Examining the role of collective efficacy for media use in hybrid teams

Valerie Cotronei-Baird

Department of Management & Marketing, University of Melbourne

valeriec@unimelb.edu.au

ABSTRACT

An increase in the availability of media for work teams has resulted in a growing number of teams that work in a hybrid team environment. They are teams comprised of members who are engaged in a shared task face-to-face whilst interacting using some form of computer-mediated or communication technology. Research that has examined the relation between media use and team effectiveness has yielded inconsistent results. A theoretical model on the predictive power of collective efficacy on team effectiveness is developed by drawing upon two theoretical perspectives: media synchronicity theory and collective efficacy. A set of propositions that predict the relationship between media use and collective efficacy are presented to stimulate future research to understand how collective influences hybrid team effectiveness.

Keywords: teams, hybrid teams, media richness, media synchronicity, collective efficacy

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INTRODUCTION

Work teams within organisations now have an increased selection of media available to them including face-to-face, written and a broad range of computer-mediated or communication technology media which can replace or supplement face-to-face interaction. This increased media choice provides teams with greater opportunity to communicate and collaborate in a range of different ways and in different settings (Griffith & Neale, 2001; Niinimäki, & Lassenius, 2009; Salanova, Llorens, Cifre, Martinez, & Schaufeli, 2003). As a result, a growing number of teams in organisations tend to work in a hybrid team environment whereby teams are made up of members who are engaged in a shared task face-to-face and, at other times, interact using some form of computer-mediated or communication technology (Griffith & Neale, 2001; Griffith, Sawyer, & Neale, 2003).

As the practice of teams using a mix of media becomes more common, there has been pressure to understand the effects that different media have on team effectiveness (Berry, 2006; Murthy & Kerr, 2003; Straus & McGrath, 1994). Indeed, teams play a major role in the workplace (Clark & Gibb, 2010; Ebrahim, Ahmed & Taha, 2009; Hackman & Wageman 2005; Salanova, et al. 2003) and are deemed to outperform work conducted by individuals (Griffith & Neale, 2001; Hackman, 1990; Hackman & Morris, 1975). Thus, regardless of the different ways and settings in which work teams are able to communicate and collaborate we must ensure that they continue to make a positive contribution to the workplace. In addition, the support given to teams to encourage the use of a range of media is important as organisations are urged to adopt improved structural forms and management practices in the face of increased competition and economic pressure.

To this end, media choice research identifies information about the media capabilities that will best influence task effectiveness. Media richness theory (Daft & Lengel, 1986; Dennis & Kinney, 1998) and media synchronicity theory (Dennis, Fuller & Valacich, 2008; Dennis, Valacich, Speier, & Morris, 1998;) argue that matching the most appropriate media to tasks is important for ensuring effective outcomes. Media synchronicity theory, however, departs from a monolithic description of a task as

proposed by media richness theory, and views tasks as made up of sub-tasks that require two important communication processes of conveyance of information and the convergence of shared meaning for the information (Dennis, et al 2008). However, studies have consistently found both positive and negative relations between media use and team effectiveness. Media choice theories are based on the notion that a cognitive evaluation of the media and their suitability to the task can be made (Reimer, 2009). While media synchronicity theory provides important information about matching the range of media capabilities to communication processes, actual media use is marked by unique processes which are complex and ongoing and result in media being used in a range of different ways that do not always match the communication processes. Furthermore, empirical research has consistently demonstrated that knowledge held by team members are not the strongest variables in predicting team effectiveness (Campion, Papper, & Medsker, 1996) since process factors, such as level of efficacy; the belief in capability to accomplish a task, have the strongest predictive power on effectiveness.

It has been demonstrated that when a team's perception of collective efficacy is high, there is a positive influence on team effectiveness (Gully, Incalcaterra, Joshi, & Beaubien, 2002; Guzzo, Yost, Campbell & Shea, 1993; Stajkovic, Lee & Nyberg, 2009). Yet, despite the positive relationship between collective efficacy and team effectiveness, the mediating role that collective efficacy for media use has on hybrid team effectiveness has not been developed. This exploratory paper develops the construct of media use collective efficacy and proposes that media use collective efficacy is a mediating variable between media use and team effectiveness. A theoretical model on the predictive power of media use collective efficacy on team effectiveness will be developed by drawing upon two theoretical perspectives that foster team effectiveness: media synchronicity theory and collective efficacy.

This paper begins with a discussion of the interconnection between media use and team effectiveness and between collective efficacy and team effectiveness. Following this review, a discussion of the conditions that influence the development of media use collective efficacy will be presented. As an outcome of the discussion, a set of propositions that predict the relationship between the antecedents of collective efficacy and the emergence and maintenance of media use collective efficacy are presented to

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stimulate future research on building media use collective efficacy and to understand how such efficacy develops and influences contemporary work team effectiveness.

LITERATURE REVIEW

Media Choice

Media choice refers to the use of the most appropriate media for particular tasks. The underlying tenet of media choice theories, including media richness theory and media synchronicity theory, is that appropriate media-task fit is dependent upon the characteristics of media and their ability to facilitate different communication patterns.

Media Richness Theory

Media richness theory proposes that task performance will be improved when the information needed for a task is matched to the appropriate level of media richness (Daft & Lengel, 1986; Lengel & Daft, 1988). The characteristics of media richness include the capability of the medium to facilitate the number of different cues, the immediacy of feedback, the tailoring of messages that provide a personal focus and using language variety to convey messages (Daft & Lengel, 1986; Lengel & Daft, 1988). For example, face-to-face communication is considered to be the richest form of media as it allows for a range of modes of communication that includes words, vocal cues, non-verbal communication (gestures, touch) and written or drawn communication. Communication media such as email are considered leaner in richness because they are text based and have lesser abilities to transmit different forms of communication cues and are slower in the giving and receiving of feedback (Dennis & Kinney, 1998).

Media richness theory ranks media on a richness continuum based on their ability to handle information that is deemed equivocal and uncertain. Equivocality refers to ambiguity and multiple and conflicting interpretations of the information (El-Shinnaway, & Markus, 1997). Uncertainty refers to the difference between the amount of information required to complete a task and the amount of information that is actually possessed (El-Shinnaway, & Markus, 1997). To reduce equivocality requires a medium that is able to support the clarification and explanation of information rather than just information transmission. Media such as face-to-face and telephone are proposed to be the most suitable for resolving

equivocal situations (El-Shinnaway, & Markus, 1997). To reduce uncertainty, the medium should help fill the gap between the information held and that which is required to perform the task. As the information processed increases, the level of uncertainty should decrease. Communication media that are considered the best for reducing uncertainty are those that help with the exchange of large amounts of accurate, objective and numerical data (Daft & Lengel, 1986; El-Shinnaway, & Markus, 1997). Written documents are thus considered most suitable (El-Shinnaway, & Markus, 1997) as they can easily convey this information by way of text, graphs, statistics and pictorial information.

Although media richness theory led the way in seeking to identify media capabilities that best suit tasks, research that tests the propositions of media richness have resulted in inconsistent results. While some studies have yielded support for the media richness argument that matching levels of media richness to task results in effective performance (Dennis & Kinney, 1998; Daft, Lengel & Trevino, 1987; Trevino, Lengel & Daft, 1987; Valacich, Mennecke, Wachter & Wheeler, 1994), most other studies have provided contrary evidence or only weak support for the argument (Burke & Chidambaram, 1996; ; Dennis, & Kinney, 1998; Rasters, Vissers & Dankbaar, 2002; Suh, 1999).

Media Synchronicity Theory

Media synchronicity theory has responded to the contradictory results of research conducted using media richness theory by identifying media capabilities that are required to support the two important communication processes of conveyance and convergence. Media synchronicity theory argues that almost all tasks (equivocal or uncertain tasks) require both the need to convey information and converge on a shared meaning for the information (DeLucca & Valachich, 2005; Dennis, et al. 2008). Dennis et al. (2008) demonstrate that by reexamining prior media richness theory research using the lens of media synchronicity theory, it becomes evident that all the tasks under study required both conveyance and convergence communication processes (Dennis, et al. 2008).

Media synchronicity theory points out that there are five media capabilities which support the level of synchronicity required for the two communication processes, they include: transmission and feedback velocity, parallelism (number of effective simultaneous conversations), symbol sets (format in

which information is conveyed, that is, verbal, non-verbal), rehearsability (reviewing/revising a message before sending it) and reprocessability (readdressing the message within the context of the communication event). (Dennis, et al. 2008). The media capabilities associated with synchronous media include high velocity of information transmission and feedback, low parallelism, high symbol variety and low reprocessability and rehearsability. Asynchronous media is characterisied by low velocity of information transmission and feedback, high parallelism, low symbol variety and high reprocessability and rehearsability (see Table 1).

Media synchronicity theory predicts that media with capabilities that support asynchronous interactions between team members are better for conveyance of information and media that support synchronous interaction are better for the convergences of shared meaning for the information. The study conducted by Dennis, et al. (1998) confirm that conveyance and convergence are different processes which require different media that support levels of synchronicity to enable the communication processes that will best influence team effectiveness. For instance, it was found that teams using written media (asynchronous media) generated significantly more unique ideas (conveyance processes) than those groups using only face-to-face media (synchronous media). In addition, it was found that the teams that used face-to-face media (synchronous media) were significantly more likely to converge and would do so in significantly less time than teams using written media (asynchronous media) (Dennis et al. 1998).

Research that has tested media synchronicity theory, however, has also yielded inconsistent results. For instance, the study conducted by DeLuca and Valacich (2006) established that teams were successful at performing with lower synchronicity for convergence tasks despite the fact that the theory stipulates convergence tasks require media with capabilities of high synchronicity. The participants in the study reported that communication using email was successful because the media provided the capability of the members of the team to revise their contributions (rehearsability) and receive input from team members at once (parallelism) and re-read input until it was understood (reprocessability). Asynchronous media with high levels of parallelism, rehearsability and reprocessability, therefore provides the options to support convergence when immediacy and symbol variety is not an important or required capability.

For example, face-to-face media is high in immediacy but low in rehearsability and therefore would, in some cases, not be desirable for convergence of a shared meaning of the information because there no opportunity for rehearsability and reprocessabiliy of the information. Furthermore, while email is considered asynchronous media, since it enables users to benefit from high rehearsability it would be more desirable than face-to-face media at some stages for completing convergence communication (DeLuca & Valacich, 2006).

The important influence that media capabilities have on supporting conveyance and convergence was also demonstrated in a study conducted by Niinimäki et al. (2011). The Global Software Development project team examined in the study had access to and used a range of media with different capabilities that supported both conveyance and convergence. For example, instant messaging was found to offer both synchronous and asynchronous communication because it provided members of the team with the option of providing immediate feedback (synchronous) or the chance to delay feedback (asynchronous). Delaying feedback provided team members the opportunity for rehearsability and reprocessability. Instant messaging also provided high levels of parallelism (asynchronous) because members could receive information as they worked on the development of the task. It was reported that team members preferred media with higher levels of rehearsability (asynchronous); that is, text-based media such as instant messaging and email over audio-based media such as audio-conferencing and the telephone when they rated their own language skills to be inadequate or when they were expected to discuss technical and complex issues (convergence). In some circumstances, instant messaging was used in conjunction with teleconference because the capability of rehearsability associated with instant messaging (asynchronous media) assisted with sharing concepts that were difficult to pronounce (convergence). Media with high levels of reprocessability such as email, task management tools or issue tracker, although an asynchronous media, were used when it was required that information necessary for the project needed to be shared efficiently and effectively. Thus the capability of reprocessability (asynchronous) provided the members of the team opportunity to reexamine and process the information in different formats and at different times. Email was also used as a repository for important information

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that could be revisited again at a later date and thus the capability of reprocessability allowed for the development of a shared understanding of information (convergence) and was used more so than the other media available in most cases. The observation of how instant messaging and email was used illustrates that one medium was used for both conveyance and convergence depending upon how the members of the team adapted the media's capabilities to suit conveyance or convergence communication processes.

Overall, the aforementioned studies indicate that media use is marked by unique processes which are complex and ongoing. Thus, media richness theory provides an approach to media use that can improve team effectives explaining the contradictory results of previous media choice research. Research has demonstrated that no one media type is necessarily better or richer than another. Instead, since tasks requires both the conveyance and convergence of information a range of media capabilities that are able to support the levels of synchronicity are required to support the communication processes. Thus media synchronicity theory suggests that media switching should be encouraged and supported (Dennis et al. 2008; Dennis et al. 1998). It was noted by work teams in Fernando, Hall and Fitzpatrick's (2001) study, that had the teams possessed the knowledge about media capabilities in supporting the communication processes of conveyance and convergence, the members of the teams predict that they would have been able make a richer analysis of the important media capabilities necessary for the completion of tasks.

However, while media synchronicity research have indicated that teams in fact do use adaptive strategies to work with or against media capabilities (Fuller & Dennis, 2009; Münzer & Borg, 2008; Münzer & Holmer, 2012), at other times they do not resulting in perceptions of inefficiency and dissatisfaction (DeLuca & Valacich, 2006; Niinimäki et al. 2011) and low task success (Münzer & Holmer, 2012) associated with poor match between media capabilities and task. Van den Bosshce, Gijselaers, Segers, Woltjer and Kirschner (2011) found that holding complementary knowledge and ideas among team members may not be enough for the development of agreed upon shared mental model of the media capabilities and their influences on task completion. It has consistently been demonstrated that knowledge held by team members is not the strongest variable in predicting team effectiveness because process factors, such as level of efficacy; the belief in capability to accomplish a task, have the strongest

predictive power on effectiveness (Campion et al. 1996). The next section will discuss the role that collective efficacy has had on influencing team effectiveness followed by a set of propositions outlining the relationship between the antecedents of collective efficacy and the emergence media use collective efficacy.

Collective Efficacy

Collective efficacy is the team's collective perceptions of a belief in the team's capabilities of using the knowledge and skills that the team possesses to successfully accomplish a task (Bandura, 1986, 1997, 2000). Collective efficacy is a construct that is derived from social cognitive theory and is an extension of self-efficacy (Bandura, 1986, 1977). Bandura (2000) asserts that high levels of collective efficacy influence the team's vision of what they want to achieve together, how much effort they plan to exert and whether or not they will persist in the face of failure and/or challenges. Empirical research has consistently supported the link between collective efficacy and higher team effectiveness (Bandura, 1986; Gully, et al, 2002; Klimoski & Mohammed, 1994). It has been found that teams that seem to have the same skills, abilities and resources in comparable teams have resulted in lower levels of performance outcomes when collective efficacy was rated low (Gibson, 2001; Peterson, Mitchell, Thompson & Burr, 2000; Scott-Young & Samson, 2009). Therefore it is imperative that a specific form of collective efficacy associated with collective media use in contemporary hybrid work team environments is explored as a mediating variable between media use and team effectiveness.

Developing Media Use Collective Efficacy

In order for media use collective efficacy to be identified and developed, a consideration of the range of definitions given to efficacy will be considered. A distinction is made between generalized collective efficacy and specific collective efficacy. A generalized construct of collective efficacy, refers to the team's shared perception about the team's general capabilities to work as a team across a range of tasks (not task specific). Guzzo et al. (2002) refer to this type of efficacy as potency. Specific collective efficacy is described as a task and context specific variable (Stajkovic et al. 2009) and is the aggregate of individuals' members' appraisals of the team's capability to accomplish a specific task.

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Gully, et al. (2002) make a further distinction, by specifying the difference between collective efficacy and team efficacy. The authors argue that collective efficacy, while a task specific efficacy, can refer to teams, departments, organisation or nations. Placing emphasis on the 'team' ensures that the analysis of efficacy takes place specifically at the team level. As noted by Gully et al. (2002), team-efficacy is task-specific; its relationship with performance is influenced strongly by the characteristics of the specific context and task environment. Since hybrid teams are a specific team that work on a shared task with team members using a range of media, the collective efficacy that must emerge needs to be specific to the unique context and manner by which the hybrid team completes a task using a range of media. Since media synchronicity argues that most tasks are made up of a sub-set of tasks that require both the conveyance of information and the convergence of shared meaning for the information to complete the task, media use collective efficacy is a task-specific form of collective efficacy relevant to the two fundamental communication processes required for tasks. This paper proposes that the relationship between media use and team effectiveness is dependent upon the team's shared belief in the team's ability to use the media capabilities that best support the communication processes. This paper predicts, therefore, that media use collective efficacy is a mediating variable between media use and team effectiveness.The following section formulates a set of propositions outlining the conditions required for the development of media use collective efficacy.

Conditions for the emergence of Media Use Collective Efficacy

Efficacy beliefs are said to mobilise the motivation, cognitions and courses of action that are required for the control of the task at hand (Wood & Bandura, 1989). There is therefore a distinction drawn between possessing the knowledge and skills and being able to apply them consistently under changing circumstances. Bandura's (997) argues that the antecedents that influence the emergence of collective efficacy are the same as those that influence the emergence of self-efficacy, that is, that past and actual experiences (enactive mastery experience), modeling (vicarious experience) of other's the processes others take to carry complete a task (Bandura, 1986), the feedback received (verbal persuasion) and positive mood states determine the emergence of collective efficacy as they do self-efficacy. This

paper suggests that the four antecedents of collective efficacy identified by Bandura (1997) play a significant role in influencing the development of media use collective efficacy on the condition that the antecedents are linked to the use media that support conveyance and convergence. The conceptual model (see Figure 1) proposes new ways to understand how the sources of collective efficacy can be used as a technique for building media use collective efficacy through mastery experiences, vicarious experiences, feedback and positive mood states associated with the use of synchronous and asynchronous media.

Enactive Mastery Experiences (actual and past experiences)

Previous research has indicated that past group success or failure is positively related to collective efficacy (Riggs & Knight, 1994). A resilient sense of efficacy is achieved through the experience of overcoming obstacles through persistent effort. The experience teaches people that continual effort results in success (Wood & Bandura, 1989). Consequently, the relation between enactive mastery experiences on developing and strengthening the collective efficacy for using the media capabilities that support levels of synchronicity required for conveyance, convergence or both would require teams to collectively be exposed to information and the practice of using the media.

Proposition 1a: Hybrid teams who practice using media for conveyance will have higher levels of collective efficacy for media use than teams who do not.

Proposition 1b: Hybrid teams who practice using media for convergence will have higher levels of collective efficacy for media use than teams who do not.

Vicarious Experiences (modeling)

Vicarious experiences (or modeling) refers to observing the processes that others carry out in completing a task (Bandura, 1986). The mediating role of collective efficacy on facilitating the relationship between modeling and group effectiveness has been supported by empirical research (Prussia & Kinicki, 1996). In order for teams to accurately model appropriate behaviour, they need to be able to model the behaviour internally amongst members of the team, as well as the team observing modeling behaviour of external teams using media that supports conveyance and convergence communication processes. Such observations and modeling can generate expectations in a teams' collective belief for media use.

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Hypothesis 2a: Hybrid teams exposed to vicarious experiences (modeling) of media for conveyance will have higher levels of collective efficacy for media use than hybrid teams who do not.

Hypothesis 2b: Hybrid teams exposed to vicarious experiences (modeling) of using media for convergence will have higher levels of collective efficacy for conveyance media use than teams who do not.

Verbal Persuasion (Feedback)

Evaluative feedback is another condition for the development of efficacy (Bandura, 1997). Research provides support for the link between performance feedback and collective efficacy (Jung & Sosik, 2003; Prussia & Kinicki, 1996; Tasa, Taggar & Seijts, 2007). Performance feedback that is directed specifically to the team and not the individual members will be most effective because the team is exposed to similar evidence that their team can, or cannot, master whatever it takes to succeed (Tasa, et al. 2007, p. 24). Lindsey, Brass and Thomas (1995, p. 653), propose that high-quality performance feedback that is defined as 'accurate, timely, specific feedback regarding an understanding of the cause-and-effect relationships involved in performing the task' rather than feedback that outlines success/failure information will allow for self-correcting adjustments to be made. Providing a work environment in which collective efficacy is developed and enhanced via performance feedback related to using media for conveyance and convergence is important throughout the life of the team for the emergence and maintenance of media use collective efficacy.

Proposition 3a: Hybrid teams that receive timely feedback related to media use for conveyance throughout the duration of the team's life are more likely to develop and maintain higher levels of collective efficacy for media use than teams who do not receive timely feedback.

Proposition 3b: Teams that receive timely feedback related to media use for convergence throughout the duration of the team's life are more likely to develop and maintain higher levels of collective efficacy for media use than teams who do not receive timely feedback related to media use.

Positive Mood States

Social cognitive theory states that people judge their efficacy levels on their emotional reactions to particular situations (Bandura, 1986, 1977). The emotional states refer to how people feel within themselves at any given moment in the context of performance. For example, some people can interpret their reactions to stress, as a way of energising oneself to persist while others will interpret stress in a way

that is debilitating to their performance (Bandura, 1997). In this way, by providing teams with the opportunity to experience positive mood reactions via relevant to media that supports conveyance and convergence tasks can reduce the dysfunctional consequences of obstacles and challenges in such a way that teams will develop strong and resilient collective efficacy for media use.

Proposition 4a: Hybrid teams who experience positive mood states by exposure to media use for conveyance will possess higher levels of collective efficacy for media use than teams who do not experience positive mood states.

Proposition 4b: Hybrid teams who experience positive mood states by exposure to media use for convergence will possess higher levels of collective efficacy for media use than teams who do not experience positive mood states.

CONCLUSION AND CONTRIBUTIONS

The purpose of this paper has been to develop the construct of media use collective efficacy; a specific form of collective efficacy associated with a hybrid team's shared belief in the team's ability for media use. A theoretical model on the predictive power of the antecedents of collective efficacy for the emergence and maintenance of media use collective efficacy was presented to stimulate future research on building media use collective efficacy and to understand how such efficacy develops and influences hybrid work team effectiveness.

An exploration of the the role of media use collective efficacy can lead to important information about changing media use routines in teams. This can be achieved by providing team members with an evidence-based approach to using media more effectively despite the range of different ways and in different settings that teams work as a result of increased media choices. Thus, this exploration allows for a better understanding and prediction of factors that contribute to team effectiveness. Such information can be used to inform practice about how to develop strategies, in particular, the development of training interventions, so that work teams in contemporary organisations can develop the collective efficacy needed to organise and execute action required to effectively make media use decisions that will influence team effectiveness.

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Table 1: The media capabilities of synchronous and asynchronous media

Synchronous media	Asynchronous media
High Transmission velocity (speed of information) and high immediacy of feedback	Low Transmission velocity (speed of information) and low immediacy of feedback
Low parallelism	High parallelism
High symbol variety	Low symbol variety
Low reprocessability	High reprocessability
Low rehearsability	High rehearsaiblity

Figure 1: Conceptual model for media use collective efficacy

Experience in media use for conveyance & convergence via:
- Enactive Mastery
- Modeling
- Feedback
- Positive Mood State

Media Use Collective Efficacy

Hybrid Team Effectiveness:

Team performance:
- Quality of project: depth, correct problems identified,
- Quality of recommendations
- Integrated piece

Team effectiveness
- Team functioning
- Communication satisfaction level.

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