133
H vs. H+L	2.5729	0.0100	1.5617	0.1183	-3.0993	0.0019
H vs. N	0.3037	0.7613	1.4993	0.1337	-1.8289	0.0674
L vs. H+L	3.8285	0.0001	-0.8202	0.4120	-1.5342	0.1249
L vs. N	2.3362	0.0194	-1.4566	0.1452	-0.1718	0.8635
H+L vs. N	-2.4945	0.0126	-0.5385	0.5902	1.8776	0.0604

Note. The Z-score resulting from a two-sample test of proportions

Table 7 shows Z-test results that were used to compare differences between groups at each task engagement level. For task level 3, H+L group appeared to be more fully engaged than the H group ($p = .0019$). For task level 2, the H group exceeded the L group, the only significant difference. For task level 1, significant differences exist between the H and H+L ($p = 0.01$), L and H+L ($p = .0001$), and H+L and N ($p = .0126$) groups. The H+L group had a smaller proportion of task level 1 messages than the other three groups. In terms of task engagement, the four groups can be ordered in the following way: H+L>H>N>L. Groups with high-profile members tended to be more engaged in relevant task-related activities than the other groups.

The above statistic results reveal that students in the H+L group used more two-way communication and were more focused on instructional issues, compared to students in other groups. In contrast, students in the L group tended to “post” (one-way) marginally related or unrelated messages rather than “talk” (two-way) with each other about the discussion topics. Interestingly, the H and L groups had similar proportions of task level 1 messages. This finding suggests that although the students in the H group used two-way communication with their peers, they were not always fully engaged in the learning task. The outgoing, socially oriented personality of students in this group may have contributed to their off-task discourse. These results suggest that communication type does not correlate with task engagement level.

Attitude Survey

Table 8 reports students’ feelings, attitudes, and opinions about their online learning experiences, grouped into five categories. Survey results indicate generally positive levels of satisfaction across personality profiles, indicating that students in general are receptive to and satisfied with online learning experiences that involve interaction and collaboration.

Table 8

Results of Students’ Feelings, Attitudes, and Opinions About Online Learning

Category	H (n=16)	L (n=9)	H+L (n=10)	N (n=32)	Total (N=67)
	<u>M</u> (SD)	<u>M</u> (SD)	<u>M</u> (SD)	<u>M</u> (SD)	<u>M</u> (SD)
Feeling about the quality of online discussion tasks & content	4.97 (.78)	4.94 (.92)	4.95 (.88)	4.75 (.93)	4.86 (.89)
Feelings about the quality of online collaborative learning	4.83 (.96)	4.89 (.80)	4.8 (.89)	4.4 (1.13)	4.62 (1.04)
Attitudes about group structure & membership	3.31 (1.49)	3.78 (1.26)	3.75 (1.21)	3.63 (1.35)	3.59 (1.35)
Opinions about assigning a group leader in the discussion form	3.88 (1.63)	3.56 (1.59)	3.8 (1.62)	3.5 (1.27)	3.64 (1.43)
Opinions about the value of online discussion & professional development	4.78 (1.01)	5.00 (.59)	4.65 (.88)	4.52 (1.13)	4.66 (1.01)
Attitudes toward future participation in forums of other online courses	4.50 (1.59)	4.67 (.71)	4.2 (.92)	4.16 (1.42)	4.31 (1.32)

Discussion

This research has demonstrated that personality affects online discussion in several ways. Students that tend to be more socially outgoing and engaging, inclined to agreeableness and intellectual and/or imaginative experiences talk with others using two-way communication, therefore, seem better able to meet the goals of collaborative online interaction. Although high-profile students consistently engaged in two-way communication, their interactions were not always focused on learning tasks. This result suggests that communication type and task engagement are not related.

On the other hand, students that tend to be more socially retiring and reserved and less inclined to be interested in sustained social interaction are more likely to use one-way communication for online discussion. The low-profile students seem to be less able to engage in online collaborative learning and less able to meet the goals of learning task.

Combining the communication and task engagement results of this research leads to a recommendation for effective grouping, i.e., mixing High- and Low-profile students in the same group. Perhaps due to unfamiliarity with each other, this group started the discussion with Low-profile members posting one-way messages and High-profile students posting two-way messages. However, as the discussions progressed, the rate of two-way communication grew significantly. Grouping High- and Low-profile students together produced changes in group dynamics, communication type, and task engagement, a possible result of an influence of the High-profile learners on their Low-profile peers. As a consequence, this group exceeded all other groups on task engagement and was better able to meet the goals of online collaboration and instruction. The increasingly interactive interpersonal communication may also account for the high proportion of messages scored as task engagement level 3.

Assuming personality influences length of messages, those ranked high in personality might use more two-way communication than those scoring lower. However, the insignificant findings for message length, suggest that little or no relationship exists between communication type and message length. Apparently, message length cannot be used as an indicator or predictor of learning outcomes or performance; rather, the content of discourse should be used when one is interested in assessing the process and outcome of online learning.

The results of this study support the expectation that personality affects group interaction in terms of type and pattern of online communication and task engagement. When forming online learning communities for collaborative learning, personality factors should be taken into account to promote the potential effectiveness of online communication.

Practical Implications and Future Research

As noted earlier, the growth of online learning in educational settings will continue. The genie is out of the bottle and not going back any time soon, if ever. Though online learning is still in its infancy, much remains to be discovered. Understanding how to build productive learning communities via effective collaborations is a critical goal for online education. Based on the findings of this

research, several practical suggestions can be offered to instructors designing group-based online learning activities.

Online instructors will be better able to structure more effective collaborative groups and develop more dynamic and effective online learning communities by utilizing knowledge of student personality profiles. Appropriate grouping strategies should be part of the design of instructional activities. The results of this study suggest that combining high- and low-profile students in the same group may result in more effective online communication and task engagement. Low-profile students should not be isolated or placed in homogeneous groups.

As Jonassen, Howland, Moore, and Marra (2003) noted, though students are assumed to know how to communicate and work with others; they do not. Meaningful learning may result from the use of problem-based tasks and team building training introduced prior to the start of online collaboration.

The effects of personality on group interactions investigated in this study suggests how little is currently known about online learning; much more remains to be understood about building productive learning communities and designing effective online instruction and learning activities.

Future research should include qualitative analyses of online discourse to better understand the extent to which personality may influence conceptual and relational structures of message content, as well as how course content and concepts are developed and applied in collaborative online discussion.

Longitudinal research with broader scope should be conducted which includes other grouping strategies, such as random assignment and self-selection in to groups, as well as other personality traits, such as neuroticism and conscientious. Such research would help to determine if there are long-term effects of grouping by personality, peer influences, and stability of communication outcomes. For example, theoretically, those scoring higher on neuroticism and conscientious should have higher level of task engagement than those scoring lower. Effects such as these have not been addressed in this study. Future research should not limit the number of postings to allow the effects of personality to be more clearly demonstrated.

The ultimate concern for future research is to understand how to design collaborative tasks and structure effective groups for optimal online learning experiences. The research results reported in this paper offer insights and ways to begin to address this essential concern.

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