Running head: STUDENT TEAMMATE EVALUATIONS

Using student teams in the classroom: How online versus paper-and-pencil

teammate evaluations impact important team member outcomes

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1. Introduction

A movement toward small-group and team-based pedagogical methods has been taking place, prompted not only by research on how students can learn more effectively, but also by trends in the workplace. As educators, we seek to identify ways to communicate key course material, engage students, and support their learning, as well as to consider long-term issues, such as how to best prepare students for their futures. It is not surprising, then, that scholars have called for this shift from coursework designed for individual students to more collaborative learning environments. Indeed, the traditional methods where classroom learning is "a spectator sport in which faculty talk dominates" that subjects students to "isolated" and "disconnected" learning (Tinto, 2003, p. 1) are being replaced by learning communities, cooperative or collaborative learning, and team-based pedagogies (Davidson, Major, and Michaelsen, 2014). As these small-group learning approaches are gaining traction, educators look to practitioners, scholars, and published research on how to best design these methods to maximize benefits to their students.

While the extant research has provided a great deal of guidance on how to form student teams, design assignments, and support the students in their group work (e.g., Cooper & Robinson, 2011; Michaelsen, Knight, & Fink, 2004; Millis, 2010), one area that has received less attention is how to provide feedback to students who work on these learning teams – particularly peer feedback about team processes and dynamics that is unbiased, easy for faculty to use, and that provides not only evaluative data but developmental feedback to support student growth. The goal of the current research was to explore two methods for evaluating students working in

teams and to examine how an online teammate evaluation process can impact not only student team processes, but also student readiness and energy for working on future teams.

Before comparing team feedback modes, we first provide background on the movement toward teams both in industry and in the classroom. In addition, we provide a review of the literature on peer evaluations – its applications, methods, and flaws – especially in team settings.

1.1 Trends toward Teaming in the Workplace

The goals of higher education are far from simple. Deep learning, promoting intellectual curiosity, intellectual and personal development, and benefits to society are some of the objectives of college and university education (Chan, 2016; Keniston, 1960; Sandoval-Lucero, 2014). Preparing students for their careers is another goal (AAC&U, 2013; Chan, 2016; Keniston, 1960; Sandoval-Lucero, 2014; White House, n.d.), and according to the National Association for Colleges and Employers' *2016 Job Outlook* survey, the ability to work on a team is what employers are looking for in today's college graduates (NACE, 2015).

An early perspective on this workplace trend was provided by Bolman and Deal who described how "leadership teams, quality teams, design teams, and other forms of teamwork [were] replacing the individualistic Lone Ranger, I'll-do-my-job-myself-thank-you attitude" (1992, p. 34). Yet, even earlier, in 1983, Hock noted how teamwork happens "in the symphony, in the ballet, in the theater, in sports, and equally in business" (as cited in Schlesinger, Eccles, & Gabbaro, 1983). Since then, the "teaming" trend (Edmondson, 2012) has become a widely-accepted method of organizing work as we see employees working in offices with physical space designed for collaboration (Cain, 2012); this makes sense since today's work involves sharing knowledge, solving problems, and often taking action by working together whether in for-profit, not-for-profit, public, or private organizations (Ashmos & Nathan, 2002; DeChurch & Mesmer-

Magnus, 2010; London, 2013; Riebe, Reopen, Santarelli, & Marchioro, 2010). Thus, it is not uncommon to find diverse teams of employees solving complex problems at firms such as Coca-Cola, Nokia, and Ford; in hospital operating rooms or research labs, museums, and engineering quality teams; or addressing crime, environmental disasters, or political strategy (American Society for Quality, 2014; Ashmos & Nathan, 2002; Buljac-Samardzic, Dekker-van Doorn, van Wijngaarden, & van Wijk, 2010; DeChurch & Mesmer-Magnus, 2010; Decuyper, Dochy, & Van den Bossche, 2010; DeDreu & Weingart, 2003; Jordan, Field, & Armenakis, 2002; Lashinsky, 2006; London, 2013; London & Sessa, 2006; Mankins, Bird, & Root, 2013; Mesmer-Magnus & DeChurch, 2009; Museum of Modern Art, 2011; Peeters et al., 2006; Prokesch, 2009; Tata & Prasad, 2004; Werner & Lester, 2001; Zaccaro, Ely, & Shuffler, 2008). Moreover, a recent review puts teamwork as a concept with significant prevalence in society. Using culturonomics analysis (akin to content analysis measuring societal diffusion), the notion of teamwork "gained momentum, with a sharp increase continuing until the end of available data in 2008" (Weiss & Hoegl, 2015, p. 599); in addition, the same researchers' bibliometric analysis confirmed "the accounts of the steady and rapidly increasing prevalence of teamwork in the past three decades are certainly correct" (Weiss & Hoegl, 2015, p. 606).

However, trends and hiring preferences are not the only reasons for teaming in the workplace. The management and workplace psychology literatures have provided richly detailed, well-documented research demonstrating that teams and small groups are beneficial in a variety of ways. The performance, productivity, and efficiency improvements of teaming have been illustrated, as have the potential for cost savings, improved problem solving, and more positive employee attitudes (Aubé, Rousseau, & Tremblay, 2011; Beersma, Hollenbeck, Humphrey, Moon, Conlon, & Ilgen, 2003; Campion, Medsker, & Higgs, 1993; Dunphy & Bryant, 1996;

Hansen, 2006; Napier & Gershenfeld, 2004; Richter, Dawson, & West, 2011). The use of teams in the workplace is not a trend likely to pass by soon; the research evidence demonstrates teaming is "an effective means for organizations to enhance productivity", so we should not "view teamwork as a 'management fashion' to disappear in the course of time" (Richter et al., 2011, p. 2761). For example, a recent meta-analysis demonstrated that when healthcare workers learn team skills and team abilities (i.e., team training), key organizational outcomes result such as higher safety levels, more satisfied patients, and lower mortality (Hughes et al., 2016). Another meta-analysis of teams in military, business, aviation, medicine, labs, and universities found that 12-19% of performance outcomes are due to engaging in more effective team behaviors; for instance, communicating and making decisions as a team was linked to higher productivity (i.e., quantity) levels (Salas et al., 2008).

It makes sense, then, that a lack of team culture was identified as a source of NASA's 2003 Columbia explosion and that the failure to share information across teams was "a key factor" in the 9/11 terrorist attacks (Marks, 2006, p. i). *The New York Times* tells its readers: "Solitude is out of fashion….Most of us now work in teams, in offices without walls, for managers who prize people skills above all. Lone geniuses are out. Collaboration is in" (Cain, 2012). Thus, given the "direct impact" research can have on policies and practices "in the public and private sectors", there is still more to learn about how to make teams more effective, including the role of feedback (Kozlowski & Ilgen, 2006, p. 111).

1.2 The Use of Teams in Academia

The widespread use of teams in the workplace, noted above, is one key reason why we see the teaming trend in academia. In order to prepare students for the work world that awaits them, there is increasing evidence that "responsible pedagogy" (Cockburn-Wootten, Holmes, &

Simpson, 2008, p. 420) occurs when students can develop requisite critical analysis

competencies, communication skills, habits for personal accountability, and skills for operating

in a team setting (Aggarwal & O'Brien, 2008; Capelli & Rogovsky, 1994; Chen, Donahue, &

Klimoski, 2004; Hernandez, 2002; Hunsaker, Pavett, & Hunsaker, 2011; Pfaff & Huddleston,

2003; Quintessential Careers, 2004). Given the "increased demand for teamwork in business,

employers [have] turned to business schools to incorporate teambuilding exercises and group

projects into the curriculum, with the idea that students working in teams would learn teamwork,

problem-solving, communications, leadership, and other key skills" (Hansen, 2006, p. 12).

However, this has not only happened in business schools. We see the teaming trend in academic

programs as diverse as nursing and medical schools, communication programs, education

programs, mathematics and computer science departments, engineering programs, and even

applied in military training (Brzovic & Matz, 2009; Capelli & Rogovsky, 1994; Conn, 2010;

Delva, Jamieson, & Lemieux, 2008; Ericson, Masiello, & Bolinder, 2012; Hernandez, 2002;

Jordan et al., 2002; Nicoll-Senft, 2009; Pieterse & Thompson, 2010; Powers & Summers, 2009;

St. Clair & Chihara, 2012; Stoller, Rose, Lee, Dolgan, & Hoogwerf, 2004; Toumasis, 2004;

Vasan, DeFouw, & Compton, 2009) where classroom team projects and assignments are said to

simulate real-world teams in organizations (Jassawalla, Sashittal, & Malshe, 2009).

  Enhanced learning is the second driver behind the teaming trend in academia. Aside from

enriching communication skills, course retention, and student satisfaction, there is evidence that

teamwork in the classroom can lead to more engaged learners (Grant-Vallone 2011; Kreie,

Headrick, & Steiner, 2007). Collaborative learning, for example, is a particular approach to

student group work that "can lead to deep learning, critical thinking, and genuine paradigm shifts

in students' thinking" (Millis, 2010, p. 5). Similarly, team-based learning is a very specific

instructional strategy that has been said to have significant transformative benefits: increased effort by individual learners, enhanced problem solving, and more understanding of the instructional material (Fink, 2004).

Overall, putting students in teams for small group work has been called one of the "most-often-used approaches to get students engaged in the classroom" (Davidson, Major, & Michaelsen, 2014, p. 1) leading to the introduction of a variety of journals on the topic (e.g., *Journal on Excellence in College Teaching*, *Academy of Educational Leadership Journal*, *New Directions for Teaching and Learning*) as well as books devoted to best practices for utilizing team pedagogies (e.g. Millis, 2010; Cooper & Robinson, 2011). Some of the most talked about issues related to using student teams are forming teams, team size, role assignments, and designing effective team assignments (Michaelsen, Davidson, & Major, 2014; Michaelsen, Knight, & Fink, 2004). While feedback and assessment are also topics of concern (e.g., Angelo, 2011; Fink, 2004), there's still a great deal to learn about student teams and peer feedback.

1.3 Peer Feedback

Kozlowski and Ilgen call team feedback a "key leverage point and a pressing research need" (2006, p. 112). Citing over 50 years of research, their review of the literature demonstrates that, while there is a lot that we know about how to improve team effectiveness, the body of scholarship on "feedback…at the team level is not nearly so well developed" (2006, p. 112). This has implications not only for performance of the student team, but also for students' future careers. As Michaelsen, Davidson, and Major note, peer assessments can help students "develop the interpersonal and teamwork skills that are so important for their future success" (2014, p. 68); moreover, researchers have demonstrated the centrality of peers to engagement in learning, GPA, and career perceptions (Grier-Reed, Appleton, Rodriguez, Ganuza, & Reschly, 2012). For

these reasons, we focused the current research on peer evaluations – in particular on how different modes of gaining peer feedback for teamwork affects results and any effects on team processes and future teamwork preparedness.

Team feedback can be seen in a variety of applications. Peer evaluations/assessment, group performance feedback, and 360-degree feedback are all terms used to describe the collection of performance-related data from teammates, other students, or individuals on the same lateral hierarchical/educational level (Anson & Goodman, 2014; Dominick, Reilly, & McGourty, 1997; El-Mowafy, 2014; Pellecchia et al., 2011; Penny, 2003). It builds on the fact that "learning is an inherently social process" (El-Mowafy, 2014, p. 225; Gabelica, Van den Bossche, Maeyer, & Segers, 2014) and that "team members can play an important role in enhancing and sustaining team effectiveness by providing feedback to each other" (Dominick et al., 1997, p. 509). Given the frustration students have expressed with unfair or dissatisfactory team assignments in classes, the use of peer assessment has been noted for its support of student learning and reduction of free riding (Anson & Goodman, 2014); in sum, feedback is one of the most effective means for enhancing performance and learning (DeShon, Kozlowski, Schmidt, Milner, & Wiechmann, 2004).

The benefits of peer feedback are broad and far reaching. Student team assessments can lead to enhanced content learning/retention, less social loafing (if students perceive that they'll have the opportunity to weigh in on whether their teammates made equal contributions to the group's work), better student experiences, improved team behavior and/or performance; improved team processes (i.e., becoming more self-managed rather than instructor-facilitated and developing team skills), and a more collective versus individual team orientation (e.g., collaboration, cohesion; Anson & Goodman, 2014; Brutus & Donia, 2010; El-Mowafy, 2014;

Gabelica, Van den Bossche, Segers, & Gijselaers, 2012; Loughry, Ohland, & Moore, 2007; Michaelsen, Davidson, & Major, 2014; Pellecchia et al., 2011; Van der Vegt, de Jong, Bunderson, & Molleman, 2010). Getting feedback from peers makes sense, too, since students have access to performance data on their teammates that the faculty member is not privy to (Brutus & Donia, 2010; Fink, 2004; Greguras, Robie, & Born, 2001; Loughry et al., 2007; Michaelsen, 2004; Michaelsen, Davidson, & Major, 2014; Ohland et al., 2012). In a way, using peer evaluations can result in more accurate assessments since the peer is an insider to the team and on the same level as the person being evaluated (Burton, 2005; Ohland et al., 2012). Moreover, engaging in peer feedback in classroom settings is good training for "an important and difficult organizational duty" that they'll be required to perform in their professional careers (Brutus & Donia, 2010, p. 652; Ohland et al., 2012; van der Pol, van den Bert, Admiraal, & Simons, 2008). What's interesting, too, is that it is not just a matter of getting the feedback that makes a difference. As Dominick et al., (1997) found, simply being exposed to and completing peer feedback instruments can lead to behavioral improvements.

So, the pedagogical benefits of peer evaluation are twofold: students benefit from providing it and from receiving it (van der Pol et al., 2008). Unfortunately, teammate peer evaluations can suffer from a variety of drawbacks. First, students occupy several roles – they can be work colleagues on the same team but also close friends or roommates outside of class. This, can lead to competing priorities when evaluating each other where peers can put the maintenance of their relationship (i.e., friendship) or a desire to take revenge on their teammates above honesty in their assessments, resulting in rating inaccurate ratings (Burton, 2005; Loughry et al., 2007; Ohland et al., 2012). Second, peer feedback can become more evaluative than developmental. For example, when teammate feedback is given only at the end of the project

(e.g., Fink, 2004), the assessment often factors into each student's grade – missing an opportunity for development when students can consider the feedback and change their behavior while still working on the team. This can happen when too much emphasis is placed on the team's output (a presentation, a paper, a business plan) instead of the process the team engaged in (Kozlowski & Ilgen, 2006). Instead, authors tend to agree that peer feedback should be frequent, immediate, and tied to accountability to the student team (Michaelsen, Davidson, & Major, 2014) if students are not only to learn the material but to also develop requisite teamwork skills (Kozlowski & Ilgen, 2006). Anson and Goodman (2014) call this "formative" assessment to support team processes rather than "summative" feedback after the team's work is completed (2014, p. 27). Third, the methods and forms used to gather peer feedback can be too general and unspecific. For example, some of the experts on student team-based pedagogies recommend a simple evaluation survey at the end of the semester to assess each teammates' feelings about how the team performed, how helpful the teammates were to each other, and how their peers contributed to their learning (e.g., Michaelsen & Fink, 2004; Opatrny, McCord, & Michaelsen, 2014) or a time log method where students keep track of the time they put into their teamwork and ratings of their work quality each week (Angelo, 2011). Yet, when assessment calls for simple scale measures (e.g., rate your teammate on a scale of 1 to 5), students often respond with ratings that lack depth. Even the request for reasons or explanations can be ignored leading to feedback that essentially says s/he "wasn't a good teammate". In addition, distributive justice can play a role whereby high performers have been shown to provide more variable and distinguishing peer ratings while low performers on the team distinguish less between good and bad teammates (Davison, Mishra, Bing, & Frink, 2014; Ohland et al., 2012). Ohland et al. contend this can have implications for accurate, fair, and useful peer assessments in team

settings. Finally, when asking for student-peer feedback, there is often increased workload on the faculty member (e.g., entering all of the peer ratings, administrative time for repeated peer evaluations, moderating the assessments to avoid leniency); so methods that can save time such as online assessments deserve interrogation (Anson & Goodman, 2014; Bouzidi & Jaillet, 2009; El-Mowafy, 2014).

The differences and similarities in using online modes versus paper-and-pencil data collection methods have only recently gained attention in the literature. Fouladi, McCarthy, & Moller (2002) provide a thorough review of these issues. Moving online for peer assessment, they summarize, may lead to less social desirability effects, less missing data, and human errors that can come from instructor's having to enter/process the rating data, as well as time savings for administrators. Despite these benefits, Penny points out that there have been a number of studies to suggest that online formats result in "measurement inequivalence" while other published reports demonstrate equivalence between data collection modes (2003, p. 64). For example, in one study comparing paper-and-pencil to online modes of data collection, very minor differences resulted as the compared instruments were found to have very similar psychometric properties (Fouladi et al., 2002). Similarly, Penny (2003) published findings comparing online and paper-and-pencil modes of 360-degree feedback and, again, found little evidence that online items functioned differently from the traditional mode of data collection.

Overall, though, scholars are aware that the value of feedback depends on the quality of the feedback (Gabelica et al., 2014). The role that online versus paper-and-pencil modes plays in that quality is of question in the current research. Since there is a need for "continued evaluation of mode effects" between online and paper and-pencil data collection methods (Fouladi et al., 2002, p. 212), and since formatting of items can change when moving online from a paper-and-

pencil format (Penny, 2003), the similarity of results for peer feedback in team settings is something that continues to beg attention in the literature.

2. Hypotheses

Despite all that is known about teamwork and peer feedback, "how much students learn from the process of providing feedback to peers" and "the mechanisms of peer assessment" are less understood (Patchan & Schunn, 2015, p. 592). Thus, how to provide feedback to students who work on learning teams – particularly peer feedback about team processes and dynamics that is unbiased, easy for faculty to use, and that provides evaluative and developmental feedback to support student growth – was our focus. With the goal of our research to explore two methods for evaluating students working in teams and to examine how an online teammate evaluation process can impact not only student team processes, but also student readiness and enthusiasm for working on future teams, we identified the following hypotheses:

H1: Online teammate evaluations will enhance team processes more than paper and pencil teammate evaluations

H2: Online teammate evaluations will enhance team member enthusiasm for teaming more than paper and pencil teammate evaluations

H3: Online teammate evaluations will enhance readiness for teamwork more than paper and pencil teammate evaluations

3. Methods

3.1 Participants.

Data were collected from 52 business students enrolled in two class sections of a Strategic Management course in a small northeastern university. Within classes, members were

randomly assigned to 10 teams, although an attempt was made to have an equal representation of majors (i.e., marketing, management, finance, accounting, economics) while composing the teams. There were 8 five-member teams and two six member teams. On average, participants were 21.2 years old, 92% Caucasian, and 49% were women. The representations of majors were: 25% Accounting, 18% Finance, 33% Marketing, 22% Management, and 2% Economics.

Typically, the teams examined in the current study would be referred to as "project teams" or "student teams" (Sundstrom, 1999). However, as Tannenbaum, Mathieu, Salas, & Cohen (2012) suggest, teams are changing, and our description of teams must be more precise. Hollenbeck, Beersma, & Schouten (2012) provide a dimensional scaling conceptualization for describing teams. Similar to past research (Eddy, Tannenbaum, & Mathieu, 2013), using the Hollenbeck, et al. dimensions of skill differentiation, authority differentiation and temporal stability, we would describe the current teams as: high in skill differentiation – teammates were not easily interchangeable and students on teams represented various functions (i.e., management, marketing, finance, accounting, and economics); low in authority differentiation – no one person held a position of formal authority or leader on the team; and moderate in temporal stability – as a student project team, teammates only worked together for fifteen weeks.

3.2 Procedures

During the course of their work together, teams read four case analyses (e.g., Harvard Business School Case Study) on four separate organizations. Teams reviewed the company facts, analyzed the current situation, and developed a five-year recommended strategic plan for the company. The student teams completed four business cases over 10 weeks of the semester. Each

team also did an oral presentation of one of their cases which was distributed over the semester. In other words, 25% of the teams did oral presentations of each of the four cases. After each case, students engaged in teammate evaluations (either online or in paper and pencil format) to provide feedback on team member performance.

In one condition, students completed a typical paper and pencil teammate evaluation. This evaluation asked student to provide a grade (on a scale of 0% to 100%) for each team member assessing that team member performance on the case. In the second condition, students completed an online teammate evaluation. In this online format, students provided a much more comprehensive analysis of team member performance. Each team member was evaluated on 48 unique team member behaviors within four categories (i.e., doing the work, showing up for meetings, contributing to group discussions, and cooperating with team members). Each team member then received an online individualized assessment report that summarized their grade on the project along with behaviorally-specific feedback on ways to enhance team member performance moving forward.

Survey data were collected at the end of the semester. Following the fourth case, team members completed a survey that assessed their team processes, individual readiness for teamwork, and enthusiasm for teaming.

3.3 Measures

Participants completed surveys at the end of the semester. All items were answered using five-point Likert-type response scales that ranged from "1" (Not at all) to "5" (To a Very Great Extent). We created scale scores for multi-item measures by averaging item responses per construct.

3.3.1 *Team processes.* Team processes were measured using multi-item scales developed by Mathieu and Marks (2006), which correspond to Marks et al.'s (2001) three super-ordinate categories. The three scales each exhibited acceptable psychometric properties: *Transition processes* (six items, e.g., "To what extent has our team worked to prioritize and agree upon our goals and tasks?"; α= .93); *Action Processes* (14 items, e.g., "To what extent has our team worked to monitor and manage our time wisely"; α= .97); and *Interpersonal Processes* (seven items, e.g. "To what extent has our team worked to encourage healthy debate and exchange of ideas"; α= .97). The agreement indices were uniformly high, justifying aggregation. These three subscales were also highly correlated (*r*s= .85 to .96, *p*<.01) so we averaged them to form a composite *team process* score (α= .92). LePine et al. (2008) found support for a single, higher-order process dimension underlying the three separate subscales, thereby justifying this approach.

3.3.2 Readiness for teaming. Readiness for teamwork (Eddy, Tannenbaum, & Mathieu, 2013) was assessed using the following three items (α= .85): 1) I feel better prepared to lead teams in the future as a result of my experiences with this team; 2) Being a part of this team will help me be a more effective member of teams in the future; and 3) I learned about teamwork by participating in this team.

3.3.3. Enthusiasm for teaming. Enthusiasm for teaming (Eddy, Tannenbaum, & Mathieu, 2013) was assessed using the following three, reverse coded, items (α= .74): 1) Being on this team has decreased my enthusiasm for working in team settings in the future; 2) Given my experience with this team, I would prefer to work alone in the future; and 3) If I could have left this team, I would have done so.

4. Results

Analysis of Variance (ANOVA) methodology was utilized to assess the three hypotheses. Hypothesis one stated that online teammate evaluations would enhance team processes more than paper and pencil teammate evaluations. Results shown in Table 1 provide support for this hypothesis (F=10.185, p<.002) with mean differences shown in Table 2 of 4.16 for online evaluation and 3.77 for paper and pencil evaluation.

Hypothesis two stated that online teammate evaluations would enhance team member enthusiasm for teaming more than paper and pencil teammate evaluations. Results shown in Table 1 provide support for this hypothesis (F=3.10, p<.049) with mean differences shown in Table 2 of 4.12 for online evaluation and 3.75 for paper and pencil evaluation.

Hypothesis three stated that online teammate evaluations would enhance readiness for teamwork more than paper and pencil teammate evaluations. While the mean differences were in the correct direction (4.27 for online evaluation and 4.00 for paper and pencil evaluation), statistically significant differences were not found (F=1.51, p=.224).

Insert Tables 1 and 2 About Here

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5. Discussion

Given the "unrelenting move from the paper-and-pencil administration of 360-degree surveys to electronic administration using the Internet and the World Wide Web" (Penny, 2003, p. 62) and the fact that the "effects of feedback on team processes and performance are not

nearly as well understood" (DeShon et al., 2004, p. 1036), focusing on team feedback methods and outcomes was called for. Moreover, pursuing answers to these questions has the potential to improve student experiences. Surveys "consistently show that students are less satisfied with feedback than with any other feature of their courses" (Nicol, Thomson, & Breslin, 2014, p. 102).

Thus, the current research focused on developing and testing online versus paper-and-pencil versions of teammate evaluations centered on team processes: action processes, transition processes, and interpersonal processes. They represent not only how teammates work together towards a team outcome, but they represent meaningful moments or episodes for team functioning (Ilgen, Hollenbeck, Johnson, & Jundt, 2005; Marks, Mathieu & Zaccaro, 2001; Mathieu, Maynard, Rapp, & Gilson, 2008).

Findings of the current research suggest that an online teammate evaluation process had substantial benefits over the traditional paper and pencil format. Online evaluations led to more positive team processes and enhanced individual enthusiasm for teamwork. These are both exceptionally important factors for students who are just learning about teamwork. A better understanding of team processes and increased enthusiasm for teamwork will be important factors influencing success in a team-based organizational structure.

Peer feedback has been called essential to team experiences and behavioral improvements. It can improve learning and performance in team settings and the effects can be powerful (Gabelica et al., 2014). According to Anson and Goodman, "Without feedback, students will not be able to learn to improve their behaviors – this time, or the next time around" (Anson & Goodman, 2014, p. 33).

References

AAC&U (Association of American Colleges and Universities). (2013, October). *Why are students going to college and what are they studying?* Data from the 2013 Chronicle of Higher Education Almanac. Retrieved on June 18, 2014, from http://www.aacu.org/aacu_news/aacunews13/october13/facts_figures.cfm

Aggarwal, P., & O'Brien, C. L. (2008). Social loafing on group projects: Structural antecedents and effect on student satisfaction. *Journal of Marketing Education*, *30*(3), 255-264.

American Society for Quality (2014). *2014 International Team Excellence Awards*. Retrieved on January 9, 2017, http://wcqi.asq.org/team-award/case-studies.html

Angelo, T.A. (2011). Using assessment to improve cooperative learning. In J.L. Cooper & P. Robinson (Eds.), *Small group learning in higher education: Research and Practice* (pp. 47-49). Stillwater, OK: New Forums Press.

Anson, R., & Goodman, J. A. (2014). A peer assessment system to improve student team experiences. *Journal of Education for Business, 89*, 27-34.

Ashmos, D. P., & Nathan, M. L. (2002). Team sense-making: A mental model for navigating uncharted territories. *Journal of Managerial Issues, 14*(2), 198-217.

Aubé, C., Rousseau, V., & Tremblay, S. (2011). Team size and quality of group experience: The more the merrier. *Group Dynamics: Theory, Research and Practice*, *15*(4), 357-75.

Beersma, B., Hollenbeck, J., Humphrey, S., Moon, H., Conlon, D., & Ilgen, D. (2003). Cooperation, competition, and team performance: Toward a contingency approach. *Academy of Management Journal, 46*, 572-590.

Bolman, L. G., & Deal, T. E. (1992). What makes a team work? *Organizational Dynamics, 21*(2), 34-44.

Bouzidi, L., & Jaillet, A. (2009). Can online peer assessment be trusted? *Educational Technology & Society, 12*(4), 257-268.

Brutus, S., & Donia, M. L. (2010). Improving the effectiveness of students in groups with a centralized peer evaluation system. *Academy of Management Learning & Education*, *9*(4), 652-662.

Brzovic, K., & Matz. S.I. (2009). Students advise Fortune 500 company: Designing a problem-based learning community. *Business Communication Quarterly, 72*(1), 21-34.

Buljac-Samardzic, M., Dekker-van Doorn, C. M., van Wijngaarden, J. D. H., & van Wijk, K. P. (2010). Interventions to improve team effectiveness: A systematic review. *Health Policy, 94,* 183-195.

Burton, K. S. (2005). Using student peer evaluations to evaluate team taught lessons. *Journal of Instructional Psychology, 32*(2), 136-138.

Cain, S. (2012, January 13). The rise of the new groupthink. *The New York Times*. Retrieved on January 9, 2017, from http://www.nytimes.com/2012/01/15/opinion/sunday/the-rise-of-the-new-groupthink.html?pagewanted=all&_r=0

Campion, M. A., Medsker, G. J., & Higgs, A. (1993). Relations between work group characteristics and effectiveness: Implications for designing effective work groups. *Personnel Psychology*, *46*(4), 823-850.

Capelli, P., & Rogovsky, N. (1994). New work systems and skill requirements. *International Labor Review, 133*, 204-220.

Chan, R.Y. (2016). Understanding the purpose of higher education: An analysis of the economic and social benefits for completing a college degree. *Journal of Education Policy, Planning and Administration, 6(5), 1-40.*

Chen, G., Donahue, L. M., & Klimoski, R. J. (2004). Training undergraduates to work in organizational teams. *Academy of Management Learning & Education*, *3*(1), 27-40.

Cockburn-Wootten, C., Holmes, P., & Simpson, M. (2008). Teaching teamwork in business communication/management programs. *Business Communication Quarterly, 71*(4), 417-420.

Cooper, J.L., & Robinson, P. (2011). *Small group learning in higher education: Research and Practice*. Stillwater, OK: New Forums Press.

Conn, C. E. (2010). Learning the hard way (but still learning!): Using team teaching as a vehicle for pedagogical change. *Business Communication Quarterly, 73*(1), 87-91.

Davidson, N., Major, C. H., & Michaelsen, L. K. (2014). Small-group learning in higher education – cooperative, collaborative, problem-based, and team-based learning: An introduction by the guest editors. *Journal on Excellence in College Teaching, 25*(3-4), 1-6.

Davison, H. K., Mishra, V., Bing, M. N., & Frink, D. D. (2014). How individual performance affects variability of peer evaluations in classroom teams: A distributive justice perspective. *Journal of Management Education, 38*(1), 43-85.

DeChurch, L. A., & Mesmer-Magnus, J. R. (2010). Measuring shared team mental models: A meta-analysis. *Group Dynamics: Theory, Research, and Practice, 14*(1), 1-14.

DeCuyper, S., Dochy, F., & Van den Bossche, P. (2010). Grasping the dynamic complexity of team learning: An integrative model for effective team learning in organisations. *Educational Research Review, 5*(2), 11-133.

De Dreu, C. K. W., & Weingart, L. R. (2003). Task versus relationship conflict, team performance, and team member satisfaction: A meta-analysis. *Journal of Applied Psychology, 88*(4), 741-749.

Delva, D., Jamieson, M., & Lemieux, M. (2008). Team effectiveness in academic primary health care teams. *Journal of Interprofessional Care, 22*(6), 598-611.

DeShon, R. P., Kozlowski, S. W. J., Schmidt, A. M., Milner, K. R., & Wiechmann, D. (2004). A multiple-goal, multilevel model of feedback effects on regulation of individual and team performance. *Journal of Applied Psychology, 89*(6), 1035-1056.

Dominick, P. G., Reilly, R. R., & McGourty, J. W. (1997). The effects of peer feedback on team member behavior. *Group & Organization Management, 22*(4), 508-520.

Dunphy, D. & Bryant, B. (1996). Teams: Panaceas or prescriptions for improved performance? *Human Relations, 49*(5), 677-699.

Edmondson, A. C. (2012, April 25). The importance of teaming. *Harvard Business School Working Knowledge*. Retrieved on January 9, 2017, from http://hbswk.hbs.edu/item/6997.html

El-Mowafy, A. (2014). Using peer assessment of fieldwork to enhance students' practical training. *Assessment & Evaluation in Higher Education, 39*(2), 223-241.

Ericson, A., Masiello, I., & Bolinder, G. (2012). Interprofessional clinical training for undergraduate students in an emergency department setting. *Journal of Interprofessional Care*, *26*(4), 319-325.

Fink, L. D. (2004). Beyond small groups: Harnessing the extraordinary power of learning teams. In L.K. Michaelsen, A. B. Knight, & A D. Fink (Eds.), *Team-based learning: A transformative use of small groups in college teaching*. Sterling, VA: Stylus Publishing.

Freeman, M., & McKenzie, J. (2002). SPARK, a confidential web-based template for self and peer assessment of student teamwork: Benefits of evaluating across different subjects. *British Journal of Educational Technology, 33*(5), 551-569.

Fouladi, R. T., McCarthy, C. J., & Moller, N. P. (2002). Paper-and-pencil or online? Evaluating mode effects on measures of emotional functioning and attachment. *Assessment, 9*(2), 204-215.

Gabelica, C., Van den Bossche, P., Segers, M., & Gijselaers, W. (2012). Feedback, a powerful level in teams: A review. *Educational Research Review, 7*(2), 123-144.

Gabelica, C., Van den Bossche, P., De Maeyer, S., & Segers, M. (2014). The effect of team feedback and guided reflexivity on team performance change. *Learning and Instruction, 34*, 86-96.

Grant-Vallone, J. (2011). Successful group work: Using cooperative learning and team-based learning in the classroom. *Journal on Excellence in College Teaching, 21*(4), 99-121.

Gregorus, G. J., Robie, C., & Born, M. P. (2001). Applying the social relations model to self and peer evaluations. *Journal of Management Development, 20*(6), 508-525.

Grier-Reed, T., Appleton, J., Rodriguez, M., Ganuza, Z., & Reschly, A. L. (2012). Exploring the student engagement instrument and career perceptions with college students. *Journal of Educational and Developmental Psychology, 2*(2), 85-96.

Hansen, R. S. (2006). Benefits and problems with student teams: Suggestions for improving team projects. *Journal of Education for Business. 82*(1), 11-19.

Hernandez, S. (2002). Team learning in a marketing principles course: Cooperative structures that facilitate active learning and higher level thinking. *Journal of Marketing Education, 24*(1), 73-85.

Hughes, A. M., Gregory, M. E., Joseph, D. L., Sonesh, S. C., Marlow, S. L., Lacerenza, C. N., Benishek, L. E., King, H. B., & Salas, E. (2016). Saving lives: A meta-analysis of team training in healthcare. *Journal of Applied Psychology*, *101*(9), 1266-1304.

Hunsaker, P., Pavett, C., & Hunsaker, J. (2011). Increasing student-learning team effectiveness with team charters. *Journal of Education for Business*, *86*(3), 127-139.

Ilgen, D. R., Hollenbeck, J. R., Johnson, M., & Jundt, D. (2005). Teams in Organizations: From I-P-O Models to IMOI Models. *Annual Review of Psychology, 56*, 517-543. Jassawalla, A., Sashittal, H., & Malshe, A. (2009). Students' perceptions of social loafing. *Academy of Management Learning & Education, 8*(1), 42-54.

Jordan, M.H., Field, H.S., & Armenakis, A.A. (2002). The relationship of group process variables and team performance: A team-level analysis in a field setting. *Small Group Research, 33*(1), 121-150.

Keniston, H. (1960). The goals of higher education. *Proceedings of the American Philosophical Society, 104*(6), 565-569.

Kozlowski, S. J., & Ilgen, D. R. (2006). Enhancing the Effectiveness of Work Groups and Teams. *Psychological Science in the Public Interest*, *7*(3), 77-124.

Kreie, J., Headrick, R.W., & Steiner, R. (2007). Using Team Learning to Improve Student Retention. *College Teaching, 55*, 51-6.

LePine, J. A., Piccolo, R. F., Jackson, C. L., Mathieu, J. E., & Saul, J. R. (2008). A meta-analysis of teamwork processes: Tests of a multidimensional model and relationships with team effectiveness criteria. *Personnel Psychology, 61(2*), 273-307.

London, M. (2013). Generative team learning in Web 2.0 environments. *Journal of Management Development, 32*(1), 73-95.

London, M., & Sessa, V. I. (2006). Group feedback for continuous learning. *Human Resource Development Review*, *5*(3), 303-329.

Loughry, M. L., Ohland, M. W., & Moore, D. D. (2007). Development of a theory-based assessment of team member effectiveness. *Educational and Psychological Measurement, 67*(3), 505-524.

Mankins, M., A. Bird, & J. Root. (2013). Making star teams out of star players. *Harvard Business Review.* January-February. Accessed January 9, 2017, from http://hbr.org/2013/01/making-star-teams-out-of-star-players/ar/

Marks, M. (2006). The science of team effectiveness. *Psychological Science in the Public Interest: A Journal of the American Psychological Society*, *7*(3), i.

Marks, M. A., Mathieu, J. E., & Zaccaro, S. J. (2001). A temporally based framework and taxonomy of team processes. *Academy of Management Review, 26(3),* 356-376.

Mathieu, J., Maynard, M. T., Rapp, T., & Gilson, L. (2008). Team effectiveness 1997-2007: A review of recent advancements and a glimpse into the future. *Journal of Management, 34(3)*, 410-476.

Mesmer-Magnus, J. R., & DeChurch, L. A. (2009). Information sharing and team performance: A meta-analysis. *Journal of Applied Psychology, 94*(2), 535-546.

Michaelsen, L. K. (2004). Getting started with team-based learning. In L.K. Michaelsen, A.B. Knight, and A.D. Fink (Eds.) *Team-based learning: A transformative use of small groups in college teaching* (pp. 27-50). Sterling, VA: Stylus Publishing.

Michaelsen, L. K., Davidson, N., & Major, C. H. (2014). Team-based learning practices and principles in comparison with cooperative learning and problem-based learning. *Journal on Excellence in College Teaching, 25*(3-4), 57-84.

Michaelsen, L. K., & Fink, L. D. (2004). Calculating peer evaluation scores. In L.K. Michaelsen, A.B. Knight, and A.D. Fink (Eds.), *Team-based learning: A transformative use of small groups in college teaching* (pp. 229-239). Sterling, VA: Stylus Publishing.

Michaelsen, L. K., Knight, A. B., & Fink, A. D. (2004). *Team-based learning: A transformative use of small groups in college teaching.* Sterling, VA: Stylus Publishing.

Millis, B. J. (2010). *Cooperative learning in higher education: Across the disciplines, across the Academy*. Sterling, VA: Stylus Publishing.

Museum of Modern Art. (2011). *Inside/Out: Foreclosed: Teamwork.* Retrieved on January 9, 2017, from http://www.moma.org/explore/inside_out/2011/06/30/foreclosed-team-work/

NACE (National Association of Colleges and Employers). 2015, November 18. *Job outlook 2016: Attributes employers want to see on new college graduates' resumes*. Retrieved on

August 3, 2016, from http://www.naceweb.org/s11182015/employers-look-for-in-new-hires.aspx

Napier, R. W., & Gerschenfeld, M. K. (2004). *Groups: Theory and Experience*. Boston, MA: Houghton Mifflin.

Nicol, D., Thomson, A., & Breslin, C. (2014). Rethinking feedback practices in higher education: A peer review perspective. *Assessment & Evaluation in Higher Education*, *39*(1), 102-122.

Nicoll-Senft, J. (2009). Assessing the impact of team-based learning. *Journal on Excellence in College Teaching, 20*(2), 27-42.

Ohland, M. W., Loughry, M. L., Woehr, D. J., Bullard, L. G., Felder, R. M., Finelli, C. J., Layton, R. A., Pomeranz, H. R., & Schmucker, D. G. (2012). The comprehensive assessment of team member effectiveness: Development of a behaviorally anchored rating scale for self- and peer evaluation. *Academy of Management Learning & Education, 11*(4), 609-630.

Opatrny, C., McCord, M., & Michaelsen, L. (2014). Can transferable team skills be taught? A longitudinal study. *Academy of Educational Leadership Journal, 18*(2), 61-72.

Patchan, M. M., & Schunn, C. D. (2015). Understanding the benefits of providing peer feedback: How students respond to peers' texts of varying quality. *Instructional Science*, *43*(5), 591-614.

Peeters, M. A. G., Van Tiujl, H. F. J. M., Rutte, C. G., & Reymen, I. M. M. J. (2006). Personality and team performance: A meta-analysis. *European Journal of Personality, 20*, 377-396.

Pellecchia, M., Connell, J. E., Eisenhart, D., Kane, M., Schoener, C., Turkel, K., Riley, M., & Mandell, D. S. (2011). We're all in this together now: Group performance feedback to increase classroom team data collection. *Journal of School Psychology, 49*, 411-431.

Penny, J. A. (2003). Exploring differential item functioning in a 360-degree assessment: Rater source and method of delivery. *Organizational Research Methods, 6*(1), 61-79.

Pfaff, E., & Huddleston, P. (2003). Does it matter if I hate teamwork? What impacts student attitudes toward teamwork. *Journal of Marketing Education*, *25*(1), 37-45.

Pieterse, V., & Thompson, L. (2010). Academic alignment to reduce the presence of 'social loafers' and 'diligent isolates' in student teams. *Teaching in Higher Education*, *15*(4), 355-367.

Prokesch, S. (2009, January). How GE teaches teams to lead change. *Harvard Business Review*. Retrieved on January 9, 2017, from http://hbr.org/2009/01/how-ge-teaches-teams-to-lead-change/ar/1

Powers, L. M., & Summers, J. D. (2009). Integrating graduate design coaches in undergraduate design project teams. *International Journal of Mechanical Engineering Education*, *37*(1), 3-20.

Quintessential Careers. (2004) Retrieved on September 13, 2011, from http://www.quintcareers.com/

Richter, A. W., Dawson, J. F., & West, M. A. (2011). The effectiveness of teams in organizations: A meta-analysis. *The International Journal of Human Resource Management, 22*(13), 2749-2769.

Riebe, L., Roepen, D., Santarelli, B., & Marchioro, G. (2010). Teamwork: Effectively teaching an employability skill. *Education & Training, 52*(6-7), 528-539.

Salas, E., DiazGranados, D., Klein, C., Burke, C. S., Stagl, K. C., Goodwin, G. F., & Halpin, S. M. (2008). Does team training improve team performance? A meta-analysis. *Human Factors*, *50*(6), 903-933.

Sandoval-Lucero, E. (2014). Serving the developmental and learning needs of the 21st century diverse college student population: A review of the literature. *Journal of Educational and Developmental Psychology, 4*(2), 47-64.

Schlesinger, L. A., Eccles, R. G., & Gabbaro, J. J. (Eds.) (1983). *Managerial Behavior in Organizations*. New York: McGraw-Hill.

St. Clair, K., & L. Chihara. (2012). Team-based learning in a statistical literacy class. *Journal of Statistics Education, 20*(1), 20.

Stoller, J. K., Rose, M., Lee, R., Dolgan, C., & Hoogwerf, B. J. (2004). Teambuilding and leadership training in an internal medicine residency training program. *Journal of General Internal Medicine*, *19*(6), 692-697.

Tata, J & Prasad, S. (2004). Organizational structure, team self-management, and judgments of team effectiveness. *Journal of Managerial Studies*, *16*(2), 248-265.

Tinto, V. (2003). Learning better together: The impact of learning communities on student success. *Higher Education Monograph Series, 1,* 1.

Toumasis, C. (2004). Cooperative study teams in mathematics classrooms. *International Journal of Mathematical Education in Science & Technology*, *35*(5), 669-679.

van der Pol, J., van den Berg, B. A. M., Admiraal, W.F., & Simons, P. R. J. (2008). The nature, reception, and use of online peer feedback in higher education. *Computers & Education, 51*, 1804-1817.

Van der Vegt, G. S., de Jong, S. B., Bunderson, J. S., & Molleman, E. (2010). Power assymetry and learning in teams: The moderating role of performance feedback. *Organization Science, 21*(2), 347-361.

Vasan, N. S., DeFouw, D. O. & Compton, S. (2009). A survey of student perceptions of team-based learning in anatomy curriculum: Favorable views unrelated to grades. *Anatomical Sciences Education, 2*(4), 150–155.

Weiss, M., & Hoegl, M. (2015). The history of teamwork's societal diffusion: A multi-method review. *Small Group Research, 46*(6), 589-622.

Werner, J.M., & Lester, S. W. (2001). Applying a team effectiveness framework to the performance of student case teams. *Human Resource Development Quarterly, 12*(4), 385-402.

White House, The. (n.d.). *Education: Knowledge and skills for the jobs of the future*. Retrieved on January 9, 2017, from http://www.whitehouse.gov/issues/education/higher-education

Zaccaro, S. J., Ely, K., & Shuffler, M. (2008). The leader's role in group learning. In V.I. Sessa & M. London (Eds.), *Work Group Learning* (pp. 193-214). New York, NY: Lawrence Erlbaum.

Table 1: ANOVA Results

ANOVA		Sum of Squares	df	Mean Square	F	Sig.
Team Processes	Between Groups	1.867	1	1.867	10.185	.002
	Within Groups	9.167	50	.183		
	Total	11.035	51			
Enthusiasm for Teaming	Between Groups	1.849	1	1.849	3.106	.049
	Within Groups	30.359	51	.595		
	Total	32.208	52			
Readiness for Teaming	Between Groups	1.006	1	1.006	1.518	.224
	Within Groups	33.799	51	.663		
	Total	34.805	52			

Table 2: Mean Differences

Construct	Condition	Mean
Team Processes	Online	4.16
	Paper and Pencil	3.77
Enthusiasm for Teaming	Online	4.12
	Paper and Pencil	3.75
Readiness for Teaming	Online	4.27
	Paper and Pencil	4.00