Knowledge Integration and Team Effectiveness: A Team Goal Orientation Approach

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Abstract:

Knowledge integration is critical to achieving both objective and subjective team effectiveness goals. Integrating knowledge resources, however, is a challenging activity for teams. Converging the theories of team goal orientation and knowledge integration, in this study we examine how team goal orientation impacts a team's internal knowledge integration, and how knowledge integration, in turn, affects multiple dimensions of team effectiveness. Data were collected from 90 self-directed teams engaged in an extended business simulation, where each team acted as a top management team of a business firm. Results indicated that both learning and performance-prove goal orientations positively influenced team knowledge integration, and knowledge integration impacted both objective and subjective dimensions of team effectiveness. We also found partial support for a mediating role of internal knowledge integration. The study recommends a goal orientation approach to integrating knowledge in teams and proposes that this approach has significant implications for both research and practice.

Keywords: Knowledge Integration | Team Goal Orientation | Team Effectiveness

Article:

INTRODUCTION

Firms are increasingly using teams to achieve their performance goals (Gibson, Waller, Carpenter, & Conte, 2007). Defined as social systems of three or more people, who are interdependent in their tasks, and who share responsibility for their outcomes, teams bring together individually held knowledge, expertise, and specialized skills to bear on tasks of varied nature (Hoegl & Gemuenden, 2001). Firms deploy teams across diverse contexts, such as

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software development, new product development, R&D, engineering, and consulting, to achieve their goals (Gardner, Gino, & Staats, 2012).

Teams provide firms with a viable means of assimilating and combining specialized knowledge resources (Alavi & Tiwana, 2002). This active assimilation and consolidation of individuals' specialized knowledge within teams is referred to as internal knowledge integration[1] (Mehta & Bhardwaj, 2015). Emphasizing its significant role in teams, prior research has affirmed that knowledge integration deeply influences team outcomes, such as creativity (Tiwana & McLean, 2005), decision quality (Robert, Dennis, & Ahuja, 2008), and project completion (Tiwana, 2004; Mitchell, 2006).

Despite this body of research, our understanding of how knowledge integration influences a comprehensive set of *team effectiveness* outcomes is limited. Team effectiveness captures a comparatively broad and realistic picture of team assessment, as it goes beyond just the quantitative team outcomes (such as objective performance), and includes qualitative outcomes, as well. Qualitative dimensions of team effectiveness include *team viability* (a team's capacity to continue working successfully in future), *team satisfaction* (a feeling of well-being arising from team experience), and *team perceived performance* (a sense of how well the team is doing) (Hackman, 1990; Cohen & Bailey, 1997).

Given that knowledge integration has the potential to influence both quantitative and qualitative dimensions of team effectiveness, developing this deeper understanding can be valuable for team-based organizations. Additionally, as the use of teams continues to increase in contemporary firms, and teams typically work together for an average of 1 to 2 years (Thomson, 2004), assessing subjective outcomes, such as team viability, satisfaction, and perceived performance, is as important as assessing objective performance (Smith, 2008; Bell & Marentette, 2011). This represents the first gap that the current study addresses. Thus, our first research question is: Does knowledge integration predict both qualitative and quantitative dimensions of team effectiveness?

While teams may need to integrate knowledge to be effective, it is easier said than done. Team members are often reluctant to share and combine their specialized knowledge inputs (Basaglia, Caporarello, Magni, & Pennarola, 2010). Prior research has reported that a team's deep-level diversity might be a reason for this reluctance (Harrison, Price, & Bell, 1998). Deep-level diversity includes differences among team members' attitudes, beliefs, and values that are not readily detectable (Horwitz, 2005). These differences have the potential to inhibit a team's knowledge integration efforts. Another challenge that teams face while integrating their knowledge resources is the presence of a hidden-profile, which represents a pattern of unshared critical information among the team members (Stasser, 1988). Studies have shown that teams plagued with a hidden-profile issue have problems combining the knowledge held by individual members (Stasser & Stewart, 1992). To make matters more complicated, team members cannot be forced to integrate their knowledge inputs (Staples & Webster, 2008; He, Baruch, & Lin, 2014).

[1] For purpose of brevity, internal knowledge integration will be referred to as knowledge integration in the paper.

No wonder then, knowledge integration presents a critical puzzle for scholars and managers alike, and this has led to a spurt of research examining its antecedents. For example, Robert et al. (2008) identified social capital and communication environment as important antecedents to knowledge integration. Similarly, Basaglia et al. (2010) observed team climate as a predictor of knowledge integration. Broader literature on team climate proposes that team members take cues from their team's climate, and adopt shared perceptions about the team's emphasis on either learning or performance goals (Bunderson & Sutcliffe, 2003; Dragoni, 2005). Categorized as team learning, performance-prove, or performance-avoid goal orientation, these shared perceptions typically determine which processes the team will utilize to achieve its outcomes. This can significantly impact a team's knowledge integration. For example, is it possible that *learning-oriented* teams actively perform knowledge integration to develop new expertise and skill-sets, whereas *performance-prove oriented* teams deploy knowledge integration activities to aggressively achieve their performance goals? More interestingly, is it possible that *performance-avoid oriented* teams, due to their overemphasis on avoiding risks, actually avoid knowledge integration activities? Exploring these questions may benefit both academicians and practitioners.

In prior studies, team goal orientation has been linked to team processes such as information exchange, team-focused effort, and team planning (DeShon, Kozlowski, Schmidt, Milner, & Wiechmann, 2004; Mehta, Armenakis, Feild, & Mehta, 2009; Gong, Kim, Lee, & Zhu, 2013). However, to the best of our knowledge, the relationship between team goal orientation and knowledge integration has not been examined. This presents another gap that this study addresses. Thus, our second research question is: Does team goal orientation predict knowledge integration? And, do different team goal orientations impact team's knowledge integration differently?

Finally, we also examine if knowledge integration mediates the relationship between team goal orientation and team effectiveness. Although team goal orientation has been shown to impact team outcomes (LePine, 2005; Gong et al., 2013), the evidence is mixed regarding the intervening mechanisms employed by the teams to achieve those desired outcomes. For example, DeShon et al. (2004) concluded that learning-oriented teams tend to use regulatory mechanisms (effort and feedback) more beneficially compared to performance-oriented teams. On the other hand, Mehta et al. (2009) demonstrated that only performance-prove oriented teams utilized regulatory mechanism (team planning) to achieve performance. Based on the results, the authors surmised that learning and performance goal orientations may be associated with distinct team processes and team outcomes. Extending the research reported by Mehta et al. (2009), in this study we investigate how learning- and performance-oriented teams utilize knowledge integration as an intervening mechanism to achieve outcomes such as team viability, satisfaction, and performance. In doing so, this study aims to provide the “explanatory glue” that brings together a seemingly perplexing body of research for a more comprehensive understanding of the relationship between team goal orientation and team effectiveness, and the role of intervening mechanisms, such as knowledge integration and planning, in this relationship.

Figure 1 represents the hypothesized model of the relationship between team goal orientation, knowledge integration, and team effectiveness. Also, a summary of the constructs included in the current study, their theoretical orientations, and their relevance to the hypothesized model is

presented in Appendix A. Next, we discuss the motivation for the current study and theoretical background in detail.

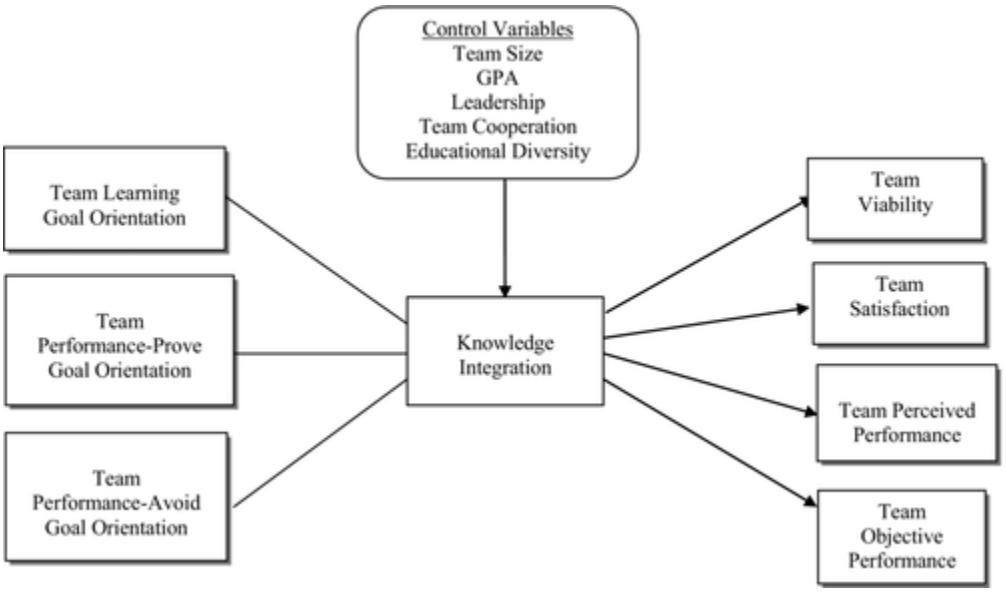

Figure 1. Hypothesized model of the relationship between team goal orientation, knowledge integration, and team effectiveness.

MOTIVATION AND THEORETICAL FOUNDATIONS

Knowledge Integration

Knowledge is identified as the genetic material of a firm, and the firm's *raison d'être* is to provide a context for integration of this knowledge to exploit the economic reality of the markets (Prusak, 1996). Teams provide a viable platform for integrating knowledge across multiple domains (Alavi & Tiwana, 2002; Okhuysen & Eisenhardt, 2002; Robert et al., 2008). Team members possess diverse portfolios of requisite know-how, skills, and abilities, and teams perform knowledge integration to actively assimilate, combine, and synthesize these knowledge resources to achieve their goals (Alavi & Tiwana, 2002). Furthermore, knowledge integration not only requires team members to jointly solve team-level problems, but also requires them to build on each other's ideas, skills, and expertise, and to gain new learning.

Given these varied facets, it is possible that effective knowledge integration would influence a myriad of team outcomes. A review of recent literature on knowledge integration affirms this notion (see Table 1). Knowledge integration has been associated with outcomes such as team learning, team memory, team creativity, team decision quality, and project completion times (Walz, Elam, & Curtis, 1993; Janz & Prasarnphanich, 2003; Tiwana & McLean, 2005; Mitchell, 2006). However, despite this impressive body of literature, our understanding of the impact of knowledge integration on all-encompassing dimensions of team effectiveness is still incomplete.

Table 1. Previous studies on knowledge integration.

Prior Studies on Knowledge Integration	Antecedents	Mediator or Moderator	Outcomes
Alavi and Tiwana (2002)	KM systems' support of: Transactive memory Mutual understanding Knowledge sharing Within-team ties		Knowledge integration
Basaglia et al. (2010)	Autonomy climate Experimental climate	Knowledge integration	Team efficiency Overall team effectiveness
Gardner et al., 2012	Relational resources Experiential resources Structural resources	Knowledge integration	Team performance
Mehta and Bharadwaj (2015)	Team sentry processes Team guard processes		Knowledge integration
Mehta, Hall, and Byrd (2014)	Team IT-use Team relational capital Team cognition	Project uncertainty	Knowledge combination Knowledge exchange
Mitchell (2006)	External knowledge access Knowledge integration		Project completion
Okhuysen and Eisenhardt (2002)	Information sharing Questioning others managing time		Knowledge integration
Robert et al. (2008)	Structural capital Relational capital Cognitive capital Environment	Knowledge integration	Team decision quality
Taylor and Greve (2006)	Knowledge combination		Team innovations
Tiwana (2004)	Knowledge integration		Software design effectiveness Software defect density Software development efficiency
Tiwana and McLean (2005)	Relational capital Absorptive capacity Expertise heterogeneity	Expertise integration	Creativity
Walz et al. (1993)	Team conflict		Team learning Team memory Knowledge integration

A key reason for this is that team effectiveness is a multidimensional construct that includes both quantitative and qualitative dimensions, such as *team performance*, *team viability*, and *team satisfaction* (Hackman, 1990). Team viability refers to the capacity of a team to continue working successfully in the future, while team satisfaction represents a feeling of well-being among team members that arises as a result of a favorable team experience. Finally, team performance can be measured both objectively, as well as, subjectively—such as perceived performance, to evaluate how well a team achieved its goals.

As shown in Table 1, prior studies in the knowledge integration domain have rarely provided a comprehensive explanation of its impact on multiple team effectiveness dimensions. Most studies have typically focused on a single team outcome, such as performance or decision quality

(Robert et al., 2008; Gardner et al., 2012). A few studies that have examined the impact of knowledge integration on both team efficiency and effectiveness have operationalized team effectiveness as a unidimensional construct. For example, Basaglia et al. (2010) measured team effectiveness as members' perceptions of overall team effectiveness. Although Fedor, Ghosh, Caldwell, Maurer, and Singhal (2003) investigated team satisfaction as an outcome of team knowledge processes, their examination was limited to a team's satisfaction with project success, and not overall satisfaction with the team experience.

In this paper, we reason that a more holistic assessment of the impact of knowledge integration on team outcomes is called for. This is particularly important in the context of the complex nature of non-routine knowledge work. Knowledge integration is quite effortful and requires a significant investment of the team's cognitive and social energies in activities such as combining multiple perspectives to develop a shared understanding of non-routine problems or blending new knowledge with what the team already knows. Such activities require teams to actively challenge the current assumptions and experiment with novel ways of doing things to achieve their objectives. For some teams, engaging in such intense social and intellectual mechanisms may result in greater satisfaction and higher confidence in the team's ability to work well in the future. On the other hand, some teams may perceive knowledge integration as requiring too much work or effort. Such perceptions can have significant long-term implications for team outcomes. Therefore, understanding the holistic impact of knowledge integration on team effectiveness becomes important to organizations, as it is likely to affect their ability to draw on the intellectual capital embedded within their human capital. Furthermore, researchers are beginning to contemplate that determinants, similar to knowledge integration, may influence quantitative team effectiveness dimensions differently as compared to qualitative dimensions (Castano, Watts, & Tekleab, 2013; Mello & Delise, 2015), thus necessitating a multidimensional inquiry of team effectiveness.

Despite its importance, knowledge integration within teams could be challenging. Team members are often reluctant to share important knowledge among themselves (Basaglia et al., 2010), and cannot be forced to do so (Staples & Webster, 2008; He et al., 2014). Given that knowledge integration essentially entails combination and synthesis, team managers often find knowledge integration challenging due to team members' reluctance to consolidate their individual expertise. This disinclination has been attributed to issues such as deep-level diversity and the presence of a hidden profile (Stasser & Stuart, 1992; Harrison et al., 1998; Horwitz, 2005). When team members differ in their values and beliefs, they would likely lack the motivation to part with and integrate individually held knowledge.

Similarly, teams prone to the hidden-profile issue fail to integrate all critical knowledge available within the team. To overcome such within-team differences, and to actively combine and synthesize unique knowledge resources, it is essential to motivate the members to collaboratively pursue common goals (Gagné, 2009; Swift, Balkin, & Matusik, 2010). A collective motivational orientation may drive the members to overcome their differences and inhibitions in order to integrate knowledge in pursuit of common goals. A key factor affecting team members' motivation and adoption of common goals is *team goal orientation*.

Team Goal Orientation

Team goal orientation refers to a shared understanding among team members regarding the team goals being pursued. Three types of team goal orientations can emerge. When a team focuses on learning and developing new knowledge and skills, team learning goal orientation emerges. Team performance-prove goal orientation ensues when teams emphasize performance goals and competitiveness. When teams focus on avoiding failures and negative judgment, performance-avoid goal orientation is the result.

The concept of team goal orientation has its foundation in the individual achievement motivation literature. According to the achievement motivation theory, goal orientation is a motivational orientation that influences how individuals interpret and respond to work situations in achievement settings (Dweck, 1986; Elliot & Church, 1997). It has been established as a three-dimensional construct comprising of: (i) a learning goal orientation, which highlights an individual's propensity to develop new skills, improve knowledge and competence, and master new situations; (ii) a performance-prove goal orientation, which emphasizes an individual's tendency to prove her ability and gain favorable judgments about it; and (iii) a performance-avoid orientation, which underlines an individual's desire to avoid failure and negative judgments about her ability (VandeWalle, 1997).

Recent research has established that goal orientation exists at the team level as well (Dragoni, 2005; Porter, Webb, & Gogus, 2010; Gong et al., 2013). Contextual signals stimulate adoption of learning or performance goals by a team, depending upon its members' shared perceptions of team climate (Turner et al., 2002; Chadwick & Raver, 2015). Team goal orientation, thus, "reflects the shared understanding of the extent to which a team emphasizes learning or performance goals, and, consequently, helps to facilitate decision making, collaborative problem-solving, and intragroup coordination that maintain the group's emphasis on learning or performance goals" (Bunderson & Sutcliffe, 2003, p. 553).

Team goal orientation emerges as a result of cues from psychological and work group climate (Dragoni, 2005). Psychological climate, defined as team members' individual perceptions of their group environment, forms as a result of members' interactions with their leader, or via other situational cues such as team policies and reward structure. The climate then cues individuals to expected outcomes, evaluation criteria, and social support, encouraging them to adopt specific state goal orientations. For example, a psychological climate for learning may emerge if individual's social context favors new ideas and skill development, and rewards innovation (Bunderson & Sutcliffe, 2002). The psychological climate (individual perceptions of work environment) becomes a shared team climate when, due to frequent interactions, members evaluate and interpret social cues regarding acceptable group behaviors and adjust their achievement motivations accordingly (Dragoni, 2005). Over time, this creates a group reality that would coerce members to follow a shared learning or performance focus (Chadwick & Raver, 2015).

The conceptualization of team goal orientation as a state is now well established (Bunderson & Sutcliffe, 2003; DeShon et al., 2004; Mehta et al., 2009). It is also confirmed that three types of team goal orientations exist: learning, performance-prove, and performance-avoid goal orientation (Dragoni, 2005). The state, when team members perceive their group as having

learning goals with an emphasis on developing knowledge and skills, mutual support mechanisms, and challenging tasks, is referred to as team learning goal orientation. The state, when team members perceive their group as having performance goals with an emphasis on proving their ability, gaining favorable judgment, and being competitive, is termed as team performance-prove goal orientation. The state, when team members perceive their group as focusing on avoiding failures and negative evaluations of their ability, is termed team performance-avoid goal orientation.

Team goal orientation creates a mutually agreed set of beliefs among team members, which then guides their actions, and in turn, the outcomes. For example, it may influence whether or not teams will engage in key knowledge processes (Swift et al., 2010), such as knowledge integration. Shaped by goal orientation, knowledge integration may be perceived by a team as a beneficial process that provides an opportunity for new learning, or as a process that is perceived as risky because it may highlight a team's lack of knowledge in certain areas. These perceptions would determine whether the team engages in the knowledge integration or not, which in turn, would impact team outcomes. Therefore, an examination of how different goal orientation dimensions impact a team's knowledge integration, and in turn, team effectiveness, would be useful to both researchers and practitioners.

Table 2. Previous studies on team goal orientation.

Prior Studies on Team Goal Orientation	**Antecedents**	**Mediator or Moderator**	**Outcomes**
Bunderson and Sutcliffe (2003)	Team goal orientation	None	Business unit performance
Chi and Huang (2014)	Transformational leadership	Team goal orientation	Team performance
DeShon et al. (2004)	Team goal orientation	Team self-regulatory processes	Team Performance
Gong et al. (2013)	Team goal orientation	Information Exchange	Team creativity
Huang (2010)	Team goal orientation	Team task conflict	Team relationship conflict
LePine (2005)	Team goal orientation	Goal difficulty	Team adaptation
Maltarich et al. (2016)	Team goal orientation Relationship conflict	Team goal orientation	Team performance
Mehta et al. (2009)	Team goal orientation	Team planning	Team performance
Pearsall and Venkataramani (2015)	Team goal learning orientation	Team identification Team goal mental model Team planning	Team performance
Pieterse et al. (2013)	Cultural Diversity	Team member goal orientation	Team performance
Porter (2005)	Team goal orientation	Team backing up behavior	Team performance Team efficacy Team commitment
Porter et al. (2010)	Team goal orientation	Slack resources	Team adaptability
Unger-Aviram and Erez (2016)	Team goal orientation	Cultural learning values	Team performance Team adaptation

As shown in Table 2, a review of existing literature on team goal orientation reveals that the goal orientation-knowledge integration link has not been examined yet. Table 2 also highlights that although team goal orientation research has advanced significantly, gaps still exist. For example, (i) a majority of studies have focused only on team performance as the outcome variable, (ii)

only two studies have investigated qualitative outcomes, and neither of these studies has examined team viability, satisfaction, and performance, and (iii) knowledge integration, a possibly critical mediating variable, has been overlooked.

Thus, motivated by the gaps in existing research, this study extends the work of Mehta et al. (2009). In their study, the authors found team performance-prove orientation to be related to team performance via team planning. Surprisingly, learning orientation was unrelated to team performance, although it was associated with team planning. An extension of the study, involving examination of knowledge integration and multiple dimensions of team effectiveness, can provide us with a holistic view of the relationship between team goal orientation and team outcomes. The results would not only enhance our understanding of the predictive capability of team goal orientation with respect to critical team processes such as knowledge integration, but would also help us discern how practitioners can utilize a goal orientation approach to promote not just team performance, but overall team effectiveness for long-term gains. Given that teams are the most prevalent means of integrating knowledge in organizations today, and outcomes such as team satisfaction and viability are considered critical to sustaining a positive and productive team culture (Smith, 2008; Bell & Marentette, 2011), this study makes important contributions to both practice and research.

HYPOTHESES DEVELOPMENT

Team Goal Orientation and Knowledge Integration

Previous research on the role of team goals (Boland & Tenkasi, 1995), team climate (Basaglia et al., 2010), and communication climate (Robert et al., 2008) in knowledge integration lends support to the notion that team goal orientation could be a compelling precursor to knowledge integration. For example, Basaglia et al. (2010) identified autonomous and experimental team climate as important to knowledge integration. Team climate provides cues to the members regarding expected team behaviors and goals, resulting in the emergence of shared perceptions of a learning or performance focus, which subsequently manifests as a team learning or performance-prove goal orientation (Bunderson & Sutcliffe, 2003). Therefore, there is a strong possibility that team goal orientation is related to knowledge integration.

Different types of team goal orientations elicit varied team behaviors, learning strategies, and processes. For example, learning orientation has been linked to learning outcomes such as innovation (Bunderson & Sutcliffe, 2002), and the use of learning strategies (Turner et al., 2002). For learning-oriented teams, knowledge integration is a valuable process that allows them to improve their skills, capabilities, and knowledge base (Elliot & McGregor, 2001). Members of learning-oriented teams share their individual knowledge with each other (Gong et al., 2013) to develop new skills and to coordinate their resources toward growth and innovation (VandeWalle, 2003). In such teams, a sincere inquisitiveness drives knowledge integration. Team members likely engage in experimentation by pooling in, debating, and consolidating ideas because of their focus on learning more about *what* works and *why* in their task execution. In other words, *learning* to achieve new understanding or mastery is the primary goal of learning-oriented teams. To accomplish this goal, such teams exhibit “exploratory learning” behaviors, which entails searching for, exchanging, and processing new information (Gong et al., 2013;

Chadwick & Raver, 2015). Thus, we argue that learning-oriented teams would actively perform knowledge integration.

> *Hypothesis 1a*: *Team learning goal orientation will be positively related to knowledge integration*.

Teams with a high performance-prove orientation view ability as fixed, and tend to focus on the task at hand and proving their competence. Similar to learning-oriented teams, performance-prove oriented teams would also be expected to integrate knowledge, but for the purpose of task accomplishment. To such teams, knowledge integration is just a means to an end—i.e., achieving high performance and proving their competence to others. Thus, members of performance-prove oriented teams likely exchange, debate, and combine ideas to identify and gain any advantageous information that can be used to enhance their performance. Such teams typically demonstrate active "exploitative learning" behaviors, such as utilizing their knowledge resources efficiently to maximize their task gains (Chadwick & Raver, 2015). Supporting this notion, Gong et al. (2013) showed that performance-prove oriented teams engage in information exchange to foster creativity.

In another study, Porath and Bateman (2006) found that performance-prove orientation facilitates proactive action, such as acquiring additional education or skills to improve performance. Knowledge integration can be considered a proactive activity that performance-oriented teams use to perform well. Overall, then, knowledge integration may be important to these teams because it will provide them with an opportunity to showcase their knowledge, prove their competence to others, and to perform well. Based on these arguments, we hypothesize that performance-prove oriented teams will actively perform knowledge integration to achieve task goals.

> *Hypothesis 1b*: *Team performance-prove goal orientation will be positively related to knowledge integration*.

On the other hand, teams with a high performance-avoid orientation exhibit maladaptive response patterns such as low task engagement and performance anxiety due to undue focus on risk-avoidance. Such teams tend to underestimate their capabilities, resulting in performance anxieties. Such negative response patterns consume team members' cognitive resources, hampering their ability to use these resources for knowledge integration activities (Sutcliffe & Weick, 2008). Additionally, due to a fear of being perceived as incompetent, performance-avoid oriented teams tend to avoid making mistakes, takings risks, or getting unfavorable evaluations. Integrating knowledge may be perceived as too risky and undesirable, because it may highlight existing knowledge gaps and expose the team as being incompetent. Such teams have also been shown to circumvent both exploratory and exploitative learning (Chadwick & Raver, 2015). Previous research has shown that performance-avoid orientation hinders information exchange (Gong et al., 2013). To summarize, teams with performance-avoid orientation may avoid integrating knowledge either because of their inability to identify relevant information due to cognitive overload (Sutcliffe & Weick, 2008) or out of fear of being perceived as incompetent (Elliot & Church, 1997). Thus, we hypothesize:

Hypothesis 1c: *Team performance-avoid goal orientation will be negatively related to knowledge integration*.

Knowledge Integration and Team Effectiveness

Researchers generally agree on the pivotal role of team processes in achieving both objective and subjective team outcomes. According to Marks, Mathieu, and Zaccaro (2001, p. 356), "Success is not only a function of team members' talents and the available resources, but also the processes team members use to interact with each other to accomplish the work." Team processes, such as knowledge integration, entail activities that generally require team members to actively interact with each other. For example, team members typically assimilate knowledge by communicating verbally, exchanging tangible artifacts, coordinating their expertise, and by sharing information about who knows what in the team (Rulke & Galaskiewicz, 2000). These active inter-personal communication and coordination activities not only allow the team members to develop a common perspective on the problem and potential solutions (Reich & Benbasat, 1996), but also satisfy their social and intellectual needs, thus resulting in greater team satisfaction.

Additionally, knowledge integration involves having one's knowledge built upon, or combined with others' ideas, to generate new insights. Engaging in such activities would make team members feel important, as they would deem their own knowledge key to achieving team goals. This would likely enhance one's satisfaction. Likewise, it is probable that the act of combining each other's knowledge to achieving team goals would (i) give team members the sense that they could work well together to solve problems, and (ii) demonstrate the competence of team members—both of which would increase their desire to continue working together in the future, i.e., increase long-term viability. Interestingly, studies examining attitudinal team outcomes such as satisfaction and viability are scarce.

However, previous studies have examined and reported a positive link between knowledge integration and team performance (Tiwana, 2004; Mitchell, 2006). Assimilation of members' knowledge resources improves the overall technical, business, and operational knowledge available to a team, thus enhancing performance (Mitchell, 2006). Studies have also shown that the social interactions and coordination mechanisms involved in knowledge integration process promote a common understanding of team objectives and how to achieve them, resulting in better performance (Reich & Benbasat, 1996). Hence, we propose:

Hypothesis 2: *Knowledge integration will be positively related to team viability, satisfaction, and performance*.

Knowledge Integration as a Mediator between Team Goal Orientation and Team Effectiveness

Following the stepwise approach, we first hypothesize the relationship between team goal orientation and team effectiveness and then hypothesize mediation (Frazier, Tix, & Barron, 2004). An extant body of research has emphasized the role of different team goal orientations in predicting varied team outcomes (see Table 2). For example, a team with a high learning goal orientation may have productive and satisfied members, who are ready to work

together in the future due to the team's emphasis on the development of new skills, mutual support, and being adaptive and solution-oriented (LePine, 2005; Chadwick & Raver, 2015).

Given their emphasis on completing the task and proving competence, performance-prove oriented teams are also expected to impact team outcomes positively. Working together on tasks with a motivation to excel may improve team satisfaction and viability, while also improving productivity. Performance-avoid oriented teams, however, exhibit low task engagement, performance anxieties, and risk-avoidance (Chadwick & Raver, 2015). Such teams would likely perform poorly and have dissatisfied members, who have no motivation to work together in the future.

Prior empirical studies generally confirm these associations. For example, Gong et al. (2013) reported a positive effect of team learning and performance-prove orientations, and a negative impact of performance-avoid orientation, on team creativity. Similarly, Dragoni and Kuenzi (2012) demonstrated a positive effect of learning and performance-prove orientations, and no effect of performance-avoid orientation on work unit performance. A positive, but non-linear, relationship between team learning orientation and performance was reported by Bunderson and Sutcliffe (2003). Team performance-prove goal orientation has also been found to predict team performance (Mehta et al., 2009). Thus, we propose:

> *Hypothesis 3a*: *Team learning goal orientation will be positively related to team effectiveness*.
> *Hypothesis 3b*: *Team performance-prove goal orientation will be positively related to team effectiveness*.
> *Hypothesis 3c*: *Team performance-avoid goal orientation will be negatively related to team effectiveness*.

Past research confirms that "teams use different types of processes to convert inputs to outcomes" (Marks et al., 2001). This Input-Process-Output (IPO) approach has been established as a useful way to examine team effectiveness (Cohen & Bailey, 1997). For example, Marks et al. (2001) observed that context-specific states often serve as inputs to impact team processes, which in turn enable team members to work interdependently to utilize resources and achieve team outcomes. It can be similarly argued that emergent states—such as team goal orientation—do not themselves produce team outcomes (e.g., better performance) directly, rather it is the actions or processes that follow from such states that yield the outcomes (Maltarich, Greenwald, & Reilly, 2016). Members of learning-oriented teams, for example, would likely assimilate knowledge to advance learning and to develop new skills. Members combine and reformulate existing knowledge in such teams to produce new insights and learning, and generate creative solutions (Okhuysen & Eisenhardt, 2002). Similarly, for performance-prove oriented teams, combining and building upon each other's knowledge (i.e., knowledge integration) would be a necessary means for achieving the high performance they strive for. In such teams, members would integrate knowledge to: (i) identify information requirements of the task; (ii) fulfill those requirements; and (iii) accomplish their performance goals (Mitchell & Zmud, 1999). Teams with performance-avoid orientation may not be earnest about integrating knowledge because the focus of such teams is on avoiding risk and failure. Thus, team goal orientation (input) would

likely boost knowledge integration (process), which in turn, would lead to different team outcomes (output).

The relationship between team goal orientation, knowledge integration, and team effectiveness may also be explained through self-regulation theory (Zimmerman, 2000). Self-regulation entails the use of cognitive, affective, and behavioral strategies for goal accomplishment. As per Zimmerman's (2000) three-phase cyclical social cognitive model of self-regulation, interrelationships exist among motivational beliefs (e.g., goal orientation), regulation strategies (e.g., knowledge integration), and evaluation and adaptation (e.g., performance). Because self-regulation is goal-driven (Vancouver, 2000) and is influenced by social environment (Zimmerman, 2000; Schunk, 2005), members' perception of their team's climate and the resulting state team goal orientation may affect self-regulation strategies adopted by the team, and ultimately, team outcomes. Research has shown that team regulatory processes, such as planning and effort, mediate the relationship between team goal orientation and team outcomes (Porter, 2005; Mehta et al., 2009). Hence, we predict:

> *Hypothesis 4*: *Knowledge integration will mediate the relationship between team goal orientation and team effectiveness*.

METHOD

Sample

The study sample comprised of 529 business seniors enrolled in multiple sections of a capstone strategic management course over two semesters, at a large southeastern university. The participants were randomly assigned to 116 teams, each formed for a single semester. A final sample of ninety teams (N = 90), with an average team size of five members (*SD* = 1.82), was retained after discarding the teams that had fewer than 3 members, did not complete all the surveys, provided incomplete information, and/or had reliability values below the acceptable range. The majority of the participants were Caucasian (90%), male (62%), and between 21 and 24 years of age (92%).

Task and Procedure

At the beginning of the course, participants were assigned to teams of comparable size so as to maintain similar compositional heterogeneity of members' functional background and gender. Over the semester, the teams participated in a complex computer simulation using the Capstone Business Simulation (Stephen, Parente, & Brown, 2002). All the teams played two practice rounds in the first two weeks before starting on the actual simulation. The simulation entailed that each team, working as the top management team of a business firm, develop and implement business strategies through weekly decisions pertaining to research and development, production, marketing, finance, human resources, and total quality management. The teams received weekly, computer-generated feedback on the firm-level impact of their business decisions and a comparison of their results with competing teams, along with domain specific information such as resource availability and constraints. The team members were required to understand, analyze, and integrate this information into their subsequent decision-making. The teams competed with

each other not just within each class, but at a national level with other teams from different universities. Given that the top management teams in organizations make similar strategic decisions under a competitive business environment, the task had external validity. The team members had diverse educational backgrounds as reflected through their undergraduate majors, which is similar to work teams' functional diversity (Bunderson & Sutcliffe, 2002; Dahlin, Weingart, & Hinds, 2005).

The Capstone Business Simulation was specifically chosen for this study as it is designed for senior graduates and is sufficiently complex to require both performance and learning elements. Additionally, the teams had no prior exposure to a similar task. Therefore, playing multiple rounds over the semester would not only affect team performance, but also learning and competence, giving the teams an opportunity to develop both performance and learning orientations. Thus, although performing well in the simulation was important to the participants because it constituted 70% of their grade, elements of both performance and learning would be instrumental in achieving the task. Most work teams in organizations have performance goals that require both performance and learning elements. Thus, the teams used in the current study seemed appropriate for examining team performance and team learning goal orientations. Team members also had to analyze and integrate computer-generated information with their own knowledge and expertise to make collective simulation decisions, making the sample suitable for examining knowledge integration.

The sample provided an opportunity to examine these constructs in a relatively controlled situation because the teams had identical tasks, received similar background information and instructions, received computer-generated feedback, and were comparable in terms of age, work experience, and racial composition. Prior researchers have extensively used similar teams and tasks to examine team goal orientation and other team variables (e.g. DeShon et al., 2004; Dahlin et al., 2005; Porter, 2005).

Data Collection and Aggregation of Team Measures

Data were collected at three times, Time 1 (T1), Time 2 (T2), and Time 3 (T3), in each semester, with different variables being measured at each time. The beginning of the fifth week of the semester was chosen as T1, for two main reasons. First, it was important to give the participants an opportunity to function as interdependent entities or “teams” before administering any team-based survey (DeShon et al., 2004). Second, because team goal orientation was conceptualized and measured as a “state,” T1 would allow team goal orientation to emerge as a distinct state, based on members' shared perceptions. To ensure that the teams really functioned as a single unit when the first survey was administered, we sought inputs from the faculty who had been teaching the course over several semesters. Qualitative inputs from the faculty indicated that the notion of “teamness” and team perceptions typically emerged around the fourth week into the semester. Therefore, the first survey, measuring demographic and predictor variables (team goal orientation), was administered at the beginning of the fifth week of the semester (T1).

The eighth week of the semester was chosen as T2. By this time, the team members would have formed their perceptions regarding teamwork and team effectiveness, independent of the knowledge of their final objective team performance. This would have minimized any effects

due to the knowledge of final results. Therefore, the mediating and dependent variables, except objective performance, were measured at T2. T3 was the final week of the simulation. Teams' objective performance measure was obtained from computer-generated reports at T3, after completion of the final round of the simulation. Thus, different sets of variables were measured at different times in the simulation so that teams could start functioning as a collective entity and develop team-related perceptions and cognitions independent of their final outcome.

Team members responded to team-referent items for each construct (e.g., "My team has gained from the collaborative project"), corresponding to the referent-shift model (Chan, 1998). This model is preferred over the individual-referenced direct consensus method that may not be able to grasp the team-level construct (Klein, Conn, Smith, & Sorra, 2001). Team level measures were obtained by aggregating members' responses to the team-level (DeShon et al., 2004). Intraclass correlations (ICC) were calculated to compare within-team and between-team response variances (ICC[1]) and to assess the reliability of team-level means (ICC[2]) for each scale (Bliese, 2000). Interrater reliabilities ($r_{wg(j)}$) were calculated to assess within-team agreement for each construct (James, Demaree, & Wolf, 1993).

Measures

Team learning goal orientation was measured with 4 items from a scale used by Bunderson and Sutcliffe (2003). Participants rated the items using a 7-cell Likert-response format ranging from 1 (very strongly disagree) to 7 (very strongly agree). A sample item from the scale is, "My team likes challenging and difficult assignments that teach new things." The intraclass correlations for this scale were ICC(1) = .08 and ICC(2) = .87. Median $r_{wg(j)}$ was .94 (mean = .90), Cronbach's alpha was .86. *Team performance-prove goal orientation* was measured using 4 items adapted from a goal orientation instrument developed and validated by VandeWalle (1997). Participants rated each item on a 7-cell Likert-response format. A sample item from the scale is, "My team tries to figure out how to prove its ability to other teams in the class." The observed ICC(1) was .07 and ICC(2) was .88. Median $r_{wg(j)}$ was .92 (mean = .90). Cronbach's alpha was .88 for the scale. *Team performance-avoid goal orientation* was measured using a 4-item scale adapted from VandeWalle's (1997) goal orientation instrument. A sample item from the scale is, "My team prefers to avoid situations where it might perform poorly." The ICC(1) was .05, and ICC(2) was .82. Median $r_{wg(j)}$ was .91 (mean = .84). Cronbach's alpha was .82 for this scale.

Confirmatory factor analysis was performed to verify the theorized three-dimensional factor structure of the team goal orientation construct. Results showed that model fit for the three-dimensional model (χ^2/df = 1.54, RMSEA = .08, CFI = .95, GFI = .89) was better than the two-factor (χ^2/df = 7.64, RMSEA = .27, CFI = .41, GFI = .54) and one-factor models (χ^2/df = 6.76, RMSEA = .25, CFI = .46, GFI = .60). The χ^2 difference tests were also significant for the two-dimensional (χ^2 = 333.972, $p < .001$) and one-dimensional (χ^2 = 306.51, $p < .001$) models when compared to the three-dimensional model. These results justified the conception of team goal orientation as a three-dimensional construct in our study.

Knowledge integration was measured with an 8-item scale drawn from prior studies (Templeton, Lewis, & Snyder, 2002; Tiwana & McLean, 2005). Participants rated each item on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). A sample item from the

scale is “My team members often gained new insights by sharing their ideas with each other.” The ICC(1) was .08 and ICC(2) for the scale was .89. Median $r_{wg(j)}$ was .94 (mean = .86). Cronbach's alpha was .90. *Team viability* was measured using 6 items from a scale developed by Jordan (2001). Participants rated each item on a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). A sample item from the scale is “I would like to work with members of my team on other projects.” The ICC(1) for the scale was .12; ICC(2) was .94. Median $r_{wg(j)}$ was .95 (mean = .88). Cronbach's alpha was .94. *Team satisfaction* was measured using 5 items from a scale used by Hoegl and Gemuenden (2001). Participants rated each item on a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). A sample item from the scale is “My team members have gained from the collaborative project.” The ICC(1) was .05 and ICC(2) for the scale was .85. Median $r_{wg(j)}$ was .90 (mean = .80). Cronbach's alpha was .85. *Team perceived performance* was measured with a 5-item scale used by Hoegl, Weinkauf, and Gemuenden (2004). Participants rated each item on a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). A sample item from the scale is “All the team goals were achieved by the team.” The ICC(1) was .05 and ICC(2) was .81. Median $r_{wg(j)}$ was .86 (mean = .79). Cronbach's alpha was .81 for this scale.

Team objective performance. We measured objective performance using teams' overall performance score generated by a computer simulation algorithm. The Capstone simulation generated a standardized measure of team performance based on success criteria such as stock price and profits. Each team was scored on a 6-point scale based on the adjusted weighted averages of their success criteria. The simulation algorithm calculates the teams' adjusted weighted average scores by (i) determining a raw score for each category of results, (ii) creating an adjusted score by multiplying the team's raw score by the measurement weight, and (iii) summing the adjusted scores for the categories.

Control variables. We controlled for five variables in this study. Three of the control variables were related to team composition: team size, educational diversity, and mean grade point average (GPA) of team members. Team size and educational diversity were controlled for because these variables are known to affect team outcomes and information processing (Haleblian & Finkelstein, 1993; Horwitz, 2005). For example, educational diversity has been associated with information integration (Dahlin et al., 2005) and team viability (Foo, Sin, & Yiong, 2006). Similarly, research demonstrates that larger management teams tend to perform better compared to smaller teams (Haleblian & Finkelstein, 1993; Stewart, 2006). We included mean GPA of team members as a control, because GPA, as a proxy for cognitive ability, has been linked to performance and satisfaction in student teams (Devine & Philips, 2001; Bell & Cooke, 2003).

The other two variables we used as controls were related to team processes: team leadership and team cooperation. Previous studies indicate that leadership not only influences team outcomes such as satisfaction, viability, and performance, but also team goal orientation (Dragoni, 2005; Foo et al., 2006). Team members responded on a 6-point scale to the item, “An informal leader emerged in the team.” We also controlled for team cooperation, as a proxy for team cohesion, because it can influence team performance and learning (Williams, Durray, & Reddy, 2006; Mach, Dolan, & Tzafrir, 2010). Given the strong correlation between team cooperation and task cohesion (Carless & De Paola, 2000), its use as a proxy for cohesion is deemed acceptable. Team cooperation was measured with 5 items using a 5-point Likert scale. The items were drawn from

a peer-evaluation survey administered by Capstone. A factor analysis of the items demonstrated clear factor loadings on a single construct. A sample item from the scale is "My team members helped each other to perform their task more effectively." The coefficient alpha for the scale was .97. Similar items have been used in past research to measure group cohesion (Williams, Duray, & Reddy, 2006). Appendix B provides details of the scales used in the current study.

Reliabilities and Validities

Cronbach's alpha scores for all scales were well above the recommended cut-off of 0.70. As presented in Table 3, composite reliabilities (ρ_c), which avoid the assumption of equal weighting of items, were all above .80 (Fornell & Larker, 1981). Convergent validity was assessed by calculating average variance extracted (AVE). All AVE values were higher than the recommended value of 0.5 (Fornell & Larker, 1981). We then assessed the discriminant validity of the measures by two ways. The measurement items displayed higher loadings on their "assigned factor" than on any other factor (Table 4). Second, the square-root values of AVEs were greater than the inter-construct correlations (Table 3) (Fornell & Larker, 1981; Titah & Barki, 2009). Finally, the values for ICC(1) and ICC(2) (Bliese, 2000), and $r_{wg(j)}$ (Glick, 1985) were all within recommended ranges.

Table 3. Descriptive statistics, reliabilities, validities, and correlations.

S. No.	Variable	Mean (*SD*)	Composite Reliability	AVE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Team size	5.01 (1.75)	–		1														
2	GPA	2.99 (.26)	–		.23*	1													
3	Leadership	4.28 (.88)	–		.00	.11	1												
4	Team cooperation	4.68 (.28)	–		.17	.15	−.01	1											
5	Low diversity	.12 (.33)	–		−.29**	.34**	.07	−.07	1										
6	Medium diversity	.64 (.48)	–		−.35**	−.11	.00	−.03	−.50**	1									
7	High diversity	.23 (.42)	–		.63**	−.14	−.06	.08	−.20	−.74**	1								
8	TLGO	4.86 (.53)	.90	.65	.01	.09	.03	.08	.07	−.12	.08	1 **(.81)**							
9	TPPGO	5.12 (.57)	.92	.74	−.14	.10	−.01	.11	.17	−.09	−.03	.65**	1 **(.86)**						
10	TPAGO	3.65 (.46)	.87	.60	.14	.04	.14	−.04	.02	−.16	.16	−.42**	−.30**	1 **(.77)**					
11	Knowledge integration	3.95 (.30)	.92	.60	.20	−.04	−.15	.32**	−.08	−.06	.14	.51**	.44**	−.20	1 **(.77)**				
12	Team viability	4.95 (.55)	.95	.77	.25*	−.09	.05	.14	−.12	.03	.06	.43**	.43**	−.08	.60**	1 **(.88)**			
13	Team satisfaction	4.38 (.64)	.90	.64	.36**	−.14	.10	.08	−.02	−.15	.18	.45**	.28**	−.09	.44**	.54**	1 **(.80)**		
14	Team perceived performance	4.28 (1.43)	.86	.55	.11	−.17	.15	−.01	−.08	.06	−.00	.38**	.45**	−.10	.30**	.51**	.57**	1 **(.74)**	
15	Team objective performance	4.28 (1.42)	–	–	−.26*	.09	.15	−.13	−.04	.19	−.19	.25*	.41**	−.21	.14	.45**	.05	.43**	1

**$p < .01$, *$p < .05$. Bold diagonal elements show the square-root of average variance extracted (AVE) for each construct.

GPA = grade point average, TLGO = team learning goal orientation, TPPGO = team performance-prove goal orientation, TPAGO = team performance-avoid goal orientation, *SD* = standard deviation.

Data Analysis

Hierarchical multiple regression was utilized to test the main effects and mediation hypotheses. In addition, we extended our mediation analysis by using the bootstrapping test for mediation,

because it does not assume normality and provides confidence intervals to estimate the significance of indirect effects (Hayes, 2013).

Table 4. Item loadings and cross-loadings.

	TLGO	TPPGO	TPAGO	IKI	TVIAB	TSATIS	TPERF
TLGO1	**0.8912**	0.6176	−0.4063	0.4632	0.4649	0.4320	0.3560
TLGO2	**0.7446**	0.4026	−0.3378	0.3415	0.2070	0.2335	0.2197
TLGO3	**0.8732**	0.5549	−0.4328	0.4177	0.3640	0.3418	0.3216
TLGO4	**0.8569**	0.6164	−0.2982	0.4918	0.4295	0.5647	0.3839
TPPGO1	0.6783	**0.8378**	−0.3022	0.3405	0.3969	0.2864	0.4699
TPPGO2	0.5381	**0.8876**	−0.3120	0.4286	0.3782	0.2020	0.4063
TPPGO3	0.4680	**0.8500**	−0.2370	0.2779	0.3834	0.2770	0.5179
TPPGO4	0.6034	**0.8664**	−0.2299	0.4215	0.3454	0.2303	0.3347
TPAGO1	−0.3603	−0.2175	**0.8730**	−0.1664	−0.1348	−0.1358	−0.2054
TPAGO2	−0.2994	−0.1737	**0.7686**	−0.0930	−0.0650	−0.0217	−0.0966
TPAGO3	−0.3691	−0.2289	**0.7630**	−0.1215	−0.0106	−0.0141	−0.0221
TPAGO4	−0.3553	−0.3477	**0.7746**	−0.2100	−0.0522	−0.1412	−0.1354
KI1	0.3198	0.3010	−0.2193	**0.7669**	0.3549	0.2647	0.1371
KI2	0.3857	0.2887	−0.1335	**0.7674**	0.5688	0.3486	0.2105
KI3	0.4830	0.3940	−0.0796	**0.8258**	0.5351	0.3902	0.3270
KI4	0.5425	0.4674	−0.2140	**0.8892**	0.5571	0.4024	0.2699
KI5	0.3108	0.2220	−0.0927	**0.7161**	0.3202	0.2148	0.1962
KI6	0.3846	0.2345	−0.1400	**0.7796**	0.4174	0.2902	0.2412
KI7	0.2903	0.3238	−0.2436	**0.6730**	0.4100	0.3379	0.1893
KI8	0.4637	0.4340	−0.2566	**0.7222**	0.4632	0.3842	0.3286
TVIAB1	0.4333	0.4028	−0.0317	0.5430	**0.8840**	0.4163	0.3566
TVIAB2	0.4003	0.3520	−0.0712	0.5766	**0.9009**	0.4302	0.3497
TVIAB3	0.4132	0.3973	−0.0650	0.5199	**0.9239**	0.3749	0.4900
TVIAB4	0.3313	0.3610	−0.1104	0.4721	**0.9153**	0.4074	0.3770
TVIAB5	0.4077	0.4418	−0.0623	0.5217	**0.8357**	0.5149	0.5737
TVIAB6	0.3911	0.3349	−0.2148	0.4907	**0.8071**	0.6437	0.4881
TSATIS1	0.2958	0.2044	−0.0220	0.3266	0.4051	**0.6181**	0.5731
TSATIS2	0.3502	0.1174	−0.0731	0.3499	0.4459	**0.8427**	0.2615
TSATIS3	0.4582	0.2394	−0.0649	0.4548	0.5326	**0.8464**	0.3386
TSATIS4	0.4032	0.2720	−0.1189	0.3062	0.3336	**0.8090**	0.2773
TSATIS5	0.4262	0.3157	−0.2229	0.2352	0.3670	**0.8500**	0.4614
TPPERF1	0.3016	0.4786	−0.2548	0.2565	0.3903	0.2411	**0.8444**
TPPERF2	0.2571	0.4601	−0.1889	0.2139	0.2671	0.0022	**0.6930**
TPPERF3	0.2854	0.2458	−0.0657	0.1723	0.4056	0.5446	**0.6705**
TPPERF4	0.3309	0.2797	−0.0514	0.1775	0.4150	0.5433	**0.7116**
TPPERF5	0.3049	0.3339	−0.0140	0.2721	0.4426	0.6159	**0.7923**

TLGO = Team Learning Goal Orientation; TPPGO = Team Performance-Prove Goal Orientation; TPAGO = Team Performance-Avoid Goal Orientation; KI = Knowledge Integration; TVIAB = Team Viability; TSATIS = Team Satisfaction; TPPERF = Team Perceived Performance.

Common Method Variance and Multicollinearity Diagnostics

Although data for the dependent and the independent variables were collected at different times, common method variance could not be ruled out. To estimate the true relationship among

theoretical constructs, a number of measures were taken (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). First, Harman's one-factor test was conducted, which did not result in any single factor accounting for a majority of the variance among the variables (Podsakoff et al., 2003). Additionally, a confirmatory factor analysis showed that a single-factor model did not fit the data well (χ^2/df = 3.04, $p < .000$, GFI = .42, CFI = .47, RMSEA = .15). Thus, there was no evidence of a general factor. Next, the marker-variable (MV) test (Lindell & Whitney, 2001) was performed, where a theoretically unrelated "marker" variable was used to adjust the correlations among the model's main constructs. Using team's weighted profit percentage as the dummy marker variable (because it was not significantly correlated with any main construct), we partialled out its effect from other correlations. The correlations between the dependent and the independent variables remained significant suggesting that common method variance was unlikely to confound the results. Given that there was a significant correlation between team learning goal orientation and team performance-prove goal orientation, we calculated the variance inflation factors (VIF) to estimate how much the variance of a coefficient was "inflated" because of its correlation with other predictors (Greene, 2003). The highest value of VIF observed in this study was 2.50 for team learning goal orientation, which is substantially lower than the commonly recommended cut-off point (5).

Post Factum Analysis

A dominant body of research in the team goal orientation domain has theorized and reported linear relationships between team goal orientation and various team outcomes (DeShon et al., 2004; Gong et al., 2013). However, at least one prior study (Bunderson & Sutcliffe, 2003) found a curvilinear relationship between team learning goal orientation and team performance. Therefore, we did a post factum analysis to test for any curvilinear effects of team goal orientation on the outcome variables. We also tested for possible interaction effects of team learning goal orientation and team performance-prove goal orientation.

Table 5. Regression results for relationship between knowledge integration and team effectiveness.

Variable	Team Viability (β)	Team Satisfaction (β)	Team Perceived Performance (β)	Team Objective Performance (β)
Team size	.21	.31*	.11	−.26
GPA	−.04	−.11	−.16	.08
Leadership	.05	.10	.16	.19
Team cooperation	.11	.06	−.01	−.20
Diversity low	.04	.12	.05	−.13
Diversity medium	.14	.01	.10	.04
Knowledge integration	.61***	.43***	.36***	.28**
Model R^2	.40	.29	.17	.19

$^{***}p < .001$, $^{**}p < .01$, $^{*}p < .05$.

RESULTS

Hypotheses 1a and 1b, predicting positive relationships of team learning goal orientation (TLGO) and team performance-prove goal orientation (TPPGO) with knowledge integration, respectively, were supported. Both TLGO ($\beta = .39$, $p < .01$) and TPPGO ($\beta = .23$, $p < .05$) were

significantly related to knowledge integration, even after accounting for the control variables. No support was found for hypotheses 1c as team performance-avoid goal orientation (TPAGO) was unrelated to knowledge integration. Hypothesis 2, predicting a positive relationship between knowledge integration and team effectiveness, was supported (Table 5). Knowledge integration significantly predicted team viability, ($\beta = .61$, $p < .001$), satisfaction ($\beta = .43$, $p < .001$), perceived performance ($\beta = .36$, $p < .001$), and objective performance ($\beta = .28$, $p < .01$), even after accounting for the control variables.

Table 6. Multiple hierarchical regression analysis for testing mediation.

Variable	Team Viability (β)	Team Satisfaction (β)	Team Perceived Performance (β)	Team Objective Performance (β)
Model 1				
Team size	.24*	.33*	.11	−.25
GPA	−.04	−.11	−.16	.08
Leadership	.05	.10	.16	.15
Team cooperation	.11	.06	−.01	−.11
Diversity low	.04	.12	.05	−.13
Diversity medium	.14	.01	.10	.04
Model 2				
Team size	.32**	.38**	.20	−.15
GPA	−.07	−.15	−.18	−.09
Leadership	.03	.08	.15	.17
Team cooperation	.05	.02	.−.08	−.18
Diversity low	.04	.15	.03	−.17
Diversity medium	.25	.12	.20	.08
TLGO	.25*	.46***	.17	−.10
TPPGO	.34**	.08	.42***	.44***
TPAGO	.09	.10	.10	−.09
Model 3				
Team size	.26*	.35**	.19	−.16*
GPA	−.05	−.15	−.18*	−.09
Leadership	.10	.12	.16	.19
Team cooperation	−.06	−.04	−.10	−.20*
Diversity low	.06	.17	.03	−.17
Diversity medium	.23	.11	.19	.07
TLGO	.11	.37**	.14	−.10
TPPGO	.28*	.02	.43***	.42**
TPAGO	.12	.08	.09	−.10
KI	.45***	.23*	.08	.11
Model 1 R^2	.07	.13	.06	.12
Model 2 R^2	.36***	.35***	.32***	.30***
Model 3 R^2	.47***	.38*	.31	.31
ΔR^2	.12***	.03*	.00	.00

*** $p < .001$, ** $p < .01$, * $p < .05$. GPA = grade point average, TLGO = team learning goal orientation, TPPGO = team performance-prove goal orientation, TPAGO = team performance-avoid goal orientation, KI = knowledge integration.

For hypotheses 3a and 3b, we found partial support, as shown in Table 6. TLGO was associated with team viability ($\beta = .25$, $p < .05$) and satisfaction ($\beta = .46$, $p < .001$); whereas TPPGO was

related to team viability ($\beta = .34$, $p < .01$), perceived performance ($\beta = .42$, $p < .001$), and objective performance ($\beta = .44$, $p < .001$). TPAGO was unrelated to team effectiveness (hypothesis 3c). Hypothesis 4, predicting mediation of knowledge integration, was partially supported. Knowledge integration fully mediated the relationship between TLGO and team viability, and partially mediated the relationship between TPPGO and team viability, even after accounting for the controls (Table 6). The relationship between TLGO and team satisfaction was also partially mediated by knowledge integration. No other mediation effects were found.

Using the bootstrapping approach (Hayes, 2013), we found that the bootstrapped confidence interval at 95 percentile ranged from .17 to .49 for TLGO-viability link, from .11 to .36 for TPPGO-viability link, and from .04 to .33 for TLGO-team satisfaction link, confirming the significance of indirect effects. In the post factum analysis, we did not find any significant curvilinear effects of team goal orientation on any of the dependent variables. No interactional effects were found either.

DISCUSSION

Extending previous research (Mehta et al., 2009), this study investigated the relationship between team goal orientation, knowledge integration, and team effectiveness. We found team learning and performance-prove goal orientations to be significantly related to knowledge integration. We also found support for knowledge integration as a critical process that affects both quantitative and qualitative dimensions of team effectiveness. Results partially supported our mediation hypothesis, and the mediated model explained 39–45% of the variance in team effectiveness dimensions of viability and satisfaction. These results, combined with what we know from previous research, confirm that teams with different team goal orientations utilize distinct regulatory mechanisms to achieve both qualitative and quantitative team outcomes.

Team Goal Orientation and Knowledge Integration

This study is one of the first to examine and demonstrate the importance of team goal orientation in fostering knowledge integration among teams. In spite of being used extensively by teams, the knowledge integration process is fraught with challenges. An understanding of the key factors, such as team goal orientation, influencing this process may help mitigate these challenges, resulting in better team outcomes. However, as evident from Tables 1 and 2, research in the knowledge integration and goal orientation domains has overlooked this investigation. Thus, this study fills some critical knowledge gaps in the existing literature. Our results confirmed that team learning and performance-prove orientations do impact knowledge integration. Team learning goal orientation was positively associated with knowledge integration. These results align with the existing team goal orientation literature that has generally reported a significant effect of learning goal orientation on team processes (Porter, 2005; Gong et al., 2013). Learning-oriented teams tend to focus on new learning and developing skills for current and future tasks (Button, Matheieu, & Zajac, 1996). Given that members of such teams engage more in information exchange (Gong et al., 2013), these teams are expected to achieve higher knowledge integration. We also found team performance-prove goal orientation to be positively associated with knowledge integration. When teams have a high performance-prove orientation and complex task goals, members are motivated to actively engage in information search, resulting in

greater knowledge integration (Kong, Konczak, & Bottom, 2015). Similar results have been reported by previous researchers (Gong et al., 2013).

This study also advances previous research pertaining to the role of team climate in knowledge integration (Robert et al., 2008; Basaglia et al., 2010). We examined specific achievement motivations (team goal orientation) that are shaped by cues from the team climate and, hence, could be better predictors of processes and strategies adopted by teams to achieve their goals. For example, Basaglia et al. (2010) demonstrated the importance of autonomy and experimental climate in knowledge integration. Such a climate would most likely influence knowledge integration by fostering a learning goal orientation in teams. In addition, our results show that a performance-focused climate may also be equally important in knowledge integration, especially where performing well on a task requires knowledge integration.

Our results indicate that team goal orientation may be relatively resistant to the effects of expertise diversity. We did not find any significant effects of team diversity on the dependent variable, and team goal orientation predicted knowledge integration even after controlling for team diversity and other variables such as team size, cooperation, GPA, and leadership. Although diversity had no significant effect in our sample, team goal orientation may have the potential to not only attenuate the negative effects of expertise diversity, but also augment knowledge integration in functionally diverse teams.

Knowledge Integration and Team Effectiveness

Knowledge integration was strongly associated with all four dimensions of team effectiveness namely, viability, satisfaction, perceived performance, and objective performance. Our results are consistent with previous studies that have emphasized, separately, the role of knowledge integration in attaining different group goals (see Table 1). However, this study contributes uniquely to the literature by conducting a more holistic examination of the impact of knowledge integration on both quantitative and qualitative dimensions of team effectiveness (Hackman, 1990), which has largely been overlooked.

As we had reasoned earlier, given the effortful, intellectual, and social nature of knowledge integration activities, they may impact not only the quantitative dimensions such as performance, but the qualitative dimensions such as satisfaction as well. Interestingly, our results demonstrate that knowledge integration, although significantly related to all dimensions of team effectiveness, was more strongly associated with the qualitative dimensions of team viability ($R^2 = .40$) and satisfaction ($R^2 = .29$). Such people-oriented outcomes are becoming increasingly important to firms, given that most work teams generally last more than a year (Thomson, 2004), and positive team outcomes over the long term can only be ensured if team members have higher satisfaction and viability.

Knowledge Integration as a Mediator

We observed a positive relationship between learning goal orientation and team viability and satisfaction. Team learning goal orientation was not related to team performance. Team performance-prove goal orientation, on the other hand, was positively related to team viability

and performance, but was unrelated to team satisfaction. Thus, members of a high performing team may still be dissatisfied, which may prove dysfunctional in the long term. Such a team might perform well, but would not be effective (Hackman, 1990). These results validate our assertion that it is important to examine team goal orientation and team effectiveness more closely. For example, Mehta et al. (2009) reported that only team performance-prove goal orientation predicted team performance. Team learning goal orientation was unrelated to performance. Because no other dimension of team effectiveness was examined, it was difficult to establish what role, if any, did learning goal orientation play in team effectiveness and how would performance-prove orientation impact team outcomes other than performance. Our results establish learning and performance-prove goal orientations as important predictors of team effectiveness. Additionally, the results reveal how different goal orientations predict distinct dimensions of team effectiveness.

Similar to Porter (2005), we found no relationship between learning goal orientation and performance. Thus, although learning orientation appears to have a generally positive effect on most team outcomes, its relationship with team performance appears to be complicated. The results in our study may be attributed to the context. Teams had to make bounded decisions within the specific time and resource constraints. In such a context, teams that focus on seeking new knowledge, developing skills, and mastering tasks, may find themselves distracted from actual task accomplishment. However, a high learning orientation may foster a sense of mastery among the members, resulting in satisfied members, confident of their team's viability.

For team performance-prove goal orientation, an interesting observation was its nonsignificant relationship with team satisfaction. It appears that a highly task focused and competitive team does not necessarily translate into a satisfied team. The results, although seemingly perplexing, may be attributed to the type of outcome. Team satisfaction is an affect-based outcome (Marks et al., 2001; Tekleab, Quigley, & Tesluk, 2009) that develops as a result of a convergence of member interactions, relationships, and perceptions (Behfar, Peterson, Mannix, & Trochim, 2008). When teams have a high performance-orientation, members may focus on the task, but the constructive conflict and disagreements may hinder satisfaction. Thus, there is a need to distinguish between types of team outcomes when examining them in relation to team inputs and processes (Castano et al., 2013; Mello & Denise, 2015). For performance-avoid orientation, we observed no effects on any of the outcome variables. Given that team members' performance on the simulation constituted a substantial part of team members' grades, it could be expected that teams would not exhibit performance-avoidance orientation strong enough to impact the team outcomes negatively.

Knowledge integration fully mediated the relationship between team learning goal orientation and team viability and partially mediated the learning goal orientation and team satisfaction relationship. It appears that the inevitable interactional and relational dynamics developed as a result of knowledge integration process do foster satisfaction and viability. We observed a partial mediation of knowledge integration in the relationship between team performance-prove goal orientation and team viability, indicating that other intervening processes or moderating factors may be at play. Additionally, team performance-prove goal orientation was related to team performance, but not via knowledge integration. In fact, the significant relationship between knowledge integration and team performance became non-significant in the presence of team

goal orientation. One possible explanation is that the direct effect of performance-prove orientation on team performance is stronger than the mediated effect through knowledge integration. Additionally, when the predictor to mediator effect is stronger than the mediator to outcome effect, it may reduce the testing power to detect weaker mediation effects (Shrout & Bolger, 2002). Finally, because both learning and performance-prove orientations significantly affected knowledge integration, the collinearity among these variables may have influenced the mediator to outcome effect (Frazier et al., 2004).

These direct-only, non-mediating results also indicate the likelihood of other mediating processes being utilized by performance-prove oriented teams (Mehta et al., 2009; Zhao, Lynch, & Chen, 2010). For example, the lack of mediation of knowledge integration in performance-prove orientation and performance link may be explained from the costs and benefits perspective of team goal orientation, derived from social exchange theory (Blau, 1964). According to this perspective, a performance-oriented team would engage in knowledge integration only if it brings evident task benefits and involves minimum effort. To such teams, exerting effort to integrate knowledge would likely indicate lower ability and incompetency (VandeWalle, 2003). Therefore, such teams would likely integrate sufficient knowledge and utilize other mediating processes such as planning and strategizing to achieve performance goals.

Previous research confirms this notion. For example, Mehta and colleagues (2009) showed that performance-prove oriented teams utilized team planning to achieve team performance. However, no mediating results were found for learning goal orientation, prompting the authors to posit that teams with different goal orientations likely utilize diverse mediating processes. In this extended study, we found evidence that learning oriented teams achieve team outcomes through knowledge integration. Overall, these results help us understand how learning and performance goal orientations *together* influence team performance, team viability, and team satisfaction by utilizing two different intervening mechanisms—team planning and knowledge integration. These results bring to light the complexity of the mediating relationships among the study variables and reinforce our belief that there is value in adopting a holistic approach to examining these relationships. The results also help us underscore the role of knowledge integration as a key mediating process between goal orientation and team effectiveness, a previously unexplored association (Tables 1 and 2). The findings also support the I-P-O framework of team effectiveness and confirm that the social cognitive model of self-regulation (Zimmerman, 2000) holds true at the team level. This substantiates previous studies reporting mediation of regulatory processes (Porath & Bateman, 2006; Gong et al., 2013).

IMPLICATIONS

Theoretical and Research Implications

Our results indicate that teams with different goal orientations use diverse intermediary processes. For example, the direct relationship of performance-prove goal orientation with team performance observed in this study reflects mediation of a process other than knowledge integration. Future research should examine regulatory tactics such as feedback seeking and social competence (Porath & Bateman, 2006) and the role of goal orientation in their selection. Also, possible moderating factors may confound the team goal orientation–team outcome

relationship. For example, leaders may strongly influence the team's psychological climate and its social information approval processes by providing cues regarding expected group behaviors (Chadwick & Raver, 2015). This would influence which type of goal orientation emerges in the team, irrespective of group members' initial goal orientations.

Additionally, the conceptual model for this study was drawn from the I-P-O models of team effectiveness. While widely researched and apt for this study, the I-P-O models may be limited in certain aspects (Ilgen, Hollenbeck, Johnson, & Jundt, 2005). For example, the team input–output relationship may not always be mediated by processes; emergent cognitive and affective states may also mediate this relationship (Marks et al., 2001). Moreover, I-P-O models do not account for possible interactions among process and input factors, several of which are known to influence team effectiveness (e.g., Colquitt, Noe, & Jackson, 2002; Pieterse, Van Knippenberg, & Van Dierendonck, 2013). These limitations provide an impetus to not only develop new theoretical frameworks of team goal orientation and effectiveness, but also to test possible moderators and mediators such as leadership and nature of knowledge.

Another opportunity for research involves an integration of team goal orientation research and the motivation-opportunity-ability (MOA) framework of knowledge sharing (Siemsen, Roth, & Balasubramanian, 2008). The MOA framework prescribes three factors as essential to knowledge sharing—motivation to share, opportunity to share, and ability to share. This research pertained to the first factor, i.e., motivation to share. Similar to goal orientation studies, knowledge management research has also shown that knowledge-sharing behavior is shaped by psychological climate (Kettinger, Li, Davis, & Kettinger, 2015), among other factors. However, the MOA framework has not been applied much at the team level of analysis. Similarly, team goal orientation research may benefit from the inclusion of “opportunity” and “ability” factors when examining team outcomes. Thus, integrating team goal orientation and MOA theories may stimulate a comprehensive, multilevel conceptualization of a knowledge integration framework.

Team goal orientation was measured as a three-dimensional construct in this study. However, a four-dimensional view of goal orientation has recently emerged (Swift et al., 2010; Porter, Thundiyil, & Ellis, 2014). In a recent study, Porter et al. (2014) demonstrated that team goal orientation or “collective goal orientation” may be best measured as a four-dimensional construct. The four dimensions of collective goal orientation were found to be related to several team processes over compositional goal orientation. Therefore, future studies may provide valuable insights by examining the four-dimensional collective goal orientation. Also, given that goal orientation was operationalized as a “state” in this study, fostered by the team's climate, it may not be completely isomorphic over time and may change in response to the changing situational cues. It may be useful to examine the factors influencing this change. For example, is it possible to change team goal orientation through feedback? Another useful extension would be to collect longitudinal data to observe how team goal orientation may change as the team progresses toward its goal(s).

Given that there is evidence of the research setting influencing the relationship between team composition and team performance (Bell, 2007), it may be prudent to validate this research in a field setting. Some of our results, which are incongruent with prior goal orientation studies, may be attributed to the contextual effects and types of outcomes examined. For example, Bunderson

and Sutcliffe (2003) used US-based management teams to examine performance, Gong et al. (2013) used Korean teams to examine team creativity in R&D teams, and we used student teams acting as the top management team of a virtual business, to investigate viability, satisfaction, and performance. Therefore, a viable research question may be: Does the impact of team goal orientation vary as a function of team context and outcome? For example, for teams performing under acute resource constraints, performance-prove goal orientation might be more useful, as compared to new product development teams, where learning orientation may be more valuable. Moreover, without replication in a real business environment, our results may have limited generalizability. Although student data have been used to investigate goal orientation, the model needs further validation in a field setting.

Managerial Implications

As firms become innovation-focused, a vast majority of teams at workplaces are engaged in intellectual and creative pursuits requiring integration of diverse knowledge inputs (Cooke, Salas, Cannon-Bowers, & Stout, 2000). Our results indicate that members of learning-oriented teams integrate knowledge, are satisfied, and have the motivation to work together in future. An important implication of these results for practitioners pertains to the area of knowledge integration in work teams. Our results inform the practitioners that in addition to its previously known benefits such as creativity, decision quality, and performance (Tiwana, 2004; Tiwana & McLean, 2005; Robert et al., 2008), knowledge integration will also improve team members' satisfaction, performance, and their capacity to work together successfully in future. This would be a win-win situation for all stakeholders because knowledge integration would bring tangible gains such as greater innovation and productivity to the firm, and intangible gains such as a greater sense of satisfaction and achievement among team members. Also, such teams would work well over the long term.

Another implication of this study, which team leaders may find useful, is regarding *how* to promote knowledge integration. Managers today must find ways to motivate individuals and teams to share and assimilate knowledge (Siemsen et al., 2008). Traditionally, managers have enabled knowledge sharing through technical tools such as knowledge management systems, discussion forums, emails, blogs, and so on. Although useful in *accessing* and *sharing* knowledge, these tools are impersonal and can be limited in their ability to promote *integration* of knowledge. This study emphasizes that an important means of promoting intrateam knowledge integration is through managing teams' perceptions about their group climate. Members who perceive their team as being focused on developing new skills and knowledge through mutual support, or who perceive their group as task-focused and competitive, consolidate more knowledge. Managers can foster such perceptions, in light of intended outcomes, through interventions such as instruction and feedback to alter teams' attributions about their ability and performance. For example, a team leader may be able to create a climate of learning and support through open dialogue with members and by setting learning goals.

Our results can also be valuable to the team managers in dealing with team diversity. Ironically, team diversity and heterogeneity, while essential to effective knowledge integration, also creates challenges for managers in the form of team conflicts and hidden-profile problem. Our results

indicate that team goal orientation may help managers overcome the pitfalls associated with team diversity.

An understanding of team goal orientation may also allow a team leader to emphasize goal orientations according to the task requirements and intended outcomes. For certain teams, a focus on learning might improve team effectiveness more than a focus on performance. This might be especially pertinent to relatively permanent teams formed to operate over longer time periods, or to newly formed, nascent venture teams. Overemphasizing performance in such teams might prove to be costly in the long term. For example, measuring team performance in nascent ventures may not be relevant in the initial stages when the focus is on establishing the venture, however, members staying together and being satisfied may be critical to team success (Foo et al., 2006). Similarly, team leaders may emphasize learning orientation in product design teams and long-term project teams. Teams engaged in routine, target-oriented production tasks and construction projects may require more of a performance orientation.

Finally, our results indicate that teams that are good at employing processes such as knowledge integration are more likely to work well in the future and have satisfied members. Additionally, previous research affirmed that team planning is vital to team performance. Thus, by promoting team processes such as planning and knowledge integration, a team leader can not only improve productivity, but also member satisfaction. However, just as individuals are usually unaware of when and how to apply self-regulation (Ames, 1992), teams may also be ineffective at employing regulatory processes. Therefore, firms would benefit by implementing training programs to help teams develop regulatory skills. Effective utilization of regulatory tactics may also result in other benefits such as adaptability and success.

Limitations

The educational setting of data collection may have restricted the range of variability of certain variables. For example, a greater focus on performance compared to learning may happen, because the teams may focus on getting a better grade. Teams with different outcome expectations and rewards may focus on learning and performance differently. We did not include a measure of team efficacy, which may also limit the study's findings. Although previous goal orientation studies did not include team efficacy, it is possible that it might have played a role in some of our outcome measures. Future studies on team effectiveness would gain by controlling for efficacy. Additionally, we measured team goal orientation only once, in the fifth week of the simulation. Given that the study did not involve any interventions designed to change or influence team goal orientation, it was considered to be a relatively stable construct. Previous studies have similarly used single measures of team goal orientation (Bunderson & Sutcliffe, 2003). However, because goal orientation was conceptualized as a state, it would have been beneficial to measure it at multiple times to confirm its stability.

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APPENDIX A

Summary of constructs, related theoretical orientations, and relevance to the model

Construct	Definition	Theoretical Orientation	Relevance to Hypothesized Model
Team goal orientation	The shared perceptions of team members regarding their team's climate (Bunderson & Sutcliffe, 2003; Dragoni, 2005).	Achievement goal theory (Dweck, 1986); Psychological climate (Dragoni, 2005)	Has been shown to impact team processes and team outcomes.
Team learning goal orientation	The state when team members perceive their group as having learning goals with emphasis on developing knowledge and skills, mutual support mechanisms, and challenging tasks	Exploratory learning perspective (Chadwick & Raver, 2015)	Has been positively linked to adaptive team processes and outcomes such as information exchange and creativity
Team performance-prove goal orientation	The state when team members perceive their group as having performance goals with emphasis on proving their ability, gaining favorable judgment, high competition, and task specificity	Exploitative learning perspective (Chadwick & Raver, 2015)	Has been found to mediate team processes such as planning, and team outcomes such as performance.
Team performance-avoid goal orientation	The state when team members perceive their group as focusing more on avoiding negative outcomes and risks, and less on task accomplishment	Cognitive overload (Sutcliffe & Weick, 2008)	Has been associated negatively with most team processes and outcomes
Team knowledge integration	The process of assimilation of individually held knowledge and expertise to create group-level knowledge for goal accomplishment (Mehta & Bharadwaj, 2015)	Self-regulation theory (Zimmerman, 2000); Input-process-output model (Ilgen et al., 2005)	Has been linked to a number of positive team outcomes, and is in turn, associated with team inputs
Team viability	The capacity of the team to continue to work successfully in future (Hackman, 1990)	Team effectiveness model (Cohen & Bailey, 1997; Hackman, 1990)	Team performance has been linked to team goal orientation and knowledge integration
Team satisfaction	The feeling of well-being experienced by the team members as a result of their team experience (Hackman, 1990)		

Construct	Definition	Theoretical Orientation	Relevance to Hypothesized Model
Team perceived performance	Team members' perceptions regarding the productive output of the team		
Team objective performance	Team's performance calculated by the simulation based on quantitative output		

APPENDIX B
Scales used in the study

Team Goal Orientation (7-point scale)

Learning Goal Orientation

(1) My team likes challenging and difficult assignments that teach new things.
(2) My team is willing to take risks on new ideas in order to find out what works.
(3) My team likes to work on things that require a lot of skill and ability.
(4) My team actively tries to identify best practices across the class.

Performance-Prove Goal Orientation

(1) My team is concerned with showing that it can perform better than other teams.
(2) My team tries to figure out how to prove its ability to other teams in the class.
(3) My team enjoys it when other teams are aware of how well this team is doing.
(4) My team prefers to work on projects where it can prove its ability to others.

Performance-Avoid Goal Orientation

(1) Avoiding to be seen as incompetent is more important to my team than learning new skills.
(2) My team is concerned about taking a task if its performance would reveal that it had low ability.
(3) My team prefers to avoid situations where it might perform poorly.
(4) My team prefers to avoid asking what might appear to others as “dumb questions” when faced with something not understandable.

Team Effectiveness (6-point scale)

Team Viability

(1) My team can continue to function as a team in future.
(2) My team is capable of working together as a unit.
(3) I would want to remain a member of my team.
(4) I wish it were possible for the team to dissolve.
(5) If it were possible to move to another team, I would have.
(6) I would like to work with members of my team on other projects.

Perceived Performance

(1) Going by its performance, my team can be regarded as successful.
(2) All the team goals were achieved by my team.
(3) My team's output was of high quality.
(4) I was satisfied with my team's performance.
(5) The faculty could be fully satisfied with the performance of my team.

Team Satisfaction

(1) After this project my team members could draw a positive balance for themselves overall.
(2) I found it enjoyable to work with members of my team.
(3) Overall, I am satisfied with my team.
(4) My team would like to do this type of collaborative work again.
(5) My team members have gained from the project.

Team Knowledge Integration (5-point scale)

(1) My team members pooled-in their individual expertise to jointly solve simulation-related problems.
(2) My team members combined their individual perspectives to develop a shared understanding of the simulation objectives.
(3) My team members competently blended new simulation-related knowledge with what they already knew.
(4) My team members could clearly see how different aspects of simulation fit together.

Team Knowledge Integration (5-point scale)
(5) Many creative ideas came from the discussions among my team members. (6) My team members frequently built on each other's ideas, skills, and expertise to develop new simulation-related knowledge for decision-making. (7) My team members learned better ways to take decisions from each other. (8) My team members often gained new insights by sharing their ideas with each other.
Team Cooperation (5-point scale)
(1) My team members helped each other to perform their task more effectively. (2) My team members listened to each other's ideas. (3) Team members regularly participated in the team meetings. (4) To achieve high performance it was important for my team members to rely on each other. (5) The team members liked each other.