Investigating Factors Affecting Group Processes in Virtual Learning Environments

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Abstract

With the widespread popularity of distance learning, there is a need to investigate elements of online courses that continue to pose significant challenges for educators. One of the challenges relates to creating and managing group projects. This study investigated business students' perceptions of group work in online classes. The constructs of learning and social interaction, process satisfaction, product satisfaction, and use of technology in the virtual learning environment were investigated. The use of social media networks by group participants was also examined. Recommendations are provided for business educators looking to develop or enhance teamwork in virtual learning environments.

Developments in instructional technology, course management systems, mobile learning platforms, Web 2.0 applications, social media, and Massive Open Online Courses have created opportunities to develop new teaching pedagogies to enhance learning in ways that have not been possible in the past (Eom, Wen, & Ashill, 2006; L. Johnson, Adams, & Cummins, 2012). Colleges and universities are accommodating students' needs by restructuring programs to include online learning for individual courses as well as for degree programs. Online learning classes (referred to as virtual learning environments in this study) have grown in popularity due to the flexibility of time and space. Collaborative learning activities are used in online courses to develop soft skills

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(problem solving, critical thinking, decision making) and enhance technology skills through group work. Collaborative efforts are highly favored due to the multitude of benefits they offer. According to Barcelona and Rockey (2010), collaborative learning increases critical thinking skills as well as creativity and interpersonal skills. It prepares students for the workplace environment where teamwork is essential. Working collaboratively in a group setting offers students the opportunity to share ideas and discuss diverse viewpoints. The collaborative learning process includes discussion and reflection of the task at hand that leads to deeper processing of the information to include richer and more meaningful learning (Kirschner, Paas, & Kirschner, 2009).

Collaborative activities are designed to promote active learning skills in students. In active learning, students take ownership and control of the environment to engage in open-ended discussions that shape their learning experience. The use of active learning techniques to develop critical-thinking skills and promote higher order learning in traditional face-to-face classroom environments has been researched in business and other disciplines (Dalal, 1994; Hansen, 2008; Jenkins, 1998, Page & Mukherjee, 2007). Active learning techniques include case studies, group projects, think-pair-share, debates, and discussion. Using active learning techniques in collaborative environments helps students develop higher order thinking skills, make better psychological connections, create social competence and self-esteem, improve critical thinking, and develop socialization skills (D. W. Johnson, Johnson, & Smith, 1991; Paulson, 2011). More specifically, the use of computer-supported collaborative learning has been studied as a pedagogical approach where active learning takes place via social interaction using a computer or on the Internet (Stahl, Koschmann, & Suthers, 2006). In this environment, learning is characterized by the sharing and construction of knowledge among participants using technology as their primary means of communication or as a common resource. While previous research has explored the use of group work to promote learning, few empirical studies have studied the efficacy of group work in virtual learning environments specific to business courses. Virtual learning environments, in this study, are defined as courses without boundaries where learning is often facilitated with technology to communicate, share, discuss, and develop deliverables that meet learning outcomes.

This study investigated business students' perceptions of virtual group-based learning, interaction, attitude, and technology (including social media) use related to process (group dynamics) and product outcomes. Although virtual learning environments have been shown to promote isolation behavior (Harasim, Teles, Hiltz, & Turoff, 1995), faculty can implement group project strategies to engage students in collaborative learning environments. Activities such as discussions, debates, case studies, and projects, which are suited for the traditional face-to-face classrooms, need to be redesigned to succeed effectively in virtual learning environments. Emerging technologies, particularly social media networks such as Facebook, Twitter, and YouTube, have made a large impact on personal and professional communication. However, Buche, Davis, and Vician (2012) suggested "participation in social networking and use of Internet search engines do not adequately prepare students for the attitudes and competencies required to be successful in blended and online educational environments"

(p. 48). More research is needed to further understand technology-mediated group collaboration and communication in virtual and social learning environments.

The purpose of this study was to investigate perceptions of business students using group work in virtual learning environments. The assignments were designed to engage students in learning by exhibiting interest in meeting course objectives, participating actively as motivated learners, and collaborating using constructivist learning principles (see further explanation in "Conceptual Framework" section below). The article is organized as follows: Review of research on group collaboration is presented along with extraction of variables from the literature related to the study; the conceptual framework for the study is provided through which a research model is developed; hypotheses are presented; data analysis and results of the study are explained, followed by discussion and applications for practice. Due to the nature of the research design used in this study, limitations are also explained. For data collection, a scale comprising four factors (Learning and Social Interaction, Process Satisfaction, Product Satisfaction, and Technology Use) was developed from extant literature and examined for reliability and validity. The study provides results of exploratory research to use with group projects in virtual environments and investigates assessment components of group projects. The results will provide empirical evidence to an area that has been identified as lacking in research (So & Brush, 2008), and will provide direction as well as guidance for future studies. An analysis of factors affecting virtual group collaboration and team dynamics can help instructors design effective assignments and assessments to promote collaborative learning.

Literature Review

Groupwork

Since the Internet is now being widely used for teaching and learning, researchers have studied trends that may affect the virtual classroom. Almost a decade ago, Baird and Fisher (2005) identified the bifocal perception that high quality education is shaped by changes in the characteristics of student learners and the ways in which students use new collaborative technologies to exchange information. Baird and Fisher emphasized that the convergence of social networking technologies and a new "always on" pedagogy is rapidly changing the face of education. As a result of research (e.g., Kim & Bonk, 2006; Rentz, Arduser, Meloncon, & Debs, 2009), we now know that a collaborative environment can be facilitated by having a set of common objectives, peer responsibility, and willingness to exchange information and resources. In virtual environments group communication is built on minimal or constrained social cues (Biocca, Harms, & Burgoon, 2003). There is a need to study how participants view group work in virtual learning environments. The isolation factor present in virtual learning environments has to be overcome by group members as they learn to trust other members with the information. Once trust is established, scaffolding can occur among peers when working in teams. According to Storch (2005), from a social constructivist perspective, learners should be encouraged to participate in group activities

that foster interaction and coconstruction of knowledge. When designing course content, faculty must also consider characteristics of the new generation of students who may show preference for digital literacy, social learning, and have expectations toward an interactive environment where instant messaging and feedback are expected from other students as well as faculty. J. Williams and Chinn (2009) proposed the use of case studies, simulations, role playing, debates, and team projects to keep students engaged and active in the learning process.

Groups of students in virtual environments are expected to perform a range of business activities in organizations (Hertel, Geister, & Konradt, 2005). In response to an emphasis on collaboration and communication, educators have realized the benefits of group work and the need to prepare students to function in group environments (Sashittal, Jassawalla, & Markulis, 2011). When working in teams, students' exposure to alternative points of view can challenge their initial understanding and thus motivate learning (Glaser & Bassok, 1989). Teamwork can enhance group members' acquisition of discipline-related knowledge (McCorkle et al., 1999), and retention of complex subject matter (Liang, Moreland, & Argote, 1995). In group projects, students use authentic learning environments to simulate workplace settings where projects are completed as a result of team efforts using participative management style. According to Alavi (1994), cooperation and teamwork can further support learning by providing social support and encouragement for individual efforts.

Other researchers found that students who share ideas in discussions with other students spend more time synthesizing and integrating ideas and concepts (Bligh 1972), are better prepared due to higher levels of critical thinking skills and metacognitive learning strategies (McKeachie, 1980), and are more satisfied with their learning experience (McKeachie, Pintrich, Lin, & Smith, 1987). For business courses, Paulson (2011) found students can effectively learn from each other as well as the instructor while working in teams to analyze a situation, build consensus around an answer to a strategic question, and make an executive-level decision. Regarding business communication courses, Rentz et al. (2009) found that group assignments offer opportunities for extensive dialogue among group members. These authors reported that teamwork encourages students to transfer and apply curriculum-based knowledge to everyday communication, as experience with business problem solving was shown to expand and strengthen learning.

Powell, Piccoli, and Ives (2004) noted that while the findings of team research in the traditional environment may provide useful pointers, the idiosyncratic structural and contextual issues surrounding virtual teams call for specific research attention. Creating effective team environments is important, but this may be a challenge if group members have not worked together in the past, which further adds to the complexity of working in virtual teams. Teams benefit greatly from varied thinking, and mutual respect can draw on the strengths of each individual's contribution.

Groups can be formed using a variety of strategies (Rentz et al., 2009). Some of these include grouping students by last name, random selection of students enrolled in class, common interest topics, learning styles, grouping by majors or concentration, and self-selection by students. Researchers have reported on various factors (including

group composition) that may affect group performance. Individual factors, such as age, gender, personality type, and previous work experience can also play a role in how groups will interact and perform. Personality inventories, such as the five-factor model (Costa & McCrae, 1992) and Myers-Briggs Type Indicator (Myers, McCaulley, Quenk, & Hammer, 1998) have previously been used to study group performance. However, the results of such studies (e.g., Rutherfoord, 2001 with engineering students, and Clinebell & Stecher, 2003 with business students) have not been consistent when replicated because of the differences between group performance in subject areas where research was conducted. The nature of class meetings also presents additional challenges. For example, face-to-face group assignments present an opportunity for faculty and students to interact regularly, during, before, or after class time. Virtual group meetings present pedagogical and logistical challenges associated with group composition, member roles, progress monitoring, and assessment of group processes. There is a need to further study group behavior in the context of today's technology-based learning environment.

Technology and Social Media

Technology-based learning environments such as web-based course tools, learning management systems, blogs, and wikis create a virtual space where students can interact using laptop computers, tablets, mobile devices, and cell phones. Since the introduction of the World Wide Web for teaching and learning, one of the most powerful elements has been the ability to engage learners in a collaborative and interactive format (Hazari & Schnorr, 1999). In first generation of course management systems, the use of the discussion board was used to foster group collaboration (Ansorge & Bendus, 2003). Now, with social computing platforms being widely available, several Web 2.0 tools (such as Google Hangouts) have emerged and research is needed to determine how group projects can effectively use new platforms to engage students.

One of the main challenges in developing a virtual learning environment is that faculty may not be prepared to teach online. This can be because of lack of interest, expertise, or experience. There is a great paradigm shift to transition from teaching in the face-to-face classroom environment to the virtual learning environment. The role of the instructor changes from a content provider to content facilitator. V. Williams and Peters (1997) observed that online teaching may be challenging due to several reasons; for example, in the online environment, there is no visual control provided by direct eye contact or interaction. As a result, students may experience challenges when communicating with team members. In virtual learning environments, teamwork can be fostered by providing opportunities for continuous interaction through technology-based learning. Classroom experience—coupled with technology tools and an active learning environment—provides students with essential preparation for participation in companies that use networks for collaboration.

The virtual learning environment can include a broad array of learning situations involving hands-on experiences, simulations, games, demonstrations, group discussions, debates, problem solving, and interactive lectures (Bastian, VanTassell, Williams,

Menkhaus, & Held, 1997). This can be a good strategy to use in courses, particularly when it comes to teaching the technology savvy "net generation" students who have different expectations and styles (Dillenbourg & Jermann, 2010; J. Williams & Chinn, 2009).

Although we are living in a technology-rich society, technology can sometimes be a hindrance to achieve group outcomes. In addition, during the past decade, there has been an increase in the number of nontraditional students returning to colleges and universities (Taylor & House, 2010). Nontraditional students can become dissatisfied with the process by which group decisions are made regarding the final product and may have a negative attitude toward the groups' performance (Kayworth & Leidner, 2002). Also, in the electronic landscape of digital immigrants and digital natives (Prensky, 2001), faculty are more likely to be the digital immigrants struggling to keep up with digital technologies. The pace of technology change has outpaced curriculum development. Although faculty members are increasingly experimenting with alternate forms of expressions such as electronic books, blogs, wikis, multimedia presentations, and other types of digital scholarly work, these tools can be difficult to evaluate and classify according to traditional metrics (L. Johnson, Smith, Willis, Levine, & Haywood, 2011). Therefore, more research is needed that investigates technology use as a variable in affecting learning outcomes when using group assignments.

Social Media as a Learning Tool

Computer-supported collaborative online learning can be enhanced by using social media. Social media platforms provide embedded tools to create virtual communities. Examples are Facebook groups and Google Hangouts. Since many students use social media platforms, the use of social media networking for classroom projects can be a seamless transition for collaboration and communication (Everson, Gundlach, & Miller, 2013). Given enough time, groups can develop protocols and norms for interaction within social media platforms. An added benefit of social media tools is the use of audio, video, and document sharing for group collaboration. Push notifications (where a message is sent to a mobile device) can keep group members updated on new items in the group collaboration area. Students who are already using "always on" connections to receive instant messages on their mobile devices can interact with team members in real time. Recent versions of popular course management tools (e.g., Blackboard and Moodle) have collaboration tools such as instant messaging and connections to popular social media sites (e.g., Facebook and Twitter) integrated into their feature set. Institutions are providing training so faculty can integrate these social media, collaboration, and messaging tools in their courses (Moran, Seaman, & Tinti-Kane, 2011).

Although faculty are willing to adopt social media for learning and collaborative learning, many are concerned about the time it requires as well as privacy and integrity of work shared on these social media sites that are external to the institutional infrastructure. Due to composition of groups that may vary in regard to experience with social media, faculty need to provide an environment that encourages, but not requires, the use of social media for collaborative learning in virtual learning environments. This is because it is possible that some students may be more willing to use social

media for entertainment purposes and not necessarily see them as tools for learning (Poellhuber, Anderson, & Roy, 2011). To investigate this further, this study looked at the use of social media tools by teams as part of the collaboration process.

Conceptual Framework

Constructivism is inquiry-based, discovery learning in which learners construct personal interpretation of knowledge based on their previous experience and application of knowledge in relevant context (Cunningham & Duffy, 1996). It focuses specifically on students' motivation to learn and their ability to share what they learn. The constructivism theory was utilized, in context of satisfaction with process and product outcomes, to explore interactions in the online environment. Graffam (2007) observed that by creating "intentional engagements" students are more likely to immerse themselves in ongoing exploration and evaluation. When using shared learning environments, researchers (Honebein, 1996; Knuth & Cunningham, 1993; Lebow, 1993) supported the use of constructivist theory for effective learning. The constructivist approach incorporates pedagogical goals in the knowledge construction process by providing appreciation for multiple perspectives, emphasizing social interaction, embedding learning in relevant contexts, encouraging ownership in the learning process, embedding learning in social experience, encouraging use of multiple modes of representation, and encouraging self-awareness of the knowledge construction process (Bruner, 1990; Vygotsky, 1986). Leidner and Jarvenpaa (1995) also described a related concept of collaborativism, which encourages socialization in a learning context to create and share knowledge. Biocca et al. (2003) proposed a theory of social presence to investigate understanding of social behavior in mediated environments. They identified a set of criteria to measure social presence. These criteria included focus on technology requirements, social cognition and communication, and individual behaviors as they affect team performance.

In the theories listed above—although there is mention of active learning, collaboration, interaction, social presence, and technology and telecommunication systems—the specific constructs of process and product outcomes are not clearly explicated and studied. Therefore, there is a need to further investigate product, process outcomes, and student reflections on teamwork in a virtual learning environment. This study was designed to investigate students' perceptions of teamwork as it relates to process and product outcomes. Background variables such as age, gender, previous work experience, and social media use may also affect an individual's interaction in a group. Regarding gender, Sanchez-Franco, Ramos, and Velicia (2009) indicated that

> males are more motivated by their need for self-fulfillment and more independence; they promote their individual identity and resist status-based influence. Females, however, are more expressive, more skillful in sending and receiving nonverbal messages, and are more aware of the feelings of others. They are more concerned with harmony, consensus, and interdependence. Relationships are more important to them than completing a task. (p. 197)
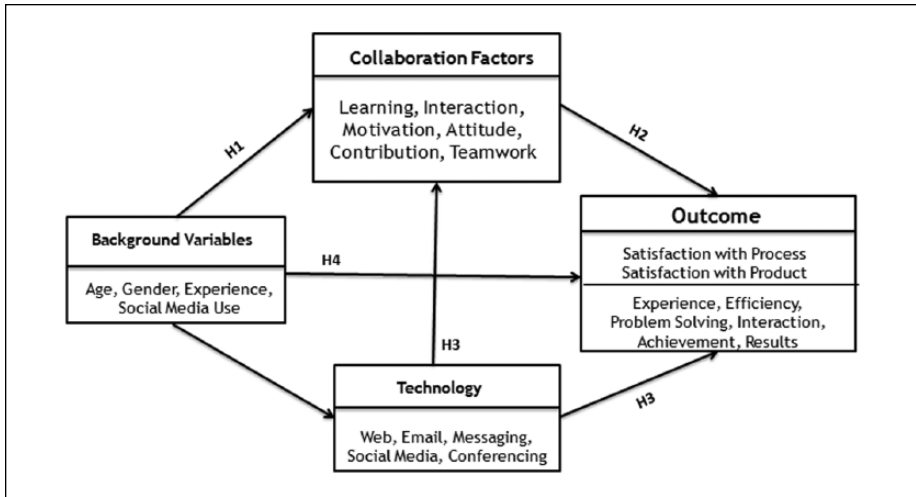
Figure 1. Conceptual framework for study of group behavior in virtual learning environment.

Other studies have found that gender affects communication and learning (Kaenzig, Hyatt, & Anderson, 2007; Savicki, Kelley, & Lingenfelter, 1996). Similarly, variables such as age, work experience, and technology use also influence learning outcomes (Gokhale, 1995; Ransdell, 2010; J. Williams & Chinn, 2009). Since these variables may also affect group performance in relation to process and product outcomes, demographic data were included as moderating variables.

The conceptual framework used in the study is shown in Figure 1.

Hypothesis

The following hypotheses were studied:

> **Hypothesis 1:** Previous experience with online courses will be positively related to learning and social interaction within the group.
> **Hypothesis 2a:** Perception toward learning and social interaction will be positively related to process satisfaction.
> **Hypothesis 2b:** Perception toward learning and social interaction will be positively related to group product satisfaction.
> **Hypothesis 3a:** Use of technology is positively related to learning and social Interaction.
> **Hypothesis 3b:** Use of technology is positively related to group process satisfaction.
> **Hypothesis 3c:** Use of technology is positively related to group product satisfaction.

Hypothesis 4: Social media experience, active use, and gender are positively related to satisfaction with (a) learning and social interaction, (b) process satisfaction, and (c) product satisfaction.

Research Method

The study was conducted over 2 years (four 15-week semesters) in multiple sections of a business communication online undergraduate course offered in the Richards College of Business, University of West Georgia. This is a required core course for all students in the College of Business. The courses were taught by the authors using the same textbook, course materials, project instructions, and rubrics. The final project in the business communication course was to create a team service proposal for a local business or nonprofit organization. Student groups had to identify a suitable business, develop documents such as a business letterhead and memorandum of interest, explain the value proposition of the business, conduct a SWOT (strengths, weaknesses, opportunities, and threats) analysis, propose a budget, develop designs for online and print-based sales and marketing literature, research licensing and legal requirements for business operations, identify staff experience and expertise needed to run the business, and compile a final report of feasibility for the business. Students submitted each project to the instructor using the web-based course tool (Blackboard/CourseDen). The instructor graded each project and returned it to student groups along with constructive feedback that had to be incorporated in the final report submitted by each group at the end of the term. In addition to group projects, students also worked on their own to complete individual assignments and exams that were not related to the group project.

The typical class size for business communication courses was approximately 40 students in each class. Four to five students were assigned to each group as this was found to be an optimum number based on the experience of the instructors who had previously experimented with smaller as well as larger groups. Although smaller groups may have been more effective, the logistics of working with many groups during the semester and using many class periods at the end of the semester for class presentations would not have allowed the instructors to cover all material to meet learning outcomes established for the course. Individual members in a group communicated and collaborated to deliver the final project according to a written rubric. The instructors served as facilitators and monitored the process by providing feedback, answering questions, and assessing milestones that had been established to ensure teams were on track throughout the semester. The projects required students to assign roles and responsibilities, set protocol for interaction, establish deadlines, and agree on the results before the final submission deadline. The final project deliverable was presented by students as an oral presentation to class at the end of the term, and a written report submitted to the instructor for final grade.

At the end of each semester, a survey was given to students. The institutional review board of the university approved the study before data collection. Before taking the survey, students reviewed the informed consent form. They were assured of confidentiality regarding the survey information. Students were informed that participation in the study

was voluntary, and they could choose not to complete the survey without impact on their course grade. The survey (see the appendix) had 26 items listed under four categories: learning and social interaction, technology use, process satisfaction, and product satisfaction. Several items were reverse coded and items under each category were presented in random order in an online survey. Data were collected using a 5-point Likert-type scale with "Strongly Disagree" and "Strongly Agree" as anchors and "Undecided" as midpoint. The survey was pilot tested with a small group of students, and items were modified based on student feedback. The formal survey was completed by 187 students.

A composite group collaboration score that included the sum of three factors directly related to learning and collaboration (identified as learning and social interaction, process satisfaction, and product satisfaction) were calculated using scores of the three categories. Using this scoring schema, a higher score indicated more perceived positive outcome (about learning and social interaction, process, and product). The fourth factor (technology) was treated as a moderating variable and was investigated as affecting group process and product satisfaction noting the effects on learning and social interaction. This was done because learning and social interaction, product satisfaction, and process satisfaction could be affected by degree of technology use by a team member, but there would be no way to know whether any observed differences were associated with demographic or other differences between groups rather than with differing patterns of technology use.

Results

Reliability and validity of the instrument were calculated before proceeding with data analysis. Chronbach alpha, which is a measure of internal consistency (or reliability), was calculated for the scale and subscales. For the subscales, learning and social Interaction had an alpha of .90, Process Satisfaction alpha was .74, product satisfaction alpha was .69, and technology use alpha was .72. All subscales individually exhibited good internal consistency. Nunnally (1978) and Thorndike (1996) have stated that an overall Chronbach alpha of .7 is considered acceptable criterion for internally consistent scales. In this case, Chronbach alpha reliability value of the overall scale was found to be .78. As recommended by Gerbing and Anderson (1988), the convergent and discriminant validity of the scale was investigated where each item was correlated with its own scale (with the item removed), and then with other scales. Item analysis showed that all items were highly correlated with their own scale in comparison to items in the other subscales therefore supporting validity of the measure.

Demographic information of study participants is shown below in Table 1.

Hypothesis 1

H1: Previous experience with online courses was examined in relation to self-reported perceived satisfaction toward learning and social interaction. A weak correlation that was significant was found, $r_s(187) = .267$, $p < .01$. Previously taking an online course is related to learning and social interaction in a group setting.

Table 1. Demographic Information.

Measure	Items	Frequency	Percentage
Gender	Male	75	40.1
	Female	112	59.9
Age	18-21	79	42.2
	22-25	74	39.6
	26-30	9	4.8
	>30	25	13.4
Previous online	Yes	158	84.5
course	No	29	15.5
Facebook account	Yes	170	90.9
	No	17	9.1
Twitter account	Yes	111	59.4
	No	76	40.6

Hypothesis 2

H2a: Satisfaction toward learning and social interaction was examined in relation to process satisfaction. A positive correlation that was significant was found, $r(133) = .734$, $p < .01$. Participants who were satisfied with learning and social interaction were also satisfied with process used in their group. Process satisfaction included interaction with other students for problem solving and decision making, including camaraderie with other group members in arriving at mutually acceptable decisions.

H2b: Satisfaction toward learning and social interaction was examined in relation to product satisfaction. A moderately positive correlation that was significant was found, $r(187) = .460$, $p < .01$. Participants who were satisfied with learning and social interaction were also satisfied with the product created by their group. Product satisfaction included quality of work developed including content and format that met or exceeded specified project requirements, and a product that reflected input from each team member.

Further analysis was done to determine the impact of process and product satisfaction on learning. A multiple linear regression was calculated to predict participants' satisfaction with overall learning and social interaction based on process and product satisfaction. The regression equation was not significant, $F(2, 184) = 26.910$, $p > .05$, with an R^2 of .226. Neither product satisfaction nor process satisfaction can be used to predict participants' satisfaction with learning and social interaction.

Hypothesis 3

Since the projects were conducted in a virtual environment, the use of technology played an important part in achieving learning goals, social interaction, product, and process satisfaction. Most participants reported using the university course tool (Blackboard/CourseDen) as their main technology platform. The course tool includes email, a discussion board, and chat features. Video conferencing is not a part of the

course tool but several participants reported using other technology tools such as Google Hangout and GotoMeeting.com to video conference with group members. Text messaging was mentioned by several participants

H3a: Satisfaction toward learning and interaction was examined in relation to attitude and use of technology for completing projects in group settings. A positive correlation was found, $r(187) = .585$, $p < .01$, with a significant relationship between the two variables. Participants who reported using technology as an integral part of group communication tend to be satisfied with learning and social interaction.

H3b: Satisfaction toward group process was examined in relation to attitude and use of technology for completing projects in group settings. A moderate positive correlation was found, $r(187) = .324$, $p < .01$, with a significant relationship between the two variables. Participants who reported using technology as an integral part of group communication tend to exhibit a moderate degree of group process satisfaction.

H3c: Satisfaction toward product developed by the group was examined in relation to attitude and use of technology for completing projects in group settings. A weak positive correlation was found, $r(187) = .224$, $p < .01$, with a significant relationship between the two variables. Participants who reported using technology as an integral part of group communication tend to exhibit some degree of satisfaction with the product developed by the group.

Hypothesis 4

The participant pool had a high percentage of social media users with all participants having either a Facebook or Twitter account. Ninety-one percent reported having a Facebook account, and 59% reported having a Twitter account. Among the Facebook users, 89.3% of males and 92% of females reported having a Facebook account, and 60.7% of males and 60.7% of females reported having a Twitter account.

Social media use was examined in relation to self-reported perceived satisfaction toward learning and social interaction, process satisfaction, and product satisfaction. A weak correlation that was not significant was found in all three cases. Using social media is not related to satisfaction with learning and social interaction, process satisfaction, or product satisfaction in virtual learning environments. This is consistent with previous research that found Web 2.0 digital tools are not critical for enhancing the learning experience (Buzzard, Crittenden, Crittenden, & McCarty, 2011). Further analysis was conducted among active Facebook users, that is, those who posted to Facebook (e.g., updated status, added photos, commented on posts, etc.) more than two to three times per week. Again, a similar weak correlation that was not significant was found in all three cases. Gender differences were investigated among social media users. No significant difference was found between the means of males and females in relation to learning/social interaction, process satisfaction, and product satisfaction. Use of social media or being an active social media user of any gender did not have a statistically significant relationship with learning/social interaction, process or product satisfaction of projects completed in virtual learning environments. More research can be done to ascertain differences between social media users and nonsocial media users.

However, for this study, comparisons were not possible because the sample included most participants who were active with social media.

Open-ended comments provided additional feedback from students related to the group process for preparing written and oral assignments. Faculty provided a review of the drafts online offering suggestions for improving the assignments. Based on student feedback through an online survey at the end of each semester, participants agreed that the online process using a team approach was positive. General comments related to the survey indicated the following positive aspects for teamwork: (a) a smaller number of students per team worked better for communicating faster and more efficiently, (b) shared responsibility reduced stress, (c) varied personality types provided for a balanced team approach, (d) social skills were enhanced and honed providing students with a venue to communicate with students from diverse backgrounds, (e) workloads were evenly distributed, and (f) decision making, critical thinking, and problem solving skills were enhanced.

General comments related to the survey indicated the following negative aspects for teamwork: (a) student procrastination complicated/slowed communication, (b) not providing face-to-face meeting time in a classroom setting on a regular basis complicated receiving consistent feedback, (c) students who dropped the class did not notify team members or faculty causing member responsibilities to shift during the course, (d) students indicated a preference to select team members rather than having faculty assign members.

Open-ended comments can be useful in getting a perspective from participants who may have perceived teamwork with a negative attitude or may have experienced a less positive group environment. Faculty should monitor group progress on a consistent basis and be proactive in identifying problems that may lead to student procrastination, which can cause communication problems. For hybrid courses that meet partly on campus, faculty can take a portion of class time to have groups provide status reports on their projects. Although a team many not admit to problems in class, the quality of work submitted for evaluation gives an indication on roles played by team members in contributing to project outcomes.

Limitations

The main limitation of this study is that only one course and one survey were used for the study. However, to overcome this limitation, data were collected over four semesters using multiple sections of the course. All students were from the same college at the same university. Students' responses were based on self-perception of individual and group interaction. As a result of this design, causal inferences cannot be implied from the results. Another limitation pertains to individual group characteristics as no control was placed on frequency of group meetings. However, some groups may have chosen to occasionally meet in a face-to-face environment. To mitigate this limitation, only classes that were 100% online were selected for this study. Only one survey was used at the end of the semester, which may not have captured changes in behaviors and assessments over time. Longitudinal studies would further benefit our understanding of group processes phenomenon.

Discussions and Conclusion

In any team project the challenge for a faculty member is how to accommodate students' preference of working alone but at the same time provide them an opportunity to work outside their comfort zone to understand the nuances of teamwork so they can be productive members of a business team. As shown in this study, group work in a virtual learning environment has the potential to engage students in the development of communication and leadership skills, higher-level reasoning strategies, peer-evaluation skills, an appreciation for diverse perspectives, and an understanding of synergistic learning. This is consistent with previous work on team collaboration (McCorkle et al., 1999; Paulson, 2011; Rentz et al., 2009). The results of this study showed that students who were satisfied with learning and social interaction had a positive attitude toward the process used in their group for problem solving.

Virtual learning environments offer several advantages such as media-rich platforms, new instructional capabilities, social media integration, accommodation for varied learning styles, information literacy, career preparation, collaborative learning, and improved communication using digital technologies. Today's generation of students is more comfortable with using technology, social media, and instant messaging to help with communication and collaboration. When working on group assignments in an online learning environment, collaboration can be facilitated by using social media tools as avenues for interaction. However, the results of the study showed that using social media is not related to satisfaction with learning and social interaction, process satisfaction, and product satisfaction in virtual learning environments. In fact, in many cases students are more skilled than faculty in using these tools.

There is conflicting research on the use of social media tools in education. Some researchers have found that social media tools benefit students in learning (Moran et al., 2011). Other researchers (Poellhuber et al., 2011), and this study, showed that social media may not play a significant role in improving learning outcomes. Further research needs to investigate the types of benefits offered by different social media tools and platforms and which types of learners may benefit most from social networking tools. Based on our experience with this research, we propose what needs to be done by faculty instead is to provide an environment that is conducive to learning and a support system to help different kinds of learners. Positive attitudes toward learning can enhance students' motivation to meet course outcomes.

In this study, technology use showed a high degree of correlation to satisfaction toward learning. Participants who used technology in their group communication were satisfied with resulting learning and social interaction as well as having satisfaction toward product developed by the group. Some groups were more skilled at using technology tools (such as mobile phone apps), while others preferred using the asynchronous discussion board in the course delivery system. Sharing of these tools, especially in the initial stages of group work, can create a better learning environment where group members can experiment with what works best for their group. Group projects are good preparation for teamwork in the workforce. However, educators must be careful to avoid the law of unintended consequences. It may be possible that students

who had negative experiences in teams may develop negative attitudes toward teamwork later in the workforce. While businesses can use resources to extensively train groups for successful functioning, the process is not applicable in a classroom environment due to time limitations. Teams are usually formed around a common purpose that creates cohesion and effectiveness. Students rely on faculty members in a virtual learning environment to provide feedback on both the process as well as product.

The results of this study have useful implications for teaching and learning and can provide additional insights into managing projects in technology-based group environments. Based on this study and previous research, in order for the course environment to be conductive to learning and interaction, inputs such as communication, interaction, and feedback from the instructor affect outcomes such as student satisfaction, performance, and participation. Faculty teaching and managing online classes must implement sound, practical strategies to provide students with the tools and feedback necessary to complete assignments. Student motivation is increased when they realize that faculty are interested in their success as learners. Based on this research, some tips for implementing successful technology-based, virtual learning team environments include the following: assign teams with 4 to 5 students for ease in communicating/ arranging meeting times; write team assignments that are short and simple; provide for draft writing opportunities and constructive criticism before grading; give ample time for students to revise assignments by monitoring progress; require all team members to submit their assigned responsibilities in writing to ensure workload equality; provide students with opportunities to develop decision making, critical thinking, and problem solving skill sets; and design an evaluation process for students to evaluate the team process/members.

This research can also be used as a basis for research that can lead to findings such as best practices for successful teamwork. Further research could look at which types of technology (synchronous, asynchronous, videoconferencing, social media, etc.) are related to individual or group performance, and if use of social networks affects group psychology or sense of community. The role of teamwork across different functional areas, such as comparing business with engineering students can provide further research avenues related to attitudes and perceptions toward teamwork. As mentioned in this study, teams can be formed based on several characteristics. The role of personality traits and styles of team members, which could affect team functioning and performance specifically in virtual environments, could also be explored.

The global economy demands skills in communication, problem solving, problem identification, and linking problem solvers and problem identifiers (Holter, 1994; Tuleja & Greenhalgh, 2008). By using team projects in virtual learning environments, students are encouraged to participate in the active learning process. Educators should strive to understand opportunities and challenges of student interaction in a technology-mediated collaborative environment and design course materials with learning objectives tied to meaningful group assignments and activities. This process can improve student motivation, retention, degree of learning, and mastery of content while providing an opportunity to foster teamwork in an environment of mutual understanding and respect. This study contributes to the growing body of research on virtual

learning environments in business education, collaborative learning, and use of technology as a mediating factor in promoting collaboration in social networks.

The use of social media tools will also continue to play an important part in information literacy. Group processes today rely on the rapid exchange of information in a synchronous format. Social media tools facilitate transfer of information in an environment which is familiar to the younger generation. Enterprise course tool vendors can closely integrate social media features in their course environments by offering widgets, channels, and hooks that will allow educators to seamlessly integrate these tools into group projects. Although most participants in this study reported email to be their basic communication tool, other technology tools such as text messaging, social media, Twitter, Facebook groups, Google Docs and Hangouts (videoconferencing), Dropbox (file sharing), GroupMe (a text messaging tool), and Doodle (scheduling) were also used by several groups. Further research needs to examine which tools will contribute most to effective learning and social interaction that can result in positive experiences with group processes and product development that maximize student success.

Appendix

Investigating Group Processes in Virtual Learning Environments

Instructions. The purpose of this survey is to investigate your perceptions about group work in online courses. Please select the most appropriate option for each statement given below as it applies to the group project you are in the process of completing (or have completed) this semester.

There is no right or wrong answer for any question.

I. Demographic Questions:

(i) For which course are you filling out this survey

_____ABED3100—Business Communication N01
_____ABED3100—Business Communication N02

(ii) Who is your instructor?

_____Prof. Hazari   _____ Ms. Thompson

(iii) Please select your gender

___ Male   ___ Female

(iv) Please enter your age in years: _____

(v) Before taking this course, did you previously take a course that was 100% online?

___ Yes   __No

(vi) Which online technology tools (such as CourseDen, Chat, GotoMeeting, Doodle, Twitter, etc.) did you use for your group work? Please list any tool and/or website that you used at least once for the project. _____

(vii) Do you have a Facebook account?

     ___ Yes   __ No

(viii) Do you have a Twitter account?

     ___ Yes   __ No

(ix) If you use social media websites (such as Facebook, Twitter, etc.), how many times during the week do you use a social media website?

     ___ less than once per week
     ___ once a week
     ___ 2-3 times a week
     ___ once a day
     ___ several times each day

Any additional comments? (such as what you liked/disliked about online group work)

II. Please indicate your extent of disagreement or agreement to the following statements by checking the appropriate box

	SD	D	U	A	SA
LEARNING AND SOCIAL INTERACTION					
Seeing work of other students in my group has helped me with my learning					
Participation in online group work has increased my confidence in my potential to succeed in the workplace					
Knowing that other students would read my work motivated me to produce better quality work					
I will retain more information as a result of completing this project as a team effort					
Participation in my group project helped me develop social relationships with my group members					
I like participating in group projects					
I prefer classes that use group projects over classes that do not use group projects					
Participating in group projects has helped develop my communication/time management skills					
My contribution to the group helped other students learn					

(continued)

	SD	D	U	A	SA

PROCESS SATISFACTION

My experience with the group project during the semester was satisfactory

In group projects, individual contribution should count more than team contribution

Participating in group projects with other students was a productive use of my time

My group's problem solving and decision making process was efficient

My group worked well together with conflicts that were easily resolved

I was sometimes reluctant to participate in group discussions because of the behavior of other group members

PRODUCT SATISFACTION

The quality of completed group project would have been better if I had worked on it individually

My group created (or is in the process of creating) a quality product that meets my satisfaction

I am committed to the content and format of my group's final product

I am confident that my group's final project will get a high score

My group's final project meets or exceeds project requirements specified in the project instructions

My group's final project does not reflect my input

TECHNOLOGY

I believe the use of technology facilitates working in group assignments

I believe using Social Media tools (such as Facebook, Twitter, etc.) can make course related group work more productive

My group used technology tools (such as email, web) effectively to plan meetings

After meetings my group used technology tools (such as email, web) effectively to discuss/share/follow-up information about what was discussed in group meetings

Online videoconferencing group meetings can be as productive as face-to-face group meetings

Authors' Note

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