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Success in Learning Groups: Where have we been? And Where are we going?

By

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Success in Learning Groups: Where have we been? And Where are we going?

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Abstract

Group discussion activities and collaborative projects for teams are some learning strategies widely used by instructors; however, limited research has examined comparative effects of these strategies. The present study examines collaborative learning activities, trust, the “bad apple” effect, and other variables that relate to learning effectiveness for teams. The paper summarizes several years of research on different collaborative activities across different team settings. It also presents an agenda for future research in team training and learning, and provides best practices and guidelines for both researchers and practitioners. With a growing focus on the importance of teamwork and collaboration in the workplace, it is critical that we better understand best practices for promoting learning effectiveness for individuals who work in groups. This research paper offers an examination of collaborative learning activities and group learning effectiveness, while also providing practical suggestions, based in research, for facilitators and training specialists.

Introduction

Collaborative Learning

During the past two decades, there has been a large increase in the use of small groups in college-level teaching (Michaelsen, Knight, & Fink, 2004). One cause for this increase in the use of groups is due to a change in students' preferences for teaching styles. Students want a learning experience that is more than the traditional lecture or "information dumping" style; students learn when they seek understanding, as opposed to simply retaining surface-level information (Barkley, Cross, & Major, 2014). Many education systems are investing in restructuring their traditional styles into a more collaborative learning environment, including even restructuring classrooms to better utilize technology and collaboration (Ryan, 2016).

In the 1980s and 1990s, small group learning in the educational setting grew from common and casual use to more structured use and was given the name "collaborative learning." This movement involved making changes to course structures to focus on implementing small group activities into current lessons and lectures. The degree to which faculty use and focus on small group learning varies; for example, "team based learning" is one instructional strategy that makes small group work the primary in-class activity, utilizes team development, and creates cohesive teams by maintaining the same group members for increased periods of time to work together (Michaelsen et al., 2004).

A second cause for this increase in use of small groups in college teaching is due to a stronger urge from employers for colleges to focus on relevant social interactions and problem solving skills, in addition to the college education content knowledge. As the workplace continues to shift toward a more collaborative environment, where working in small groups and teams is replacing the traditional "cubicle work," we can expect colleges and the education

system to change alongside the workplace, as colleges are faced with the responsibility of preparing students for the work world (Michaelsen et al., 2004).

The purpose of group work in classrooms and workplaces is to trigger specific learning mechanisms by performing collaborative learning activities (e.g. group projects, disagreement, idea sharing, problem solving) (Michaelsen et al., 2004; Dillenbourg, 1999). Collaborative learning describes a situation in which certain interactions within group members are expected to occur in order to hopefully trigger learning mechanisms that would not occur in individual learning (Dillenbourg, 1999). As its popularity and use in the classroom and in the workplace continues to grow, it is important for practitioners to focus on ways to increase the probability that these team interactions are both frequent and meaningful.

Current research literature on collaborative learning contains a broad array of definitions of what exactly is meant by “learning” (Dillenbourg, 1999). Most commonly, collaborative learning usually includes any group activity within an educational context and joint problem solving. Barkley and colleagues (2014) define “collaborative learning” using three key components: 1) it must involve individuals or students working together (co-laboring), 2) it must involve an intentional structure, and 3) it must contain purposeful, meaningful learning, where students increase knowledge and deepen their understanding. The definition used in this paper comes from De Hei, Strijbos, Sjore, and Admiraal (2015) who define collaborative learning as “methods whereby students are encouraged or required to work together on learning tasks.” (De Hei et al., 2015, p. 233).

Benefits of Collaborative Learning

Interdisciplinary research has identified numerous benefits of using collaborative learning strategies and activities (Johnson & Johnson, 1989; Michaelsen et al., 2004; Barkley et al., 2005; Dillenbourg, 1999). According to a meta-analysis of the effects of collaborative learning by Springer, Stanne, and Donovan (1999), collaborative learning correlates positively with cognitive learning outcomes (better grades in courses, exams, projects, etc.). In other words, students who learned in small groups demonstrated greater achievement than students who did not. These students showed greater achievement scores on exams and grades, and persisted through STEM (science, technology, engineering, math) courses further than non-collaborative learning students. One meta-analysis examining research in college STEM courses found students who worked together in collaborative learning environments learned considerably more than students working alone (Johnson & Johnson, 1989).

Collaborative learning allows students to solve more challenging and complex problems than if they were working individually (Michaelsen et al., 2004). For example, a group of students working together is more likely to combine different ideas and critical thinking skills to complete a large class project than one student working individually could produce on his or her own. One study found that students who participated in collaborative learning had performed significantly better on critical-thinking tests than students who studied individually (Gokhale, 1995). Groups and teams are more suitable for complex tasks because they allow members to share the workload, hold other group members accountable, and develop and contribute expertise on subtasks (Mathieu, Heffner, Goodwin, Salas, & Cannon-Bowers, 2000). In other words, utilizing collaborative learning activities such as group projects and group discussions allows students to accomplish more by working together than they would accomplish individually.

Collaborative learning also makes classes more active and participative, instead of passive. For example, when group members are asked to complete a group project related to a lecture topic, they are better able to integrate what they have learned into something tangible and “hands-on.” The biggest difference here is that students are committing different types of effort to learning; so instead of simply memorizing facts and information individually, students make connections and learn to problem solve with others (Michaelsen et al., 2004). This type of learning makes the experience overall a less isolating one, and more of a social one. This foundation of learning stems from Bandura’s Social Learning theory which explains how students learn by actively making connections and organizing them into meaningful concepts, and through interacting and imitating others. Collaborative learning gives students access to both making cognitive connections and interacting with others (Bandura & Walters, 1977; Barkley et al., 2014). Further, utilizing various collaborative learning activities adds variety to class, and can make it more interesting and engaging for students (Michaelsen et al., 2004). Collaborative learning and group work allows students to learn through example and practice, as opposed to simply listening (Watson, 1992).

Finally, there is a great deal of evidence to support the notion that students who participate in collaborative learning versus traditional lecture have more positive attitudes toward the subject, have increased motivation to learn more, and are more satisfied with their experience in the classroom (Barkley et al., 2014). One study that examined 143 college students’ perceptions of group work found that most students reported favorable impressions toward group work – approximately 90 percent of the sample agreed that they learned more from group work and from their group members, 97 percent agreed they were able to contribute to the project in a meaningful way, and 85 percent agreed that the experience will help them work on teams in the

future (Payne & Monk-Turner, 2006). Finally, one meta-analysis by Johnson & Johnson (1989) found that students who work in group-settings enjoyed the class subject more, had higher levels of self-esteem, and were more inclusive and accepting of diversity. Further, diverse groups provide a high learning potential for peers and groups, and tend to show higher creativity and performance than homogenous groups (Curseu & Pluut, 2013).

Problems with Collaborative Learning

Despite the various benefits shown in collaborative learning research, there are still some problems with collaborative learning. One of these disadvantages is that students learn at different rates, so combining students with different learning speeds into one group can be problematic. Another common problem classroom groups face is an unfair division of work, where some students fail to pull their weight and other students end up completing all the work. These “slackers” can be referred to as “bad apples” or toxic group members (Wellen & Neale, 2006). Additionally, often student group discussion activities can get off topic and waste time (Barkley et al., 2014). Some groups also have a harder time getting along than others – whether this is a result of clashing of personalities or unequal division of work is unknown. Researchers have not yet examined the characteristics of these bad apples, or focused in on the problems they cause in work environments. Further research on these toxic group members is needed to help solve these common problems that group face.

Another risk that comes with utilizing collaborative learning activities in the classroom are potential negative student perceptions. One study examined perceptions of collaborative learning in associate degree students in Hong Kong and found that although the participants generally had positive attitudes about collaborative learning, about half of them felt that this type of learning could not help them with tests or examinations (Shek & Shek, 2013). Additionally,

another study found that 40 percent of the sample agreed that they had a slacker in their groups, a third disagreed that the group members contributed equally, and about a third of the sample said they do not look forward to future group projects, and more classes should not use group projects (Payne & Monk-Turner, 2006).

Additionally, instructors and facilitators of collaborative learning techniques may also have negative perceptions of collaborative learning, and be hesitant to utilize this method. Instructors tend to have 1) no clear vision on how they could compose effective groups, 2) limited knowledge of research and theoretical perspectives on collaborative learning, and 3) limited knowledge on how to translate theoretical and empirical findings into a practical application of collaborative learning (De Hei et al., 2015). Although the majority of group-work and collaborative learning research suggests students and instructors perceive collaborative learning positively, there are a variety of hindrances that can interfere with students having a positive experience working with others in the classroom. Recommendations for dealing with these hindrances or potential pitfalls of collaborative learning can be found in section three *Recommendations for Practitioners*.

Collaborative Learning Strategies & Activities

A variety of collaborative learning strategies exist, but the premise behind them remains the same: use group work to encourage learning and problem solving. In educational settings, the use of small groups often occurs casually, whereby a teacher may informally pair up students near each other to discuss a lecture point. This strategy can be used in classes of any size, and requires very little planning in advance. However, this is the weakest form of collaborative learning, as students are often confused by the intent of the collaborative learning activity and are

not given enough information to structure their own behavior and role in the group activity (Greenberg, Greenberg, & Antonucci, 2007).

Collaborative learning activities can range from large-scale projects to group discussion following a lecture. These activities are designed to elicit different learning mechanisms. Activities include: joint problem solving, collaborative projects, computer-supported collaborative learning, and group discussion (Michaelson et al., 2004). Barkley et al. (2014) describe six categories of general learning activity types, which can be found in Table 1 below. In their guide for college faculty, *Collaborative Learning Techniques: A Handbook for College Faculty*, Barkley and colleagues identify thirty-five specific collaborative learning tasks that can be implemented in student learning groups. It also identifies the amount of time each task will take, group type (long-term or short-term), and the optimal number of group members required for each task (Barkley et al., 2014).

Table 1: Collaborative Learning Task Categories

Category	Description
Discussion	Student interaction and exchange is achieved primarily through spoken words
Reciprocal Peer Teaching	Students purposefully help each other master subject matter content and develop discipline-based skills
Problem Solving	Students focus on practicing problem-solving strategies
Graphic Information Organizers	Groups use visual tools to organize and display information
Writing	Students write to learn important course content and skills
Games	Students work together in teams to participate in a competitive activity that is guided by a preexisting set of rules

Theoretical Models of Effectiveness

In this paper, we will be examining the effectiveness, or success, of student learning groups. To help conceptualize this, this research will be organized around the input-process-output (I-P-O) model formulated by McGrath (1964; Gladstein, 1984; Salas, Dickinson, Converse, & Tannenbaum, 1992). This model was chosen because of the process-like nature of training and learning. In this model, the *inputs* refer to the composition or characteristics of the team or student working group, *processes* refer to activities that team members engage in (collaborative learning activities), and *outputs* refer to measures of success of the team, which can include performance measures (ex: letter grades), meeting team-member needs, and willingness of members to remain in the team (Kozlowski & Ilgen, 2006). In this paper, we will explore four inputs: trust, perceived similarity, and “bad apples” or negative group members, and learning environment (online v. face-to-face). We will examine how these inputs are related to outputs, or success or learning group effectiveness, which is operationalized as containing overall course grades, group discussion/project grades, student satisfaction, and student motivation. The final section of this paper gives recommendations to practitioners for ways in which they can influence the *process* of collaborative learning through collaborative learning activities, and ways in which they can ultimately affect the success of student teams through paying attention to group and individual composition and characteristics.

Research Questions

1. How does trust impact student learning group effectiveness?
2. How does perceived similarity impact student learning group effectiveness?
3. How do “bad apples” impact student learning group effectiveness?

4. How does the learning environment (online versus face-to-face) impact student learning group effectiveness?
5. What are ways in which faculty, training facilitators, and other practitioners can positively influence a group's effectiveness?

For the purposes of this paper, *effectiveness* will be defined in three subparts. 1) Student *motivation* to work in student learning groups in the future, 2) Student *satisfaction* with the learning group experience overall, and 3) Student *performance* in the project or discussion and in the class overall (measured with letter grades). Specific measures for these three subparts of *effectiveness* will be further explained in the methods section of this paper.

Factors That Influence Collaborative Learning

Trust

One factor that can influence the processes of a student learning group and has an impact on its effectiveness is trust. Trust is an essential component that group members must have in order to work together effectively and efficiently. If a team lacks trust, team members can lose sight of the goals and interests of the team to instead focus on personal interests (De Jong, Dirks, & Gillespie, 2016). Trust is most commonly defined in the current literature as “the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that party” (Mayer, Davis, & Schoorman, 1995, p. 712).

There are three main components of this definition provided by Mayer and colleagues (1995). First, trust requires the trustor to feel like he or she knows the intentions and future behaviors of other parties. Second, trust can only be present in an environment where there is risk and uncertainty. Third, trust inherently means that an individual must rely on others for

something (Huff, Cooper, & Jones, 2002). For example, if a group of students are assigned to complete a large group project, the team members within that group will perform better if each individual feels confident that he or she can let go of control, so to speak, and *trust* or rely on the other members to do their equal part of the project.

Trust is one “input” or factor that has been shown in the literature to lead to team effectiveness, especially in student learning groups (Huff et al., 2002; Serva & Fuller, 2004). If a student learning group has a trusting atmosphere, individuals are more likely to exert greater effort and motivation, be more satisfied with their relationships, and experience positive attitudes toward group work (Huff et al., 2002). Additionally, trust allows for students to express their thoughts, feelings, reactions, opinions, information, and ideas openly without fear of reprisal or backlash from their teammates (Johnson & Johnson, 1989). In other words, students in trusting groups will feel more open about sharing ideas without the threat of being called “stupid” (Lacewell, 2015). Trust is especially important in student learning groups where individuals with a lack of shared history must form trusting relationships with their team members quickly, due to the temporary nature of the group. Often groups are put together for short time periods, perhaps just for one project; group members must trust “presumptively” based on their initial judgments (Meyerson, Weick, & Kramer, 1996). Trust traditionally arises in two ways, via cognitive trust or affective trust. Cognitive trust is based on the assessment of the other person’s integrity and ability, and is usually a judgement of the other person’s competence, whereas affective trust is the result of social bonds, benevolence, and emotional ties with the other individual (Greenberg et al., 2007).

There is a breadth of literature indicating that trust impacts groups in various ways. For example, one study found that when a group has greater trust, the group members are also more

likely to demonstrate more effort and motivation (Huff et al., 2002). Costa (2003) found that teams with greater trust had higher levels of task performance and greater team satisfaction. In addition to higher performance, greater effort and motivation, trust has also shown to have a link with greater creativity, group cohesion, and better communication (Staples & Webster, 2008). Previous research on trust is clear that there are positive outcomes and benefits of groups that have greater trust within their teammates. Because of these benefits, trust should continue to be a focus for faculty, workplace training personnel, and other practitioners. Although research on trust has proven to show positive outcomes for groups, there is much room for current scholars to continue this work in student learning groups.

Perceived Similarity

In addition to trust, perceived similarity also plays a major role in student learning group effectiveness. Previous literature indicates that similarity is an important interpersonal factor related to learning group performance, and the more individuals in a group believe they are similar, the more likely that trust will develop (Newman, 2006). Perceived similarity is the idea that an individual and his/her team members view the individual as similar to the group on characteristics, such as background, ability, etc. (Graves & Elsass, 2005). Across various relationships, including relationships between classmates, individuals prefer to interact with others who are most similar across a variety of domains (Sacco, Bernstein, Young, & Hugenberg, 2014).

This phenomenon is based in the theory called the Similarity Attraction Paradigm which states that individuals are attracted to others who are most like themselves (Byrne, 1971). This similarity can be in attitudes, demographics, personality, physical attractiveness, etc. Of these constructs, attitude similarity has been one of the strongest influences on a person's attraction to

another individual (Berscheid & Walster, 1969). In other words, individuals are more likely to be attracted to others that share similar attitudes, ideas, and opinions. This attraction and positive emotionality towards others who are like oneself will likely influence the trust between parties (Byrne, 1971). When students with no prior connection are put into a short-term group, they most often use cues such as behaviors and first impressions to judge trustworthiness because they have no other information about group members' personalities or characters (Meyerson et al., 1996). In other words, individuals who find that their group members are like them based on attitudes, beliefs, intelligence, or physical characteristics are more likely to form trusting relationships, and therefore have greater achievement and more positive attitudes toward their team members and toward the collaborative learning process.

Perceived similarity has implications for student learning groups, as research has shown that not only do students perform better when placed in similar groups, but they also prefer it and have a tendency to group themselves with others based on objective attributes such as race, age, and gender (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987). However, these findings do raise implications for diversity within groups. Shouldn't practitioners form groups with different backgrounds, ages, ethnicities, etc. in order to facilitate different ideas and perspectives? It depends. Diversity in teams has been described as a "mixed blessing" because although it contributes to gains in performance, it also adds the potential for process loss by possibly creating "faultlines," which are hypothetical divisions that separate group members into smaller groups (Forsyth, 2013).

The "Bad Apple" Effect

Another factor that has shown evidence of impacting learning group effectiveness is the presence of a negative group members, slackers, or what this research refers to as "bad apples,"

single group members who behave uncooperatively, and engage in counterproductive work behaviors, which are behaviors that are harmful to the organization by directly affecting its functioning or property, or by hurting employees in a way that will reduce their effectiveness (Fox, Spector, & Miles, 2001). In this paper, we will be using a definition from Felps, Mitchell, & Byington (2006) which defines bad apples as “individuals who chronically display behavior which asymmetrically impairs group functioning” (Felps et al., 2006, p. 180). More specifically, negative group members or bad apples are individuals who consistently exhibit one or more of the following behaviors: 1) Withholding effort from the group, 2) Expressing negative affect, or 3) Violating important interpersonal group norms (Felps et al., 2006). This triple-threat combination becomes especially toxic when these bad apples are placed within other group members. A bad apple differs from a typical devil’s advocate, controlling member, or loner, because they express these three behaviors, whereas a devil’s advocate may not withhold effort or have negative affect.

A prime example of the bad apple effect would be a situation where a group of students are working on a group presentation and one student consistently shows up late to group meetings, does not do his or her fair share of the work, and has a poor attitude during his social interactions with other group members. Previous research on these singular group members suggests that the presence of just one bad apple can have a significant impact on the willingness of other group members to act cooperatively (Kerr et al., 2009). In other words, as the proverb goes, “one bad apple spoils the whole barrel.” In this case, the “barrel” is the team environment or team dynamic (Kish-Gephart, Harrison, & Trevino, 2010).

Bad apples typically display “deviant behavior” – behavior that diverges from work norms and has negative implications for other group members (Wellen & Neale, 2006). Although the

specific behaviors may vary slightly from group to group, the effect or perception of this bad apple behavior is consistent and toxic. One study that examined the role of race, age, and slacking in group work among college students found that working with slackers or bad apples is the factor that has the strongest influence on attitudes about group work (Payne & Monk-Turner, 2006). Although the idea that one group member can be toxic or detrimental to a group's success is not new, the degree to how this happens and how detrimental it can actually be is an area for future research. Although there are many recommendations for dealing with negative group members (see section three, *Recommendations for Practitioners*), often group members do not know how to effectively respond to their behavior, and these toxic individuals may often have seniority, political connections, or certain expertise that can make it hard to address for group members (Felps et al., 2006).

This “bad apple effect” can be detrimental for the effectiveness of groups. One way in which bad apples impact team effectiveness is through their influence on team cohesion, or the overall attraction or bond amongst group member (Forsyth, 2013). The presence of a deviant group member has shown to reduce perceptions of both task and social cohesion of the team as a whole (Wellen & Neale, 2006). Research in small groups has shown that task and social cohesion play a major role in the effectiveness of teams and whether they accomplish their goals.

One study found that students who reported working with a slacker (bad apple) were: 1) Less likely to agree that they had learned more from the project than they would have from another project, 2) less likely to agree that students contributed equally, 3) less likely to look forward to future projects, 4) more likely to say that they did most of the work, and 5) less likely to agree that they learned from fellow group members, or that the group members learned from them (Payne & Monk-Turner, 2006).

One theory behind why these bad apples can have such a strong impact on a group stems from a theory in cognitive psychology called the “negativity bias” which explains that we naturally focus on and remember negative behaviors, situations, and individuals (Wellen & Neale, 2006). Additionally, our brains are wired in a way in which we tend to remember extreme behaviors more than moderate. For these two reasons, bad team members’ actions tend to stand out even more, making their effect on team effectiveness that much more salient. This explanation helps us understand the reasons behind why uncooperative group members cannot be “cancelled out” or remedied by the presence of a few cooperative group members or even positively deviant group members (Kerr et al., 2009). A second theory behind the “bad apple effect” is the Similarity-Attraction Paradigm (Byrne, 1971). One study by Wellen and Neale (2006) found that teams with high perceived similarity rated the group as less socially cohesive with a group deviant.

Bad apples are not only perceived as less similar to other team members, but are also less likely to be selected as group leaders, perceived as being less capable, and are perceived as being less likable or socially attractive when compared to normative (non-deviant) individuals (Wellen & Neale, 2006). Other group members often recognize the bad apples and “punish” their behavior through socially excluding and ostracizing them (Kerr et al., 2009). Further measures to help combat the toxic effect that bad apples can have on other students can be found in section three, *Recommendations for Practitioners*.

Online Learning Groups

In addition to trust, perceived similarity, and the “bad apple effect,” another factor that influences the effectiveness of a student working group is the learning environment in which the group is working. Specifically, the most common learning environments for student groups are

either in the classroom face-to-face, or online as virtual teams or e-teams. Rapidly changing business demands, and the increase of information technology has led to virtual work becoming increasingly important in organizations and universities (Davidson, Belanger, Ahuja, & Watson-Manheim, 2006). An online group is defined as having three characteristics: 1) No shared history or anticipated future between members, 2) includes diverse members that are separated geographically, and 3) necessitates the group members to interact electronically (Davidson et al., 2006). Online groups are somewhat similar to student learning groups in that they are usually temporary groups made up of individuals with limited history and different backgrounds coming together to complete a task (Ennen, 2014).

As these online groups are becoming increasingly popular throughout organizations and learning institutions, it is important that practitioners understand the issues that are unique to online learning groups and how to best facilitate them. For example, an important factor to the success of teams is communication, and many instructors feel that communication is much more difficult when the students cannot meet in person (Ekblaw, 2016). Research shows that students in online groups desire relationships with group members more than on-campus students (Wade, Cameron, Morgan, & Williams, 2011). Additionally, because online group members never interact in person, trust may develop differently than in face-to-face groups (Jarvenpaa & Leidner, 1999). Trust is a necessary condition to create active interactions between individuals and facilitate productive learning processes and outcomes, especially in online learning (Nam, 2014).

It is clear that online student learning groups face certain challenges that face-to-face students may not encounter. It is important for faculty, training professionals, and other practitioners to be aware of these differences and how they may interfere with the collaborative

learning process. Further, Ekblaw (2016) emphasizes how essential it is for online teams to be properly prepared and supported, especially when working with new online tools and systems, otherwise any cohesiveness within the group may shatter (Ekblaw, 2016). These recommendations for how to properly prepare for an online group can be found in section three, *Recommendations for Practitioners*.

Methods

In analyzing the effects of perceived similarity and trust, archival data was collected from previous research studies (Ennen, 2014; Lacewell, 2015) and unpublished data from Fall semester 2015 courses. Each of these studies examined data from undergraduate students in psychology courses at a medium-sized Midwestern University including Research Methods, Social Psychology, History and Systems in Psychology, and Psychology and Law. This sample contained 404 total participants, of which, 56.9% were female, and 69.5% were Caucasian. The age of the students ranged from 17 to 64, but the majority of the respondents (71.3%) were from ages 18 to 23. At the beginning of the semester students were assigned to a project or a discussion group, where they completed demographic items, familiarity and liking for group work items, and perceived similarity measures. Throughout the semester participants completed required tasks to work toward their project or discussion in the learning groups. At the end of the semester, the students were asked to complete the trust measure, and were also asked questions regarding general affect, satisfaction with the group, and their motivation to work in groups in the future. Students grades were collected for the overall group project and/or the average grade on the discussion and lab activities.

Measures

Demographics

Demographic information, such as the participant's sex, age, GPA, SAT/Act score, Ethnicity, and academic year was collected across three academic semesters from 2014 to 2015. In addition, the participant's university ID was collected to link the participants' responses throughout the data collection. Participants also answered questions relating to their previous experiences working in a group setting. Example items include: "How much experience do you have working in a team setting?" and "Rate the extent to which you enjoy working in groups on course projects." In addition, some of the questions included group work in a virtual environment, such as "How often have you worked on projects communicating with people mostly through technology (using e-mail, chat, group systems software, etc.)?" See appendix A for this questionnaire.

Perceived Similarity

Perceived similarity was measured by using one item from the Perceived Relational Diversity scale developed by Clark (2001). Participants were asked about the perceived similarity of their group at the beginning of the semester. This measure asks participants to indicate how similar they believe they are to their group members on a five-point scale from "1- not at all similar" to "5- highly similar" by asking, "Please rate your overall (considering all aspects) similarity to your group members." The mean of the responses was 3.51, with a standard deviation of .75, $n=335$. Further details on this item can be found in Appendix A.

Trust

The trust survey includes two different measures: one by Costa and Anderson (2010), the other adapted from Mayer et al., (1995). The measure by Costa and Anderson (2010) measured

four different aspects of trust: propensity to trust, perceived trustworthiness, cooperative behaviors, and monitoring behaviors. To make the survey more relevant to the student project group environment, the word “team” in the items was replaced with “project/discussion group.” These items were rated on a seven-point scale, from 1 “Completely Disagree” to 7 “Completely Agree.” Four items were used from the Mayer et al. (1995) measure. An example of one of the items is as follows, “If I had my way, I wouldn’t let the other team members have any influence over issues that are important to the project.” These items were rated on a seven-point scale, from 1 “Completely Disagree” to 7 “Completely Agree.” Refer to Appendix C for all of the trust items.

For this study, overall trust scales were computed from the abovementioned trust measures at the end of semester time period. Trust items 10, 11, 16, 17, 19, 20, 21, 22, and 24 were reverse-scored before computing the overall scale variable. All trust items were out of a 1-7 agreement scale, with higher numbers corresponding to higher levels of trust. The trust measures were computed by adding all 25 of the trust items together, with the adjusted reverse-scored items. For this trust measure, the mean was 124.91 with a standard deviation of 18.19, $n=183$. The reliability for this scale was good, $\alpha=.89$.

Satisfaction with Group Experience

How satisfied students were working in their groups was measured using the Team Satisfaction Scale developed by Park and DeShon (2010). This measure was adapted to fit this study, by replacing “team” with “project/discussion group.” This measure included four items, on a scale ranging from 1 “extremely dissatisfied” to 7 “extremely satisfied.” An example of an item from this scale is “All in all, how satisfied are you with the members of your project/discussion group?” Refer to Appendix D for the Satisfaction and Motivation items.

The scale for the outcome measure of satisfaction with one's group were computed by adding the 4 items on group satisfaction. These items were rated on a 1-7 satisfaction scale, with higher numbers indicating higher levels of satisfaction. The mean for the satisfaction scale was 23.32, with a standard deviation of 4.00, $n=187$. This scale showed good reliability, $\alpha = .91$.

Motivation

Individual motivation to work in groups in the future was measured with one item created by the researchers of this study. The item reads "Because of this group experience, I am motivated to work in project/discussion groups in the future." This item is on a scale from "1" Strongly Disagree to "5" Strongly Agree. The mean for this item was 3.58, with a standard deviation of 0.95, $n=253$.

Individual Performance on Cognitive Learning Outcomes

The grades that the individual received on either the group project, the lab activities, or the group discussions were used to determine the individual's effectiveness. These grades were computed on a scale from 0 to 100. The mean of the project/discussion grades was 88.84, with a standard deviation of 16.62, $n=393$. Additionally, overall course grades were also used to determine individual effectiveness or performance. These grades were also computed on a scale from 0 to 100. The mean of the overall course grades was 85.58, with a standard deviation of 11.04, $n=355$. Descriptive information for all variables measured in this research is explained in *Table 2*.

Table 2: Descriptive Information for All Variables

Measure	Number of Items	N	Mean	Standard Deviation	Cronbach's α
Trust	25	183	124.91	18.19	.89
Satisfaction	4	187	23.32	4.00	.91
Motivation	1	253	3.58	.95	-
Project/Discussion Grade	1	393	88.84	16.62	-
Perceived Similarity	1	335	3.51	.75	-
Overall Grade	1	355	85.58	11.04	-
Negative Affect	10	145	18.64	6.13	.85

Bad Apple Measure

To identify the bad apples in the groups, a 6-item measure was created to attempt to incorporate the three behavioral markers of a bad apple according to Felps et al. (2006), which include lack of effort, negative affect, and disrupting interpersonal group norms. The six items included:

1. "How satisfied are you with your effort in this course (or section)?" (7-point Likert scale from extremely dissatisfied to extremely satisfied)
2. "How many class (or section) sessions did you miss (circle one)? (0, 1, 2, 3, 4, 5, More than 6)
3. "In my studies I set goals and have a high degree of initiative." (5-point Likert scale, 1=strongly disagree, 5=strongly agree). Neg Affect mean score, 17.4, SD=6.2.
4. Negative Affect composite score

- a. The Positive and Negative Affect Schedule (PANAS, Watson et al, 1988). Scores range from 10-50.
 - b. The trust measure consisted of the 10 negative affect items in the scale. For this negative affect measure, the mean was 18.64 with a standard deviation of 6.13, $n=183$. The reliability for this scale was good, $\alpha=.85$. This measure can be found in Appendix B.
5. “Rate the extent to which you enjoy working in groups on course projects:” (5-point Likert scale, 1=Not at all, 5= Very much).
 6. “Rate the extent to which you enjoy working group discussions in your courses:” (5-point Likert scale, 1=Not at all, 5= Very much).

Participants were given a “point” for each item they scored highly on. For example, all participants who had a greater than a 29.8 score (higher than 2 standard deviations) on the Negative Affect scale were given 1 point. Participants with 3 points or higher were identified as a bad apple. Based on this method, 3 bad apples were found in the 36 total groups surveyed.

Results

Research Question 1: How does trust impact student learning group effectiveness?

The purpose of the first research questions is to address how trust within groups impacts student learning group effectiveness (satisfaction, motivation, and performance). A Pearson’s correlation was used to test this research question. The Pearson’s correlation results showed a significant relationship between trust and overall group satisfaction, $r=.704$, $p<.001$, meaning groups who had higher levels of trust reported higher levels of satisfaction with their group experience overall. Additionally, the results showed a significant relationship between trust and

students' motivation to work in project/discussion groups in the future, $r=.451, p<.001$. Finally, results from a Pearson's correlation showed a significant relationship between trust and project/discussion grades, $r=.226, p<.01$, but were insignificant for overall course grades, $r=.068, p=.36$. One reason trust might not have shown a significant relationship with overall course grades is because a significant part of the overall grade was attributed to individual effectiveness, rather than group-level outcomes.

Research Question 2: How does perceived similarity impact student learning group effectiveness?

The purpose of this question was to assess if the degree to which students perceive that their group members are similar to them has an impact on the overall group's effectiveness (individual satisfaction, motivation, and performance). Results from Pearson's correlations showed a significant relationship between perceived similarity and overall satisfaction with group experience, $r=.170, p<.05$. In other words, students who felt that their group members were similar to them reported higher levels of satisfaction with their experience working with the group members. Correlation results also showed a significant relationship between perceived similarity and students' motivation to work in groups in the future, $r=.279, p<.001$.

In addition, results from the analysis supported previous research with a positive relationship between perceived similarity and trust, $r=.217, p<.05$. In other words, students who perceived themselves as similar to their group members reported significantly higher levels of trust toward their group. This finding supports the Similarity Attraction Paradigm discussed earlier in the paper (Byrne, 1971). However, the results showed an insignificant, direct relationship between perceived similarity and final grades received on the project or discussion, $r=.029, p=.604$, and perceived similarity and overall course grades, $r=-.015, p=.808$. This means

that the level of perceived similarity students reported among group members had no significant, direct impact on their overall performance in their discussion/group grades or in their overall course grades, which does not support previous research. However, this does not necessarily mean that perceived similarity has no effect whatsoever. Rather, perceived similarity contributes directly to trust, so most likely there is an indirect relationship happening.

Research Question 3: How do “bad apples” impact student learning group effectiveness?

The purpose of this research questions was to further understand the impact that bad apples or negative group members can have on student learning group effectiveness (satisfaction, motivation, and learning outcomes). Out of 36 total groups, three groups were identified as having a single bad apple present. Results from independent samples t-tests indicated groups *without* the presence of a bad apple ($M=23.70$, $SD=4.30$) were significantly more satisfied with their group experience overall when compared to groups *with* a bad apple ($M=20.27$, $SD=5.50$), $t(66)=-2.31$, $p<.05$). Additionally, results showed that groups without a bad apple ($M=3.56$, $SD=.72$) reported greater levels of perceived similarity within the student learning groups when compared to groups that had a bad apple present ($M=3.12$, $SD=.86$), $t(149)=-2.33$, $p<.05$). In other words, groups that had just one negative group member present felt significantly less satisfied at the end of their group experience, and felt significantly less similar to their group than groups without such members.

The results from independent samples t-tests indicated that there was no significant difference in levels of trust between groups with a bad apple ($M=115.89$, $SD=12.40$) and groups without a bad apple ($M=125.62$, $SD=19.07$), $t(65)=-1.48$, $p=.14$). Additionally results indicated that there was no significant difference in levels of motivation to work in groups in the future between groups with a bad apple ($M=3.06$, $SD=.77$) and groups without a bad apple ($M=3.48$,

$SD=.99$), $t(127)=-1.61$, $p=.11$). Further, the results of the t-test also showed no significant difference when it came to cognitive learning outcomes. Groups with a bad apple ($M=96.11$, $SD=9.52$) and groups without a bad apple ($M=95.20$, $SD=9.65$) showed no significant difference in regards to project or discussion grades, $t(126)=.312$, $p=.76$). Additionally, groups with a bad apple ($M=85.17$, $SD=12.65$) and groups without a bad apple ($M=87.60$, $SD=11.25$) showed no significant difference in regards to overall course grades, $t(126)=-.71$, $p=.48$). One explanation for this could be that two of the three bad apple groups were online groups, which we know are prone to lower levels of trust, motivation, and cognitive learning outcomes from the analysis from Research Question 4. These results may also be due to the lack of power in the analysis due to the small sample size (N bad apple =9; N no bad apple = 58).

Research Question 4: How does the learning environment (online versus face-to-face) impact student learning group effectiveness?

The purpose of this research question was to determine if there were differences in student learning group effectiveness (satisfaction, motivation, and performance) between online groups and face-to-face groups. Results from independent samples t-tests indicated that students working in face-to-face groups reported significantly higher levels of overall satisfaction ($M=24.18$, $SD=3.22$) than virtual groups ($M=22.01$, $SD=4.71$), $t(110.48)=-3.73$, $p<.001$. The Levene's Test was significant here, showing that online groups and face-to-face groups do not share equal variances, $F=12.18$, $p=.001$. Thus, degrees of freedom were adjusted to correct for this problem. Additionally, further results showed that face-to-face groups reported higher levels of motivation to work in collaborative groups in the future ($M=3.69$, $SD=.90$), when compared to virtual groups ($M=3.33$, $SD=1.02$), $t(250)=-2.73$, $p<.01$. These results show that student learning

groups that met in person, face-to-face, reported higher group satisfaction and had greater motivation than their online counterparts.

Further, in terms of cognitive learning outcome effectiveness, face-to-face groups had significantly higher project and discussion grades ($M=93.23$, $SD=21.17$), than online groups ($M=82.88$, $SD=4.71$), $t(200.16)=-2.73$, $p<.01$. According to a Levene's Test, online and face-to-face groups did not share equal variances, $F=76.79$, $p<.001$. Thus, degrees of freedom were adjusted to correct for this problem. Additionally, the analysis indicated that face-to-face groups ($M=86.95$, $SD=9.60$) had significantly higher overall course grades than online groups ($M=83.77$, $SD=12.56$), $t(268.22)=-2.70$, $p<.01$. According to a Levene's Test, online and face-to-face groups do not share equal variances, $F=6.24$, $p<.05$. Degrees of freedom were adjusted to correct for this problem. Based on these results, we can see that the learning environment in which students work in clearly plays a role in impacting the effectiveness of student learning groups.

One explanation for this could be face-to-face groups in this sample reported significantly greater levels of both trust and perceived similarity when compared to online groups. Face-to-face groups reported higher levels of trust ($M=129.04$, $SD=17.62$) than online groups did ($M=118.42$, $SD=17.24$), $t(180)=-3.98$, $p<.001$, which supports the previous literature reviewed earlier in the paper. Additionally, students in face-to-face groups perceived their peers as more similar ($M=3.62$, $SD=.73$) than the online students did ($M=3.33$, $SD=.73$), $t(331)=-3.51$, $p<.01$. These results show that across various outputs, students in face-to-face groups in this sample were more effective than online groups. These results indicate that there may be an even greater need for online student group facilitators to utilize best practices and make a greater effort to impact the various inputs that may be affecting the outcomes of collaborative student learning.

Recommendations for Practitioners

1. Below include a variety of recommendations for practitioners supported by the previous literature review and results. These recommendations serve as a type of handbook for faculty, training professionals, and other group facilitators and practitioners to utilize and reference when using collaborative learning methods. This section aims to answer Research Question 5: “What are ways in which faculty, training facilitators, and other practitioners can positively influence a group’s effectiveness?”.

Trust

Many techniques for building trust are focused on the initial forming stages of a team. Barkley et al. (2014) focus on a variety of structured activities or ‘icebreakers’ for introductions and greetings, which serve as good getting-acquainted techniques. Icebreakers can help to ease the tension and awkwardness of initial classes or meetings, helping group members develop feelings of comfort. They also create an expectation for frequent communication from all individuals. One icebreaker that can help students gain trust by learning more about their classmates is to conduct “interviews” where students will form pairs and alternate interviewing each other by asking pre-set questions such as “What is your name? Your academic major? Why are you taking this class? What are your plans after finishing school?” (Barkley et al., 2014). Greenberg and colleagues (2007) point out that this exercise not only allows learners to get to know each other, but it also provides a mechanism for members to identify the abilities and competence of each participant and how they can be an asset to the team, which can help build cognitive trust (Greenberg et al., 2007).

Another example of a common ice-breaker to help promote trust within students is the “Name Game” where students sit in a circle and the first student states his/her name, the second student states his/her name and the first student’s name, the third student states his/her name and the previous two students’ names, and so on. This is helpful for students to learn each other’s names and to become familiar with using their names in discussion (Barkley et al., 2014).

Another activity that can help to increase trust and increase group buy-in for collaboration is called “Trust Me” where students are arranged in a circle and given a large ball of twine. One student will start by stating, “Group work is good for ___” and will complete the sentence with a positive attribute of group work, and then toss the ball of string to the other side of the circle, and so on, until all the string has been used and a web has been formed. At this point, instructors can point out how individually, the string was weak, but when held together with a purpose it is strong and can hold a heavy object on top. Finally, the instructor can pull the end of a section of the string and explain how one person’s actions affects everyone in the web (Barkley et al., 2014).

When first placed into teams, students initially look to external sources to develop initial trust that is necessary for the team to work together. By having the instructor provide personal endorsements for group members, providing role-based information, and rule-based factors (rules of conduct) cognitive trust will be more likely to develop in the initial stages of a group’s formation by allowing students to see the ability and competence of their teammates (Greenberg et al., 2007). In this stage, it is important for students to be able to demonstrate their trustworthiness to other members, whether through competence or benevolence.

As a group facilitator, one of the main ways to help increase trust within groups is to help to eliminate uncertainty and ambiguity in the organization stage of the group formation by

helping groups establish their norms of behavior, procedures for assigning and delegating tasks, communication expectations, and decision rules (Greenberg et al., 2007). One way to eliminate some of the ambiguity in a newly formed group is to establish group ground rules early, along with students, to determine group work policies. This can be done through a formal team agreement where students will provide answers to questions such as “Will you have a leader? How will work be distributed? Who will turn in deliverables? How will you provide constructive feedback to each other? How will you make decisions? How will you handle work that is subpar, incomplete, or not done?”. Having students sign this document and referencing it throughout the course can help to increase trust within the group by ensuring individual accountability (Barkley et al., 2014).

Additionally, at this stage it would also be useful for students to set group roles. Common group roles include facilitator, recorder, reporter, time keeper, and materials manager. By establishing individual roles within the group, team members not only establish further structure and behavioral standards but also get to learn more about each individual member’s skills and strengths in a certain role (Barkley et al., 2014). For example, if I am confident in my ability to stay organized and manage time well, I would have the opportunity to showcase these competencies to my group through the role of “time keeper” or “materials manager”. By doing this, I would be demonstrating my ability and trustworthiness to other group members.

Perceived Similarity

From the research outlined previously, we know that students who feel that they are not similar to their groupmates find it harder to trust them (Byrne, 1971). One way to help identify similarities among students is to use icebreakers in the beginning of a course. Social icebreakers, like the “Interviews” exercise explained previously, help to identify shared interests and

experiences (highlighting ways in which they are similar) and therefore increase trust among group members (Davidson et al., 2006). We also know from the previous literature that students make quick judgments about others based on demographics and will naturally gravitate toward students who are demographically similar to them (Byrne, 1971).

The Perceived Similarity Paradigm is not a phenomenon that can be changed; however, this does not mean that practitioners should select students solely based on demographic factors because they have an initial attraction. Instead, practitioners should consider diversity to be an important factor when forming groups. By making the groups heterogeneous, it enriches the conversation by bringing in students of various backgrounds and perspectives, and allows students to interact with students unlike themselves (Johnson & Johnson, 1986). However, maintaining diverse groups does not come without cost as diverse groups often have social categorization processes and negative stereotyping, which often has disruptive effects on teamwork (Curseu & Plunt, 2013). Further, as mentioned previously, diversity and teams has been described as a “mixed blessing” because they have the potential to develop “faultlines” which are subgroups that separate group members (Forsyth, 2013).

This stream of research is sometimes references as the “pessimistic view” in the group diversity literature, where forming diverse groups can have a negative impact on group members commitment, satisfaction, positive communication, and group cohesion when faultlines or clique-like behaviors occur (Curseu & Plunt, 2013). However, diverse groups have a high learning potential for peers and groups overall; they show higher creativity and performance (Forsyth, 2013). One impact instructors can have in promoting diversity is through group composition. Often, students are randomly assigned to groups or allowed to select their own group members, however many scholars agree that instructors should depart from this method

and assign students to groups based on their characteristics (Colbeck, Campbell, & Bjorklund, 2000; Curseu & Pluut, 2013). Specifically, groups should be designed with respect to gender and diversity, as having a mix of men and women and international students have been shown to have higher complexity (Curseu & Pluut, 2013).

Additionally, Curseu and Pluut (2013) recommend providing an initial training or orientation for group members without experience working in collaborative groups, as groups who are diverse in respect to their experience level working in groups previously have been known to have poor group processes. Finally, instructors should provide formal structure for collaborative learning by providing group goals, ensuring individual accountability, assigning roles, and utilizing structured collaborative learning activities (Barkley et al., 2014; Forsyth, 2013; Curseu & Pluut, 2013). By utilizing social icebreakers to highlight ways in which students are similar, making purposeful group composition decisions, and providing a structured course, instructors and practitioners can play a key role in promoting successful learning group experiences for students as they enter an increasingly diverse workforce.

The Bad Apple Effect

Felps and colleagues (2006) have organized reactions into three types of responses: motivation, rejection, and defensiveness. When team members believe that the bad apple is willing to change his or her behavior, the team should utilize *motivating actions*, which may include withholding praise, respect, or resources until behavior changes, subtle and overt confrontations, formal administration of punishments, or demands of apology and compensation (Felps et al., 2006). By using motivating actions, teammates attempt to bring bad apples back into the group by changing their behaviors.

One of the most common recommendations in dealing with a “bad apple” is by implementing accountability in the group. One strategy for achieving this is to allow students to grade each other (Payne & Monk-Turner, 2006). Implementing accountability is one way to motivate bad apples or change their behaviors by setting very clear performance standards and expectations. One way to do this is to establish group or class rules or “codes of conduct” in the formation stages of the group to reduce any ambiguity. Davidson and colleagues (2006) explains one method for implementing individual accountability is for practitioners to give impromptu quizzes, calling on individuals to present their group’s progress, and providing students with mechanisms to deal with bad apples (Davidson et al., 2006). Additionally, recent research shows that after-action review has shown to have positive effect on performance (Bolton, 2016). Providing immediate, actionable feedback allows students to become aware of their behaviors and the impact they are having on the group’s performance, and recommendations for improvement.

However, if team members have attempted motivating actions, such as feedback and establish accountability, and failed, they often then switch to a *rejection response*, which can be defined as “those acts which intend to minimize or eliminate interaction with the negative member” (Felps et al., 2006). These can include ejecting the bad apple from the group, ostracizing the bad apple, reducing social interaction, talking *at* rather than *with*, exclusion from decisions, and removing responsibilities that require the bad apple to interact with others. Like the motivating response, the rejection responses can either be overt or subtle (Felps et al., 2006). Payne & Monk-Turner (2006) also recommend group members to “divorce” themselves from the bad apple, or to remove themselves from the situation. However, this option is often unrealistic for students who have been placed in long-term groups (Payne & Monk-Turner, 2006).

If motivation and rejection fail or are not options due to a lack of power or other organizational constraints, the third response to a bad apple's presence in a group is *defensiveness*. Defensiveness is not a recommended response or recommended method for dealing with the presence of a bad apple, but more of a common response that practitioners and group members should be aware of. Felps and colleagues define defensiveness as "those acts which intend to protect and repair one's own sense of autonomy, status, self-esteem, or wellbeing" (Felps et al., 2006). Defensiveness as a response is often a result of a combination of frustration and lack of power. These often irrational behaviors include lashing out, seeking revenge, unrealistic appraisals, distraction, various attempts at mood maintenance, and withdrawal from the group (Felps et al., 2006).

Wellen and Neale (2006) highlight how important it is to respond quickly to the bad apple, rather than remaining in a psychological state of defensiveness. A quick response minimizes the effects the bad apple has on the individual and group level. In other words, it is essential to stop this harmful behavior as soon as possible in order to avoid further downward spirals or negative effects (Wellen & Neale, 2006). Additionally, Felps and colleagues (2006) highlight how important for groups to empower themselves by building alliances or social support within the group. As mentioned before, teammates may be unable to motivate or reject the bad apple due to various power differences. It is critical for the rest of the group to maintain social support and build alliances with each other and with outside members to combat the effect the bad apple is having, either through motivation or rejection (Felps et al., 2006).

A final consideration when it comes to dealing with a slacker or bad apple is for professors to balance the students' attitudes and experience with the group with the utility of a realistic experience to prepare them for the future (Payne & Monk-Turner, 2006). In other words,

professors should highlight the learning experience of working with diverse people and how this will be a skill to utilize in the future. Additionally, instructors can also help set realistic expectations about group work in the initial formation stages, such as emphasizing the fact that *most* students who work in groups are not bad apples, but they do occur frequently enough that they will likely be encountered at one time or another (Barkley et al., 2014).

When it comes to grading groups, De Hei (2015) recommends not giving group grades, as they undermine collaborative learning by neglecting individual accountability and invites bad apples to a “free ride” (De Hei et al., 2015). By solely giving a group grade, they demotivate students who have no control over group composition and evoke reluctance and negative attitudes for group assignments in general as high achieving students often have to “pull all the weight” in the group. Davidson and colleagues (2006) recommend implementing a grading structure that assesses and evaluates individual student performance as well as group performance in order to ensure individual accountability (Davidson et al., 2006). Peer evaluation can serve as a solid strategy for assuring individual accountability as students who recognize they will be rated poorly by group members, and this will reflect on their grade, will be more likely to show positive team behaviors and be *less* likely to become a bad apple (Michaelsen et al., 2004; Forsyth, 2013).

Barkley et al. (2014) recommend the most effective method for grading is a combination of individual and group performance. This is the best way to maintain individual accountability while still promoting group interdependence (Barkley et al., 2014). Johnson and Johnson (1986) suggest moving from group to group and randomly asking one group member to explain part of the assignment; when students realize that all group members must be able to explain the material, they are less likely to try to “hitchhike” (and hopefully catch a bad apple early)

(Johnson & Johnson, 1986). Regardless of the methods used, the literature is very clear that maintaining individual accountability is a key way to help group members feel comfortable and trusting of each other, especially in a new group environment.

Learning Environment

As made evident by the previous literature review and experimental design with a mix of online and face-to-face students, online learning groups show lower satisfaction with their group experience, have low motivation to work in groups, and tend to have lower performance grades in their online group work and online courses. With these apparent issues in mind, the various components of collaborative learning become more complex and sometimes harder to measure. The intentional design of the course becomes even more essential with the added component of technology. Student collaboration becomes more difficult without non-verbal communication cues, asynchronous communication, and less general experience with online groups. Finally, meaningful learning becomes harder to measure as it happens without direction and without control (Barkley et al., 2014).

Some of the most important steps in utilizing collaborative learning in an online course happen before the course begins. Initial course setup and structure are even more essential for students in an online learning environment. As collaboration can be more challenging for learners who are not physically near each other, it is important to explain to students how collaboration will be assessed. This information should be stated in the course syllabus as a course-learning outcome (Barkley et al., 2014). Setting up a clear sense of tasks, objectives, and regular communication structure is essential for the online learning environment (Morrison, Cegeilski, & Rainer, 2012).

Another recommendation for course structure is to require an orientation for students to learn any required technology, and to learn other guidelines for collaborating effectively in an online environment (Barkley et al., 2014). It is especially important that team members are trained in how to efficiently and proficiently use group online communication tools and software, as lags in responses due to user inability to use the technology may be misinterpreted as lacking ability or commitment to the group, which may lead to a delay of trust or active mistrust (Greenberg et al., 2007).

Additionally, it is important to minimize the demands for synchronous activities, as student who choose online classes often wish to work independently on their own time constraints and schedules, so utilizing collaborative learning tasks that do not require real-time collaboration (e.g. group discussions, group projects) can help to cater to students needs (Barkley et al., 2014). Complex group projects should be organized into stages or phases with specific deadlines to serve as check-in points for feedback (Barkley et al., 2014).

As mentioned previously, one common way to promote group trust is to complete ice-breaker introductory activities. One introductory activity that can help to lighten the mood, as well as draw attention to some potential online-specific problems, is to ask the class to share an embarrassing mishap involving online communication (e.g., replying to the wrong person in an e-mail). Another way to help students become more familiar with each other is to ask students to identify where they live or where they are from (including a picture of their town, or some unique part of their location) – this can help students find shared similarity and trust within others by learning more about who they are communicating with online (Barkley et al., 2014). Additionally, group members can build trust through the use of specific avatars (symbols or

characters to represent individuals in the virtual world) or by using pictures of themselves (Jarvenpaa & Leidner, 1999).

General Tips for Utilizing Collaborative Learning

Restructuring a course and utilizing collaborative learning can seem like a daunting task for instructors. Often, teachers have no clear vision on how to compose effective groups, have limited knowledge of research and best practices for implementing collaborative learning, and perceive certain drawbacks for utilizing collaborative learning (De Hei et al., 2015). Instructors play a critical role in collaborative learning, as they help to design and facilitate collaborative activities. Barkley et al. (2014) explain that the easiest way to implement collaborative learning into your classroom is to look at what you do now and see if one or more activities could be done collaboratively (Barkley et al., 2014). However, it is important to note that activities should not simply be restructured into collaborative strategies without considering the various recommendations explained earlier in this section.

When deciding which specific collaborative learning activities to use in the course, it is important to consider the skill levels of the students first (both academic skills and small group skills); make sure to match the students' abilities with the task (Davidson et al., 2006). The main purpose of utilizing groups and teams in general is because together they can accomplish more than an individual – therefore, it is essential that the group's goals cannot be accomplished by one individual (Johnson & Johnson, 1986). This helps to promote interdependence, so each member is responsible and dependent on others to succeed. Further, it is also important to ensure that the assignment is relevant so that it does not feel like busywork, and instead is challenging with real-world relevance to motivate and engage students (Davidson et al., 2006).

Before the activity begins, it is important to explain the objectives of the activity and make sure the task is clearly defined and that students understand how they are being evaluated or assessed (Barkley et al., 2014). It is important to explain to students what is meant by cooperation and what behaviors are expected (Johnson & Johnson, 1986). Student groups of 2-4 students tend to work best for many collaborative learning activities, as small groups take less group member skills to be successful, each student gets more “talk time” and they can complete tasks faster than larger groups (Johnson & Johnson, 1986). As the collaborative learning activity comes to an end, consider having groups present their findings to an audience and contributing findings to a larger learning outcome. Additionally, practitioners should consider incorporating a reflection and evaluation stage in which students can debrief about what they have learned, can identify strengths and weaknesses, and offer ideas on how to improve the learning process (Barkley et al., 2014). For further reference, Barkley et al. (2014) have identified 35 collaborative learning tasks in their guidebook for faculty, where they identify the optimal number of group members for each activity, time spent on each task, and duration of group needed for the activity to succeed. Five examples of these collaborative learning activities are explained in *Table 3* (Barkley et al., 2014).

Table 3: Five Examples of Collaborative Learning Activities (Barkley et al., 2014)

Collaborative Learning Activity	Description of Activity
Round Robin	Form small groups and ask students to generate a list as they recall important pieces of information from a recent lecture.
Word Webs	Ask students to generate a list of related ideas and then organizing them in a graphic that represents the connections.
Think-Pair-Share	After lecturing on a topic, present a prompt “summarize in your own words...” ask students to think individually for a few minutes, then pair up with a classmate to discuss and compare their responses in pairs before sharing with the entire class.
Role-Play	Create a scenario and ask students to act out or assume identities that require them to apply their knowledge, skills, or understanding as they speak and act from a different, assigned perspective. (counseling class, business sales class).
Critical Debates	Form teams and ask students to examine an issue in preparation for a debate; develop arguments and determine evidence.

Implications for Future Research

This study is important for understanding further how factors like trust, perceived similarity, the bad apple effect, and learning environments can impact overall student learning group effectiveness and success. Future research should continue to study these factors and their relationships with each other. Specifically, further research is needed on just how perceived similarity interacts with diversity and how practitioners should promote diversity by also recognizing the Similarity Attraction Paradigm. Future research should also examine the effectiveness of specific collaborative learning activities and which activities should be utilized according for specific situations. Finally, future research should expand on antecedents to the formation of a bad apple and ways to prevent their formation in groups. Being able to track bad

apples and their effects in student learning groups will allow practitioners to have better insight into their cause and their detrimental effects on other students in the group.

A Final Word

This paper has presented several years of research examining collaborative learning activities, and how trust, perceived similarity, bad apples and the learning environment all factor into student learning effectiveness, which this paper measured through 1) Student *motivation* to work in student learning groups in the future, 2) Student *satisfaction* with the learning group experience overall, and 3) Student *performance* in the project or discussion and in the class overall (measured with letter grades). Given what we know from this previous research, which was supported through local data collected within the past few years, best practices based in research serve as an invaluable tool for instructors, facilitators, and other practitioners to utilize when structuring collaborative learning into their coursework or training. With a growing focus on the importance of teamwork and collaboration in the workplace, it is critical that we better understand best practices for promoting learning effectiveness for individuals who work in groups.

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Appendix A**Understanding Group Success**

Instructions: Please complete the following information. The goal of this project is to give me information about what contributes to success working in groups, so that I can improve the group discussions in this course.

1. Tech ID Number _____

2. Sex (circle one): M or F

3. Age: _____

4. Current overall GPA: _____

5. SAT/ACT Score: _____

6. Ethnicity:

_____ Caucasian/white

_____ African American/black

_____ Hispanic

_____ Asian American

_____ American Indian

_____ Other (please specify) _____

7. Academic year:

_____ Freshman

_____ Sophomore

_____ Junior

_____ Senior

_____ Other (please specify) _____

8. How much experience do you have working in a team setting?

_____ No experience

_____ Hardly any experience

_____ Some experience

_____ Frequent experience

_____ A great deal of experience

9. How do you prefer to work?

_____ Alone

_____ With others

10. How often have you worked on projects communicating with people mostly through technology (using e-mail, chat, group systems software, etc.)?

Appendix A (continued)

- _____ Never
- _____ A couple of times a month
- _____ Once a week
- _____ A few times during the week
- _____ Every day

11. Would you rather work with a group face-to-face or mediated through computers? (Please choose one)

- _____ No preference
- _____ Face-to-Face
- _____ Computer Mediated (i.e. email, instant messaging, video conferencing, etc.)

12. Rate the experience that you have had with group projects in your previous college courses:

- | | | | | |
|---------------|---|---|---|---------------|
| 1 | 2 | 3 | 4 | 5 |
| Very Negative | | | | Very positive |

13. Rate the extent to which you enjoy working in groups on course projects:

- | | | | | |
|-------------------|----------|----------|----------|------------------|
| 1 | 2 | 3 | 4 | 5 |
| Not at all | | | | Very much |

14. Rate the extent to which you enjoy group discussions in your courses:

- | | | | | |
|-------------------|----------|----------|----------|------------------|
| 1 | 2 | 3 | 4 | 5 |
| Not at all | | | | Very much |

15. In my studies I am self-disciplined and find it easy to set aside reading and homework time.

- | | | | | |
|-------------------|---|---|---|----------------|
| 1 | 2 | 3 | 4 | 5 |
| Strongly disagree | | | | Strongly agree |

16. I am able to manage my study time effectively and easily complete assignments on time.

- | | | | | |
|-------------------|---|---|---|----------------|
| 1 | 2 | 3 | 4 | 5 |
| Strongly disagree | | | | Strongly agree |

17. As a student, I enjoy working by myself with minimal support or interaction.

- | | | | | |
|-------------------|---|---|---|----------------|
| 1 | 2 | 3 | 4 | 5 |
| Strongly disagree | | | | Strongly agree |

Appendix A (continued)

18. In my studies I set goals and have a high degree of initiative.

1	2	3	4	5
Strongly disagree				Strongly agree

19. I have good study skills and habits.

1	2	3	4	5
Strongly disagree				Strongly agree

Perceived Similarity

Thinking about the other members of your discussion group in this class, please rate your perceived similarity to your group members on the rating scale (1 – 5) provided.

Similarity of my work unit members to me _____

5 = highly similar

4 = somewhat similar

3 = slightly similar

2 = somewhat dissimilar

1 = not similar at all

Appendix B

(Negative Affect measured with PANAS; Watson et al., 1988)

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you generally feel this way, that is, how you feel on the average. Use the following scale to record your answers.

1 = very slightly or not at all	2 = a little	3 = moderately	4 = quite a bit	5 = extremely
	_____ interested		_____ irritable	
	_____ distressed		_____ alert	
	_____ excited		_____ ashamed	
	_____ upset		_____ inspired	
	_____ strong		_____ nervous	
	_____ guilty		_____ determined	
	_____ scared		_____ attentive	
	_____ hostile		_____ jittery	
	_____ enthusiastic		_____ active	
	_____ proud		_____ afraid	

Appendix C
Trust in Teams

Tech ID: _____

Course: _____

Instructions: Please rate whether you agree or disagree with the following statements by writing in the number indicating your answer in the blank provided. Please rate your agreement using the following scale:

1 = Completely Disagree

2 = Disagree

3 = Somewhat Disagree

4 = Neither Agree nor Disagree

5 = Somewhat Agree

6 = Agree

7 = Completely Agree

_____ 1. Most people in this discussion/project group do not hesitate to help a person in need.

_____ 2. In this discussion/project group, most people speak out for what they believe in.

_____ 3. In this discussion/project group, most people stand behind their convictions.

_____ 4. The typical person in this discussion/project group is sincerely concerned about the problems of others.

_____ 5. Most people will act as “Good Samaritans” if given the opportunity.

_____ 6. People usually tell the truth, even when they know they will be better off by lying.

(Items adapted from Costa & Anderson, 2010)

Appendix C (continued)

Instructions: Please indicate your answer by writing it in the blank provided.

1 = Completely Disagree

2 = Disagree

3 = Somewhat Disagree

4 = Neither Agree nor Disagree

5 = Somewhat Agree

6 = Agree

7 = Completely Agree

_____ 7. In this discussion/project group, people can rely on each other.

_____ 8. We have complete confidence in each other's ability to perform tasks.

_____ 9. In this discussion/project group, people will keep their word.

_____ 10. There are some hidden agendas in this discussion/project group. (r)

_____ 11. Some people in this discussion/project group often try to get out of previous commitments.

(r)

_____ 12. In this discussion/project group, people look for each other's interests honestly.

_____ 13. In this discussion/project group, we work in a climate of cooperation.

_____ 14. In this discussion/project group, we discuss and deal with issues or problems openly.

_____ 15. While making a decision, we take each other's opinion into consideration.

_____ 16. Some people hold back relevant information in this discussion/project group. (r)

(r)= Reverse-scored item

Appendix C (continued)

Instructions: Please indicate your answer by writing it in the blank provided.

1 = Completely Disagree

2 = Disagree

3 = Somewhat Disagree

4 = Neither Agree nor Disagree

5 = Somewhat Agree

6 = Agree

7 = Completely Agree

_____ 17. In this discussion/project group, people minimize what they tell about themselves. (r)

_____ 18. Most people in this discussion/project group are open to advice and help from others.

_____ 19. In this discussion/project group, people watch each other very closely. (r)

_____ 20. In this discussion/project group, people check whether others keep their promises. (r)

_____ 21. In this discussion/project group, most people tend to keep each other's work under surveillance. (r)

(Previous items adapted from Costa & Anderson, 2010)

(The following items adapted from Mayer et al. (1995)).

_____ 22. If I had my way, I would not let the other team members have any influence over issues that are important to the project. (r)

_____ 23. I would be comfortable giving the other team members complete responsibility for the completion of this project.

_____ 24. I really wish I had a good way to oversee the work of the other team members on the project. (r)

_____ 25. I would be comfortable giving the other team members a task or problem which was critical to the project, even if I could not monitor them.

(r)= Reverse-scored items

Appendix D

Group Satisfaction & Motivation

Instructions: Please indicate your answer by filling in the bubble above your response.

All in all, how satisfied are you with the members in your discussion/project group?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Extremely Dissatisfied	Dissatisfied	Somewhat Dissatisfied	Neutral	Somewhat Satisfied	Satisfied	Extremely Satisfied

All in all, how satisfied are you with your group’s performance?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Extremely Dissatisfied	Dissatisfied	Somewhat Dissatisfied	Neutral	Somewhat Satisfied	Satisfied	Extremely Satisfied

How satisfied are you with the progress you made on the tasks?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Extremely Dissatisfied	Dissatisfied	Somewhat Dissatisfied	Neutral	Somewhat Satisfied	Satisfied	Extremely Satisfied

Considering the effort you put into the task, how satisfied are you with your discussion/project group’s performance?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Extremely Dissatisfied	Dissatisfied	Somewhat Dissatisfied	Neutral	Somewhat Satisfied	Satisfied	Extremely Satisfied

(Previous 4 Items adapted from Park and DeShon, 2010)

Because of this group experience, I am motivated to work in project/discussion groups in the future.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Strongly disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree