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# Team Communication Actions: Beyond the Dichotomy of Face-to-Face versus Virtual Interactions in Teams

Ignacio E. Perez-Sepulveda[a]

Carolyn M. Axtell[b]

Jeremy F. Dawson[b]

[a] School of Psychology, Universidad Adolfo Ibáñez, Peñalolén, Santiago 7941169, Chile

[b] Institute of Work Psychology, Management School, University of Sheffield, Sheffield S10 1FL, United Kingdom.

## Author Note

Correspondence concerning this article should be addressed to Ignacio Perez-Sepulveda, School of Psychology, Universidad Adolfo Ibáñez, Av. Diagonal Las Torres 2640, Peñalolén, Santiago 7941169, Región Metropolitana, Chile. Email: ignacio.perezs@uai.cl.

## ABSTRACT

Previous research has shown that team members rely on multiple media to interact with each other, combining information and communication technologies (ICTs) and face-to-face interactions, which have been commonly studied as team virtuality. Yet, a limitation of this research is that it has assumed an opposing view of ICTs versus face-to-face, ignoring the differences and similarities in the capabilities they offer and how team members use them to support their interactions. All these aspects can be instrumental in understanding how virtuality can impact the overall functioning of teams. To address these limitations, this article will present the new construct of teams' communication actions, reflecting the actions that team members perform when using media to shape how they interact with each other. Then, we will analyse how the different communication actions can impact on teamwork processes. This article contributes to the team virtuality research by offering a more nuanced understanding of media usage in teams that could help to explain some of the dissimilar results in the literature and by giving practitioners (e.g., managers and team leaders) robust guidelines to manage the use of multiple media in their teams.


**Keywords:** teams' communication actions, team virtuality, media capabilities, team dynamics

# INTRODUCTION

The development of information and communication technologies (ICTs) has significantly shaped the way modern work teams operate. They have allowed team members to work from remote locations by relying on these technologies to communicate and interact with each other (Gilson et al., 2015). The COVID-19 pandemic propelled this even further as many workers were forced into isolation conditions to comply with their governments' health policies and, therefore, were only able to communicate with other members through ICTs (Feitosa & Salas, 2021; Garro-Abarca et al., 2021). Even after the end of the pandemic, many people – and organisations – have continued to work this way, at least partially. The UK Office for National Statistics (2022) reported in May 2022 that 24% of workers were doing hybrid work, and 14% were working exclusively from home. Similarly, in April 2022, 58% of US workers reported being offered to work remotely at least part-time, with 35% having access to full-time remote work (McKinsey, 2022). The term *team virtuality* has been coined to refer to the study of team members working remotely and relying on ICTs to communicate with each other (Handke et al., 2020). Team virtuality is usually defined as a continuum construct (Gibson & Cohen, 2003) in which a team where all members are dispersed through time/space and interact only through ICTs will be considered an entirely virtual team. In contrast, one in which all members work in the same location/hours and communicate only face-to-face will be considered zero virtual. However, most teams will present some degree of virtuality by combining interactions through ICTs and face-to-face (Dixon & Panteli, 2010).

While the idea of team virtuality has helped to better understand the impact of using multiple communication media in teams (i.e., ICTs and face-to-face), it has presented some limitations. Commonly, the technology reliance component of team virtuality has been examined in contrast to face-to-face interactions, grouping all ICTs together and assuming they will have detrimental effects on team dynamics (Gibbs & Navick, 2023). As computer-mediated communication literature (e.g., Media Synchronicity Theory; Dennis et al., 2008; Dennis & Valacich, 1999) has shown, different ICTs can offer vastly dissimilar characteristics, such as asynchronous text-based email versus synchronous phone calls

(Dennis et al., 2009; Maruping & Agarwal, 2004). Also, some ICTs can offer similar capabilities to face-to-face interactions, such as video calls, which offer the possibility to communicate through verbal and non-verbal expressions, all aspects deemed an important part of face-to-face exchanges (Kock, 2004). This way, by grouping together different ICTs (in contrast to face-to-face), team virtuality research has glossed over their unique communicational capabilities.

Research on team virtuality has also overlooked theories addressing how people use technology. Scholars have argued for a shift from deterministic views of technology, where people are seen as passive users, to one where the use of technology results from the interplay between its properties and people's agency (Orlikowski, 2000; Treem & Leonardi, 2013; Zammuto et al., 2007). The deterministic view proposes that technology possesses fixed attributes programmed by developers, which users are expected to learn how to use and appropriate them (DeSanctis & Poole, 1994). Any deviation from these predetermined attributes is considered a user 'error' and undesirable. However, Markus and Silver (2008), using the affordances perspective developed by Gibson (1977), argued that the possibilities of action that users perceive from technology will depend on their own characteristics and the context of use. For example, for some people, email can be a communication tool that allows them to contact friends and family, but for others, it can be a backup platform for important work documents. In this non-deterministic view, deviations from technology's predetermined attributes are seen as an expected outcome of the imbrication of people and technology (Leonardi, 2011). Thus, while certain media offers specific capabilities, how users perceive those capabilities to afford actions and how they use them will depend on users' characteristics, preferences, needs, and the overall context.

To address the limitations mentioned above, we build on the ideas of media capabilities and the affordance perspective to propose a new concept we call *teams' communication actions.* These communication actions represent *a set of shared actions that team members perform when using communication media that shape how they interact with each other while performing their tasks*. Based on the capabilities systematised by Media Synchronicity Theory, we identified eight different

communication actions, such as using verbal and non-verbal communications, using written communications, and involving multiple participants. It is important to note that while we use the media capabilities systematised by Media Synchronicity Theory to identify the most basic communication actions that team members can perform, we do not associate the specific materiality of a medium (i.e., capabilities) with specific actions. As the affordances lens proposes, the actual actions that team members perform over media can vastly differ from the objective material attributes depending on their perceptions of the actions the media enable them to do (Faraj & Azad, 2012). For example, if we analyse face-to-face interactions, they do not appear to offer high levels of rehearsability (Maruping & Agarwal, 2004), but team members can make an effort to practice and refine a presentation before a face-to-face meeting. This way, we propose team members' communication actions as a basic unit of analysis to understand team dynamics, which emerge from the interplay between team members, the materiality of media, and other relevant aspects, such as the task and the team context.

The idea of communication actions also differs from previous systematisations of affordances. First, we focus on communication media in general, including face-to-face interactions, and not only on technology, as it has been the main focus of theories analysing technological affordances (e.g., Evans et al., 2017; Lane et al., 2023; Rice et al., 2017; Willems, 2021). Second, our approach also differs because we consider the actual actions team members perform using media and not their perceptions of potential actions, as we argue they should allow for a better understanding of the impact of media on team dynamics. Lastly, affordances researchers are usually concerned with how people afford technology to achieve a specific purpose (Malhotra et al., 2021; Shanahan, 2023). For instance, Gibson et al. (2022) analysed how technological affordances (e.g., sensemaking, codification) can be used to achieve specific knowledge management activities in global teams (accumulation, integration and implementation). However, we argue that people can use technology and media without having a specific purpose in mind (e.g., for personal preference or by mimicking others) or without realising how their actions impact on team's outcomes. This way, by exploring a basic set of actions not linked to goals, we offer a flexible construct that considers the possibility of unintended behaviours/consequences. Then, researchers can use

this set of communication actions to examine how they impact other variables usually connected to virtuality (e.g., synchronicity, copresence) or relevant team outcomes. In this article, we will do the latter by examining how these teams' communication actions can allow team members to perform specific team processes needed to effectively perform their tasks based on Marks et al.'s (2001) framework, one of the most influential taxonomies in the team's literature. Since different processes can have different communicational needs, teams that use a more robust combination of communication actions should be better positioned to respond to the requirements necessary for their successful performance (Dennis et al., 2009).

The idea of teams' communication actions contributes to expanding the team virtuality literature in three main ways. First, by focusing on actions, it offers an alternative approach to studying the use of communication media beyond the opposing view of virtuality (face-to-face versus ICTs). Second, it also goes beyond deterministic views of media by examining the actual use that team members made of media and their capabilities. Moreover, by relying on actions instead of specific media, this approach can also facilitate the inclusion and analysis of new ICTs and media developments in the future. Third, by integrating this new concept with the Marks et al. (2001) team processes framework, we can help clarify some of the mixed results of the team virtuality literature in terms of team processes (e.g., Brown et al., 2020; Lowry et al., 2006) and overall team performance (e.g., Ortiz de Guinea et al., 2012; Purvanova & Kenda, 2022).

## THEORETICAL BACKGROUND

### Virtual Teams and Team Virtuality

A large amount of early research about the use of ICTs in team contexts focused on understanding the differences between virtual teams, that is, "work arrangements where team members are geographically dispersed, have limited face-to-face contact, and work interdependently through the use of electronic communication media to achieve common goals" (Dulebohn & Hoch, 2017, p. 569) and collocated (or face-to-face) teams (Martins et al., 2004). However, this research has been criticised as, in

practice, purely face-to-face and purely virtual teams are scarce (Gibson et al., 2014; Hertel et al., 2005). Most modern teams will combine the use of ICT-mediated and face-to-face interactions to some extent (Purvanova, 2013). This way, virtual teams research is limited in its ability to explain what happens in (1) collocated teams that made high use of ICTs to communicate, and (2) geographically distributed teams that rely on ICTs, but also meet face-to-face sometimes (Gibson et al., 2014). The notion of virtuality as a continuum was used to address the above limitation of virtual teams' research (Gibson & Cohen, 2003; Griffith et al., 2003; Kirkman et al., 2012). Nevertheless, team virtuality research has not been without its limitations as researchers have struggled to agree on a definition and operationalisation of the construct (Hosseini et al., 2015). Multiple dimensions have been proposed as being part of team virtuality, such as geographical/temporal dispersion, technology reliance, and cultural diversity, among others (Chudoba et al., 2005; Schweitzer & Duxbury, 2010). Therefore, several authors have treated virtuality as multidimensional, combining several of these dimensions and increasing the number of definitions/operationalisations exponentially (Foster et al., 2015). However, the combination of these dimensions in a single measure of team virtuality is problematic as there is evidence that they are weakly correlated at best (Gibson & Gibbs, 2006).

The above limitations of virtual teams and virtuality research might help explain some of the mixed results in the literature. There is evidence that technology reliance can have a positive impact on teamwork processes. Some studies have found positive effects on transition processes (such as planning and goal setting) and action processes, such as intrateam coordination (Brown et al., 2020). Contrarily, other studies have found that virtuality can impair action processes, such as coordination (Cummings et al., 2009), communication (Espinosa et al., 2015), and overall information and knowledge sharing (Mesmer-Magnus et al., 2011; Ortiz de Guinea et al., 2012). Similar results have been found regarding interpersonal variables. Some studies have shown that virtual teams present issues in the development of positive interpersonal relationships (Rogers et al., 2021), lower levels of trust (Morrison-Smith & Ruiz, 2020; Peñarroja et al., 2013) and cohesion (Shin & Song, 2011), and higher levels of conflict (Hinds & Mortensen, 2005; Stark, Bierly, & Harper, 2014). Brown and colleagues' (2020) study found that

technology reliance is positively related to interpersonal processes and negatively related to task and relationship conflict. On the other hand, a meta-analysis by Purvanova and Kenda (2022) found that virtuality is not related to teams' cohesion and trust. In terms of performance, there is evidence that virtual teams need more time to accomplish the same task as collocated teams (Driskell et al., 2003) and present an overall worse performance (Ortiz de Guinea et al., 2012). However, Purvanova and Kenda's (2022) meta-analysis did not find a significant relationship between virtuality and teams' performance rated by others (e.g., clients, leaders) or by team members. Lastly, other studies have found that the use of ICTs can enhance creativity and the proposition of new ideas (e.g., Chamakiotis, Dekoninck, & Panteli, 2013).

To address some of the limitations and mixed results, researchers have argued for the need to clarify our understanding of what is meant by the term "virtual". Some have proposed that the defining dimension of virtuality should be the technology reliance/usage (e.g., Dixon & Panteli, 2010; Kirkman & Mathieu, 2005), with geographical/temporal dispersion and cultural diversity being characteristics of globally distributed teams (Gibson et al., 2014; Kramer et al., 2017). While these dimensions can concur (i.e., in globally distributed virtual teams), this distinction reflects that some teams can be highly virtual (i.e., rely heavily on ICTs) without being geographically or temporally distributed or having members from different cultures. Moreover, some authors have also proposed the need to go beyond the dichotomy of face-to-face versus virtual (ICT-mediated) communications to include the characteristics of communications and media in our accounting of virtuality (Kirkman & Mathieu, 2005). Using ideas from computer-mediated communication theories (e.g., media richness and synchronicity), Kirkman and Mathieu (2005) proposed that not only the reliance on ICTs but also the levels of synchronicity and informational value will determine the virtuality of a team. Similarly, Maruping and Agarwal (2004) used the Media Synchronicity Theory (Dennis & Valacich, 1999) to analyse the impact of using different types of ICTs on virtual teams' interpersonal processes (e.g., affect management, task and process conflict). Media Synchronicity Theory is one of the most recent theories that systematised a wide range of media capabilities by examining not only the ones offered by face-to-face exchanges (the approach used by

Media Richness Theory; Daft & Lengel, 1984) but also the ones offered exclusively by ICTs. Nevertheless, to date, few empirical studies have measured virtuality using Kirkman and Mathieu's (2005) approach (e.g., Brown et al., 2020; Maynard et al., 2019), and no studies have tested Maruping & Agarwal's (2004) ideas. Moreover, Maruping & Agarwal's (2004) approach was confined to virtual teams, that is, teams that only communicate through ICTs. This way, we still lack theoretical developments that use the ideas of media capabilities to analyse teams that combine the use of face-to-face and ICT-mediated interactions. This is of relevance as some ICTs offer capabilities that are not offered by face-to-face exchanges, such as the capacity offered by email to re-examine a message over time.

**Media Synchronicity Theory**

Media Synchronicity Theory (Dennis et al., 2008; Dennis & Valacich, 1999) was developed as an effort to systematise and improve on previous theories that had examined the features and capabilities of communication media. Media Richness Theory (MRT) posits that media differ in their capacity to transmit information based on four aspects: immediate feedback, multiple cues and channels, language variety, and personal focus. This theory has been used to explain the challenges faced by virtual teams using ICTs, particularly text-based ones like email or chat, which are considered 'leaner' media. These leaner media can lead to incoherent messages, misunderstandings and misattributions due to a lack of social and contextual cues in messages (Axtell et al., 2004; Sproull & Kiesler, 1986). Social Presence Theory also highlights the impact of media richness on interpersonal processes, focusing on the perception of partners during interactions (Short et al., 1976). The reduced social and contextual cues can result in a situation of de-individuation, where people focus less on their interaction partners and do not feel pressure to conform to social norms, potentially leading to conflict. However, these classic media theories, developed before the widespread use of ICTs in organisations, have struggled to explain the use and consequences of newer media like email, instant messaging, and video calls (e.g., Dennis & Kinney, 1998; Rice, 1992). Media Synchronicity Theory addresses this gap by considering the capabilities offered

by different types of media, including documents and ICTs, not just face-to-face communication (Dennis et al., 2009).

Dennis and Valacich (1999) developed Media Synchronicity Theory building on the premise that the effectiveness of a specific medium will depend on the communication needs of the task that is being performed. They proposed that the goal of every communication is to develop a shared understanding (regardless of whether this is achieved or not) between the participants. To achieve this shared understanding, they will need to perform two primary processes: conveyance of information and convergence of meaning. Conveyance involves transmitting new information to help the receiver form a mental model of a subject. Convergence involves discussing each individual's interpretation of a subject to reach a common understanding (Dennis et al., 2008, p. 580). Additionally, to perform these two primary processes – which are situated at the interactional level – two individual-level processes are necessary (in different proportions depending on the primary process being performed): (1) transmission of information, that is, "preparing information for transmission, transmitting it through a medium, and receiving information from a medium" (Dennis et al., 2008, p. 576), and (2) processing of information, namely, "understanding the meaning of information and integrating it into a mental model" (Dennis et al., 2008, p. 576).

Based on the previous analysis of task and communication processes, this theory argued that different media offer distinct capabilities, that is, *a set of physical characteristics or properties*, which allow them to be better suited for the transmission or the processing of information. This theory suggested five different capabilities (see Figure 1; Dennis et al., 2009: 582): (1) transmission velocity, namely, the speed by which a medium can deliver a message; (2) parallelism, that is, the number of simultaneous transmissions that a medium offer; (3) symbol sets, i.e., the number of ways in which a medium allows for information to be encoded (i.e., verbal, non-verbal and para-verbal components); (4) rehearsability, namely, the degree that a medium allows for the refinement and fine-tuning of the definitive version of a message before sending it; and (5) reprocessability, that is, the extent that a medium allows for a message

to be re-examined multiple times after being received. Further, they proposed that transmission velocity and parallelism are transmission-oriented capabilities, while rehearsability and reprocessability are processing-oriented capabilities. The symbol sets is the only capability related to both processes as a more robust symbol set offers the possibility to transmit different types of information (transmission) and also facilitates the correct decoding or interpretation of the message by the receiver (processing).

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An important aspect to understand how media and their capabilities can impact convergence and conveyance processes are the concepts of *synchronicity* and *media synchronicity*. Synchronicity between communication participants occurs when they exhibit coordinated behaviours with a common focus while having synchronous exchanges (Dennis et al., 2008; Harrison et al., 2003). Media synchronicity refers to the "extent to which the capabilities of a communication medium enable individuals to achieve synchronicity" (Dennis et al., 2008, p. 581). Media that allows for higher levels of synchronicity will be better suited for convergence of meaning, as they allow for quick back-and-forth exchanges and clarifications, which, in turn, facilitate achieving a common understanding between participants. Usually, media with strong transmission capabilities (e.g., video calls or face-to-face interactions) will offer higher levels of synchronicity. Although, in some instances, parallelism can hurt synchronicity if participants are involved in multiple simultaneous communications with different focuses, for example, when participants have multiple simultaneous discussions about different topics. On the other hand, media that support lower levels of synchronicity (e.g., emails or text messages) will be better suited for the conveyance of information. This type of media allows participants enough time to process and understand larger amounts of information and then to create or revise their mental models. Often, media with strong processing capabilities allow the low levels of synchronicity needed for conveyance processes.

**Beyond Determinism: The Role of Users**

While there is consensus that media vary in their objective features and attributes, some authors have questioned the use of a deterministic view in which these characteristics are argued to shape human actions and interactions without considering the role of people's agency (Orlikowski, 2010; Orlikowski & Scott, 2008). From a deterministic standpoint, it is argued that during development stages, developers are able to incorporate social structures into technology; that is, they incorporate the rules and resources that will shape the actions that people can adopt while using the technology (DeSanctis & Poole, 1994; Poole & DeSanctis, 1990). Thus, the actual use of technology results from an appropriation process of these structures by the users. From this view, when users cannot correctly appropriate these structures, that is, to use the technology for its intended purpose, the results will likely be negative. However, Orlikowski (2000) challenged this assumption based on Giddens' Structuration Theory (1979, 1984), which proposes that social structures should not be understood as external forces shaping human action. On the contrary, structures only exist 'in and through the activities of human agents' (Giddens, 1984, p. 256). Orlikowski's (2000) Technology-in-Practice perspective extends structuration theory to technology use, emphasising that technological structures emerge from their use (what the author called the enactment of structures) instead of them being embodied into technology. The idea of enactment emphasises that people can use technologies as they were designed, but also, they can "circumvent inscribed ways of using the technologies — either ignoring certain properties of the technology, working around them, or inventing new ones that may go beyond or even contradict designers' expectations and inscriptions" (Orlikowski, 2000, p. 408).

The idea of affordances has been used to pose a similar criticism to deterministic views of technology (Leonardi, 2011). The notion of affordances was used by Gibson (1977) to explain how different species of animals perceive different opportunities for action from the same objects and their respective material attributes. From an affordance perspective, the physical properties of objects are independent of the animals (or humans) who use them, but what animals perceive an object allows (afford) them to do will depend on the animals' unique attributes (e.g., height, weight, strength, posture) in relation to the object (Gibson, 1977). The idea of affordance has been applied to the analysis of how

users perceive technologies and actually use them (e.g., Hutchby, 2001; Norman, 1999; Zammuto et al., 2007). Markus and Silver (2008) defined technological affordances as "the possibilities for goal-oriented action afforded to specific users group by technical objects (p. 622)". These possibilities emerge from the relation between the user and its characteristics (e.g., goals, needs, preferences, abilities, and knowledge) and the material attributes of the technology. Therefore, affordances are not part of the technology but exist in the imbrication of the material attributes and the agency of people (Leonardi, 2007). This also means that different users can perceive different possibilities for action from the same technology, depending on their own unique characteristics. It is important to note that these possibilities are not infinite, as their existence is enabled and, at the same time, is constrained by the material attributes of the technology (Majchrzak et al., 2016; Willems, 2021). For instance, while different users can perceive that video calls allow them to afford different actions (e.g., contact relatives that live far away, discuss important work documents), it is highly unlikely they will perceive that video calls afford them the possibility to hug others as this medium lacks the capacity to support physical touch.

## TEAMS' COMMUNICATION ACTIONS

Up to this point, we have stated that team members can support their interactions and communications by combining several media, including natural (e.g., face-to-face) and artificial ones (e.g., ICTs), which will offer specific capabilities (Dennis & Valacich, 1999). Some capabilities allow for higher levels of synchronicity (transmission), while others will offer lower levels (processing). Furthermore, some communication processes will be better suited by high levels of synchronicity (convergence of meaning) and others by low levels (conveyance of information). Finally, based on non-deterministic views of technology, we have stated that there is a gap between the material attributes (i.e., capabilities) of media and the actions that people perform using the media. These actions emerge from the interplay between the materiality of media, the personal characteristics of users (such as their preferences and needs) and the context of use. In this section, we will present and define the idea of teams' communication actions as a way to apply these insights to the examination of how team members use

different media to interact with each other. Then, we will explore how these actions can help explain some of the mixed results in the virtual teams and team virtuality research by proposing relationships with several team processes.

**Definition and types of communication actions**

We define team's communication actions as *the shared set of actions that team members perform using communication media, which shape the way in which they interact with each other while performing their tasks*. Based on the capabilities systematised by Media Synchronicity Theory (Dennis et al., 2008; Dennis & Valacich, 1999), we identified eight distinct basic communication actions that team members can perform using media (see Table 1). Following MST propositions, we argue that using verbal and non-verbal communications, having quick exchanges, involving multiple team members, and having simultaneous communications will facilitate the convergence of meaning between team members as they are all relevant actions that allow for high levels of synchronicity. On the other hand, using written and graphical communications, refining, and reviewing messages will facilitate the conveyance of information among team members as they allow for lower levels of synchronicity. While we build on the capabilities systematised by Media Synchronicity Theory, the ideas of teams' communication actions and media capabilities differ in several ways. First, the focus of teams' communication actions is on how team members are able to develop a shared way of using the set of media they have at their disposal to support their interactions. The focus on shared actions is relevant because team members can present individual differences in the way they use the media at their disposal. However, due to the interdependent character of work teams (Ilgen et al., 2005; Mathieu et al., 2017), we argue that the impact of communication actions will be stronger when team members are able to develop a common pattern of these actions. On the other hand, media capabilities are concerned with the objective material attributes of media.

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Second, because media capabilities and the actions that team members perform over them are in two different levels of analysis (media and team level, respectively), there are differences in how the actual use of capabilities is expressed in the team setting. Some capabilities and actions had a clear connection, such as natural symbols set and the use of verbal and non-verbal expressions, but others presented larger gaps. For example, parallelism is concerned with how many signals a medium allows to transmit simultaneously. This way, at the team level, multiple team members can participate in one particular interaction, sending and receiving messages, which will be closely related to the parallelism of the media supporting that interaction. However, the analysis of parallelism is more complicated if we consider that team members can communicate through multiple media simultaneously, for example, when some members communicate through chat, others via email, and others face-to-face. This way, team members can maintain multiple simultaneous communications regardless of the parallelism capabilities of the media involved. Considering this, we proposed two different communication actions derived from parallelism: multiple participants and simultaneous communications.

Third, the communication actions identified in this article are not directly determined by the capabilities of the media used by team members. As non-deterministic theories have proposed, the actions that users perform over media will emerge from the interplay or imbrication of multiple factors (Leonardi, 2011; Markus & Silver, 2008), being just one of them the capabilities of media (see figure 2). Capabilities are relevant because they represent the materiality over which team members' actions can occur, serving an enabling and constraining role simultaneously (Evans et al., 2017; Leonardi, 2007). While team members can express their agency and use media in ways that challenge their capabilities, this is grounded in the materiality of media, and therefore, the possibilities are not infinite. For example, team members cannot communicate using their voice or body gestures through email without modifying the materiality of the medium (Dennis et al., 2009; Maruping & Agarwal, 2004). However, team members can use the media in ways that circumvent or ignore some of its capabilities. For example, while email is usually considered to offer low levels of transmission velocity (Dennis et al., 2009; Maruping & Agarwal, 2004), team members can set alerts and make a conscious effort to answer emails as soon as they receive

them. Also, they can ignore the high levels of rehearsability of emails and send messages without refining them. This also applies to the analysis of face-to-face interactions. Our capacity to communicate face-to-face is built over several biological systems developed through evolutionary mechanisms, that offer certain physical properties to communications (i.e., collocation, synchronicity, facial expressions, body expressions, speech, and spoken words; Kock, 2004). Because of this, it is easy to assume that people will use these capabilities in all their face-to-face interactions, as they are ingrained in our 'biological materiality'. However, people can make full use of these capabilities; they can partially use them, or they can ignore them and decide not to communicate face-to-face at all. For example, interacting face-to-face does not guarantee that people will use body language or facial expressions.

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Based on previous research on virtual teams and team virtuality, we propose the following factors as relevant in influencing the way in which members will use the materiality of media (see figure 2): (a) team members' characteristics, such as the geographical/temporal distance between them (Chattopadhyay et al., 2020; Espinosa et al., 2015; O'Leary & Cummings, 2007), their cultural background (Eisenberg et al., 2021), their knowledge and skills using media, personal preferences, and past experiences with media (Carlson & Zmud, 1994, 1999), (b) the team design and tasks characteristics (e.g., autonomy, interdependence, complexity; Costa et al., 2021; Dulebohn & Hoch, 2017) which will demand a specific set of communicational needs, and (c) the team context, that is, the external environment which can impulse certain forms of communication and inhibit others (Dulebohn & Hoch, 2017). All these aspects will contribute to articulating a particular way in which team members use the media they have at their disposal to interact with each other to perform their tasks.

**Relationships with Team Variables**

In Figure 3, we show how teams' communication actions are related to other relevant team variables using Ilgen et al. (2001) Inputs-Mediators-Outcomes-Inputs model. We consider the contributing factors that influence the emergence of the specific pattern of communication actions of a team as Inputs in the model. Then, we propose teams' communication actions as mediators because they allow us to explain how teams are able to transform inputs into outcomes. This occurs through the impact that teams' communication actions have on the teamwork processes and emergent states of the team. In this section, we will analyse how different combinations of teams' communication actions can help team members to be effective in the different types of processes they must perform to fulfil their tasks. To do this, we use Marks and colleagues' Team Processes Framework (2001), which distinguishes between transition, action, and interpersonal processes, one of the most used in the teams' literature. We focus specifically on Marks et al. (2001) taxonomy of processes as it offers clear and specific actions that team members perform to develop emergent states and the performance of teams and, therefore, could help clarify some of the mixed results found in the team virtuality literature. However, it is important to note that, as proposed by the IMOI model and shown in Figure 3 by the dashed arrows, the workflow of teams is not static but usually recurrent. This way, the team's performance at one point in time can have an impact on the next cycle's inputs, communication actions, processes, and emergent states. The same applies to the other components of the model (e.g., team processes to team communication actions). Accordingly, previous research has shown that team members' communicational needs depend on the developmental stage of their team (Maruping & Agarwal, 2004; Mathieu et al., 2017), so this will be taken into consideration to analyse the impact of the different communication actions. Based on this, several propositions regarding the relationships between these actions and teams' processes during different teams' developmental stages will be made.

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*Transition processes.* Marks et al. (2001) framework proposes that team members will cycle between performing transition and action processes to accomplish their different tasks. Transition processes have received less attention in virtuality and virtual teams research (Gilson et al., 2015); however, they play an important role in the effective fulfilment of tasks. During the transition phase of a task, team members will perform processes focused on assessing the activities they have to do, such as planning, goal specification, and strategy formulation (Mathieu et al., 2019). By performing these processes, they can formulate (or clarify) the goals of the team and the most adequate strategy to achieve them, including identifying critical resources and delineating specific goals (Salas et al., 2017).

Transition processes are of relevance for teams in early developmental stages, especially for those who will perform their tasks for the first time. Team members in this situation will likely have to share and review large amounts of new information regarding the task (conveyance of information) but also discuss and agree on the goals and the strategies to achieve them (convergence of meaning). Considering this, team members can benefit by using actions that allow the conveyance of information and the convergence of meaning in a complementary manner. For example, they can work on crafting and refining clear and precise text- and graphics-based messages to share information with each other, and they can also review them multiple times to understand the contents of those messages. Then, team members can meet through synchronous media (e.g., face-to-face or video calls) to discuss what their goals are and the strategy to effectively perform their tasks. In this instance, team members will likely benefit from communicating using verbal and non-verbal expressions that allow them to notice when someone has doubts or has misunderstood and by having rapid exchanges that allow them to quickly clarify points. Additionally, the participation of multiple members in the discussion and having simultaneous communications can facilitate that all team members achieve a shared understanding of the most important aspects of the task they have to perform. Considering this, the following proposition is made:

*Proposition 1: Teams in early developmental stages that perform communication actions that facilitate both the conveyance of information, and the convergence of meaning will be more effective in performing transition processes than teams with low levels of these actions.*

Transition processes are also relevant for teams in late developmental stages, as such processes allow them to make the necessary adjustments to their plans and strategies depending on the challenges they faced when performing tasks on previous occasions (Mathieu et al., 2020). In this context, as team members already have previous experience with the task, the need to share large amounts of new information between team members is reduced. However, they will likely still benefit from performing communication actions that facilitate the convergence of meaning, that is, using verbal and non-verbal messages, having quick exchanges, and involving multiple participants to discuss how to deal with the challenges they previously faced and quickly agree on better ways to achieve their goals. Based on this, the following proposition is made:

*Proposition 2: Teams in late developmental stages that perform communication actions related to the convergence of meaning will be more effective in performing transition processes than teams that use other communication actions.*

*Action processes.* Marks and colleagues' (2001) framework proposes that after teams have formulated and clarified their goals and strategy, they will perform several action processes, which involve the execution of their tasks and other activities that facilitate achieving their goals. Some examples of relevant action processes are monitoring resources, monitoring progress toward goals, coordination, and knowledge and information sharing (Mathieu et al., 2017). Coordination and knowledge sharing have received the most attention in virtual teams and virtuality literature (Gilson et al., 2015). Past research has shown that the development of shared mental models is fundamental for teams to be effective in performing action processes (e.g., Gorman et al., 2010). Shared mental models are organised knowledge structures within team members' cognition that allow them to describe, explain and predict each other's behaviours (Mathieu et al., 2000). By having similar and accurate mental models, team

members are able to interpret information similarly and predict how others will interpret and use that information (Mohammed et al., 2010). They also allow team members to arrive at similar explanations of why a situation occurred in a particular way. All these aspects are relevant for the adequate performance of action processes, as they facilitate the anticipation of what other members are doing (and will do in the future) and an understanding of whether other members need a particular resource and/or information in a specific situation.

Teams in early developmental stages that have yet to develop shared mental models will likely benefit from performing communication actions that facilitate the convergence of meaning. In an experiment that compared face-to-face and ICT-mediated teams, Andres (2013) showed that having face-to-face exchanges facilitated team members requesting information from one another, confirming their mutual understanding of things, and assessing the correctness of the solution to the task they were performing. In turn, this resulted in these teams exhibiting higher levels of shared mental models at the end of the experiment. This can be explained because face-to-face interactions allow for the quick back-and-forth exchanges necessary to develop a shared understanding between team members. Also, by having access to non-verbal expressions (e.g., voice intonation, body movements and gestures), team members can notice when others are confused about something and clarify it. Finally, the participation of multiple team members is also relevant in this context, as team members can only develop shared mental models if all of them are involved in the teams' interactions and communications. Considering all this, the following proposition is derived:

*Proposition 3: Teams in early developmental stages that perform communication actions that facilitate the convergence of meaning will be more effective in performing action processes than teams that use other communication actions.*

For teams in late developmental stages that have already developed shared mental models, we argue that the conveyance of information likely has a predominant role. Performing communication actions related to the conveyance of information will allow for lower levels of synchronicity, which can

facilitate team members coordinating their work, monitoring each other's progress, and sharing knowledge/information without interfering with the execution of their tasks. For example, one team member can share information regarding their progress with a task using a written message on an online board, and then the rest of the team can access to that information when this does not interfere with their progress on their own tasks. In this context, team members will likely benefit from clearly formulating their communications (i.e., refining messages) and that they can be accessed any time that another member requires them (reviewing messages). Nevertheless, we argue that the involvement of multiple team members in communications will still play a large role during this stage, as it will allow all team members to have access to these resources or information without having to ask for them. Considering this, the following proposition is formulated:

> *Proposition 4: Teams in late developmental stages that perform communication actions that facilitate the conveyance of information, together with involving multiple team members in communications, will be more effective in performing action processes than teams that use other communication actions.*

*Interpersonal processes.* Marks et al.'s (2001) framework proposes that throughout the action and transition phases, team members will have to perform several interpersonal processes that focus on managing the interpersonal relationships between team members. Team virtuality and virtual teams research has placed great emphasis on the interpersonal aspects of teamwork (Gilson et al., 2015). However, they have mostly focused on interpersonal emergent states rather than processes. Although similar, emergent states refer to the levels at which interpersonal aspects are experienced at the team level, such as the levels of conflict and affective experiences of team members (Mathieu et al., 2017). On the other hand, interpersonal processes refer specifically to the actions that team members perform to manage the level of those states, such as affect and conflict management (Mathieu et al., 2020).

We argue that the communication actions team members use will be relevant for the effectiveness of teams' interpersonal processes as well. For instance, research has shown that actions related to the

convergence of meaning can facilitate team members' development of positive and shared emotions (Cheshin et al., 2011) and the management of interpersonal conflicts within teams (Hinds & Mortensen, 2005). Having quick real-time exchanges and using verbal and non-verbal communication facilitate the expression of humour and friendliness, aspects that have been found relevant for the development and management of positive affect within teams (Hareli & Rafaeli, 2008; Van Kleef et al., 2012). Moreover, the use of non-verbal communication and involving multiple participants can help spread the emotions of members, creating a shared affective tone within the team through emotional contagion processes (e.g., through mimicry; Elfenbein, 2014).

Regarding conflict, the use of verbal and non-verbal expressions helps to transmit more social and contextual cues during communications, reducing the possibility of misunderstandings and misattributions. Additionally, using quick back-and-forth exchanges allows team members to clarify and deal with conflicts more easily when they do occur. As Maruping and Agarwal (2004) argued, involving multiple team members is the only action whose impact will depend on the situation. In general, communications that involve multiple team members will help to reduce – and clarify – task and process conflict. The same applies to interpersonal conflict that involves several or all members of the team. However, the interpersonal conflict that occurs at the dyadic level will be better resolved by only including the team members involved in the issue, as the involvement of other members can lead to further noise and misunderstandings of the situation. Having said that, performing communication actions that facilitate the convergence of meaning seems to be a crucial aspect of the management of interpersonal relationships within teams regardless of the developmental stage of the team. Considering this, the following proposition is derived:

*Proposition 5: Teams in early and late developmental stages that perform communication actions that facilitate the convergence of meaning will be more effective in their interpersonal processes than teams that use other communication actions.*

## DISCUSSION AND CONCLUSION

In our analysis, we have proposed that team members often use multiple communication media, including both ICTs and face-to-face, which can offer different levels of capabilities. Team members can use media in ways that follow the material attributes of media, but they can also use them in ways that challenge these attributes, depending on factors such as personal preferences, the task they are trying to perform, and the team context, among others. Considering this, we presented the idea of teams' communication actions as a way to examine how team members actually use communication media to support their interactions while they work together. Then, we presented propositions for relationships between these different communication actions and teams' transition, action, and interpersonal processes.

**Theoretical Contributions**

The idea of teams' communication actions represents an attempt to integrate research from overlapping and complementary research streams, such as team virtuality and computer-mediated communications (Media Synchronicity Theory and affordances perspective). This type of effort can help researchers address some of the limitations that team virtuality research has had thus far. First, by focusing on actions that team members perform using all types of media, this construct goes beyond the opposing view of face-to-face versus ICTs. Traditionally, researchers have associated 'virtuality' with teams that do not have access to face-to-face interactions and, therefore, lack capabilities that facilitate the convergence of meaning, such as natural symbols and transmission velocity. However, in practice, there is evidence showing that most teams combine the use of ICTs with face-to-face interactions (Gibson et al., 2014; Watson-Manheim & Bélanger, 2007) and that some ICTs can offer some of these capabilities (e.g., video calls; Dennis et al., 2009). This new approach can help to expand our understanding of virtuality by examining how performing different types of communication actions can have differential impacts on teams: (1) when only communication actions related to the conveyance of information are used, for instance, when team members only communicate through written and graphical expressions, (2) when only communication actions related to the convergence of meaning are used, for instance, when

team members only communicate through verbal and non-verbal expressions, and (3) when these actions are used in a complementary manner.

Second, the idea of teams' communication actions goes beyond a deterministic view of media by exploring team members' actual use of media. As several authors have noted, people are not passive users of technology (Leonardi, 2011; Markus & Silver, 2008; Orlikowski & Scott, 2008). They can, and most times will, use media in unintended ways, either mistakenly (e.g., by lack of knowledge) or intentionally (e.g., innovation or sabotage; Orlikowski, 2000). Identifying how team members actively use their teams' communication media to perform specific communication actions could offer a better understanding of the way they interact with each other and, therefore, how they are able to be effective in fulfilling their tasks. Furthermore, examining the actual use of media will also allow researchers to better comprehend the temporal dynamics of team members' interactions. Over time, teams can develop rigid rules and norms regarding the communication actions they must perform (Orlikowski, 2000). However, team members can also decide to use different media or use the same media in different ways for a myriad of reasons. Results in previous work cycles, previous experiences using the media, or changes in the context, tasks, and team composition can cause them to stop using one or more media, start using new media, or use the same media in new ways. If research assumes a deterministic view of media based on their objective set of capabilities, researchers can fail to capture the adjustments that team members make when using the same set of media but in different ways. These changes in the situated use of media, that is, the communication actions that team members perform over time, could be instrumental in understanding the functioning of teams. Likewise, as this approach is less reliant on specific media, it can also help to quickly include and analyse the newer media developments that occur in the future by examining the actions that team members can perform when using them.

Third, by integrating the idea of teams' communication actions with the well-established Marks et al. (2001) team processes taxonomy, this article can help to explain some of the mixed results that the team virtuality literature has found to date. This new construct offers a framework to interpret results

from previous research that might appear dissimilar by offering explanatory mechanisms that take into consideration (1) the actual way in which team members communicate using media and its capabilities, (2) the communicational needs that team members have depending on the processes (i.e., transition, action, and interpersonal) they are performing and the developmental stage of their team, and (3) how the different types of communication actions (related to convergence of meaning or conveyance of information) can be instrumental in satisfying those needs.

**Future Research**

The idea of teams' communication actions offers several opportunities for future research. First, to use this new construct for empirical research, it is necessary to develop and validate scales to measure the communication actions identified in this article. Second, after the development and validation of new scales, this new construct offers several opportunities for future empirical research in team contexts. New research needs to be done to test the propositions presented in this article, that is, the relationships between the communication actions and team processes in different developmental stages of teams (Marks et al., 2001; Maruping & Agarwal, 2004). Another possibility for future research is the examination of the existence of different combinations of communication actions in teams. For example, teams can usually combine high levels of quick exchanges and verbal and non-verbal communications with low levels of written information in the early stages. To do this, researchers can use empirically-driven statistical analyses such as Latent Class Analysis (LCA) and Latent Profile Analysis (LPA) and their multilevel extensions (i.e., Multilevel LPA and LCA; Mäkikangas et al., 2018; Oberski, 2016) to identify teams with specific profiles of communication actions.

Third, the construct of teams' communication actions can also promote the development of future theories. In this article, we integrated this new construct with the ideas of team processes. However, future developments can connect this idea with other team-relevant variables, such as team emergent states (Rapp et al., 2021) or with new conceptualisations of team virtuality, such as Handke et al. (2020) based on information deficits and perceived distance between team members. This way, it could be

relevant to understand how the different communication actions can create low or high levels of information deficits and perceptions of distance in teams. Additionally, based on empirically driven work and with the development of new technologies and capabilities, researchers can identify other team communication actions that have not been considered in this article. Lastly, this construct might inspire future developments that aim to integrate theories and empirical research from different streams into the virtual teams/virtuality literature.

**Practical Contributions**

This new theoretical development presents relevant practical contributions for managers and team leaders. After the ease of the restrictions to fight the COVID-19 pandemic, team members are combining the use of face-to-face interactions and ICTs more than ever before. Many organisations have decided to implement hybrid work settings in which team members work some days from their homes and others from a common location (e.g., their office) (McKinsey, 2022; Office for National Statistics, 2022). However, it is likely that even teams from organisations that decided to go back to pre-pandemic office work are still using some of the ICTs they relied heavily on during the pandemic. The ideas of teams' communication actions can be helpful in offering guidelines and support to managers and team leaders in this context. The differentiation between communication actions that facilitate the convergence of meaning or the conveyance of information can help team leaders promote specific communication actions that help their teams be effective with the process they are performing (e.g., planning, coordinating, or managing conflict) at a particular stage. Similarly, these ideas can help to inform upper and HR managers' decisions in organisations. They can support workers by offering them training regarding the different actions they can perform using media and how they can match specific communicational needs.

**Conclusion**

The new construct proposed here is an important theoretical development that can offer a nuanced understanding of how the use of communication media can impact team members' interactions and overall team dynamics. This construct offers a more nuanced view of face-to-face and ICTs to focus on

how team members can perform different communication actions using media, which will shape the interactions within the team. Likewise, it also challenges deterministic views of technology and media by taking into consideration the actual use that team members make of the media used in their team. In conclusion, the study of teams' communication actions represents a promising alternative approach to the study of virtuality in the future.

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**Table 1**

*Teams' Communication Actions derived from the media capabilities of Media Synchronicity Theory (Dennis et al., 2008)*

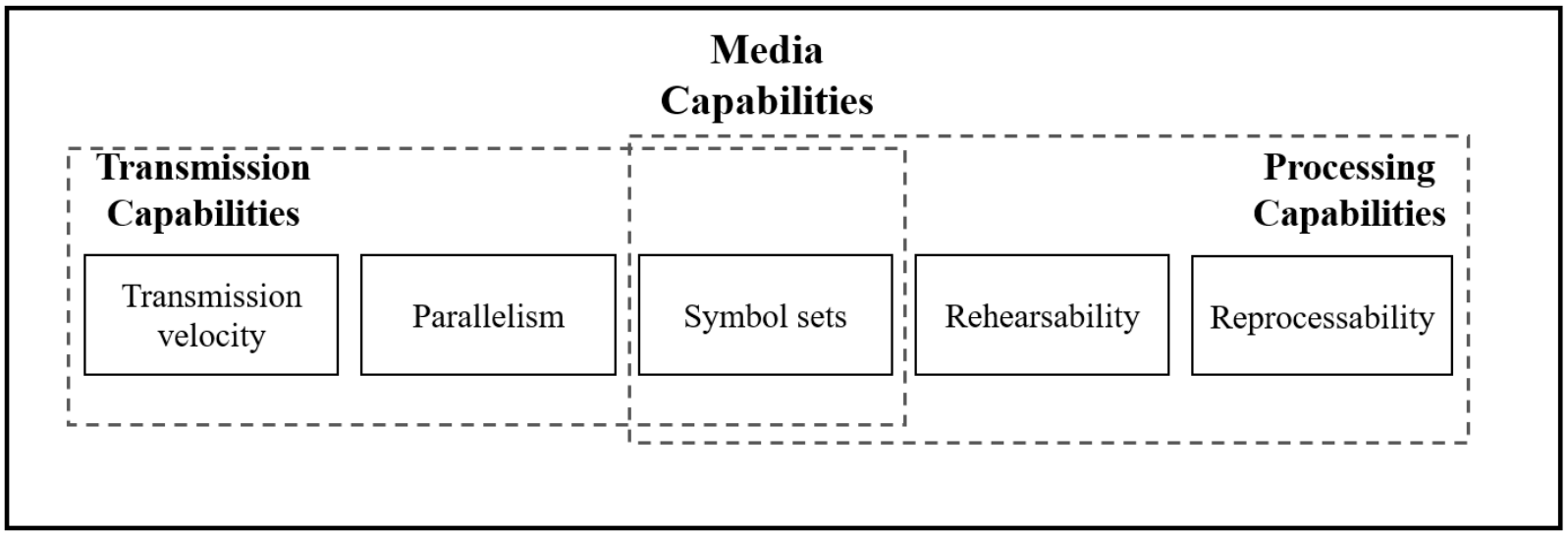
| **Media capabilities** | **Communication actions** | **Communication process** | **Definition** |
|---|---|---|---|
| Natural symbols | Verbal and non-verbal communications | Convergence of meaning | Team members use the team's media to interact using their voice, facial and body expressions. |
| Digital symbols | Written communications | Conveyance of information | Team members use the team's media to send written messages and information. |
| | Graphical communications | | Team members use the team's media to send images, pictures, and graphs. |
| Transmission velocity | Quick exchanges | Convergence of meaning | Team members use the team's media to quickly reply to other members' messages. |
| Parallelism | Multiple participants | Convergence of meaning | Team members use the team's media to involve multiple members in their interactions. Lower levels in this subdimension indicate that team members communicate often in dyads rather than involving the whole team. |
| | Simultaneous communications | | Team members use the team's media to have multiple simultaneous communications through one or more media. Lower levels of this subdimension indicate that team members usually |

| | | | |
|---|---|---|---|
| | | | focus on just one communication at a time. |
| Rehearsability | Refine messages | Conveyance of information | Team members use the team's media to edit and refine their messages before communicating them. |
| Reprocessability | Review messages | Conveyance of information | Team members use the team's media to access other members communications multiple times. |

*Note.* As argued in this article, the media capabilities are just one of the factors that will influence on the emergence of the teams' communication actions. Thus, the communication actions are not directly determined by the capabilities of media.

**Figure 1**

*Media capabilities proposed by Media Synchronicity Theory*




*Note*. Adapted from "Media, Tasks, and Communication Processes: A Theory of Media Synchronicity", by Dennis et al., 2008, *MIS Quarterly*, *32*(3), p. 582.

**Figure 2**

*Factors contributing to articulate the emergence of Team's Communication Actions*

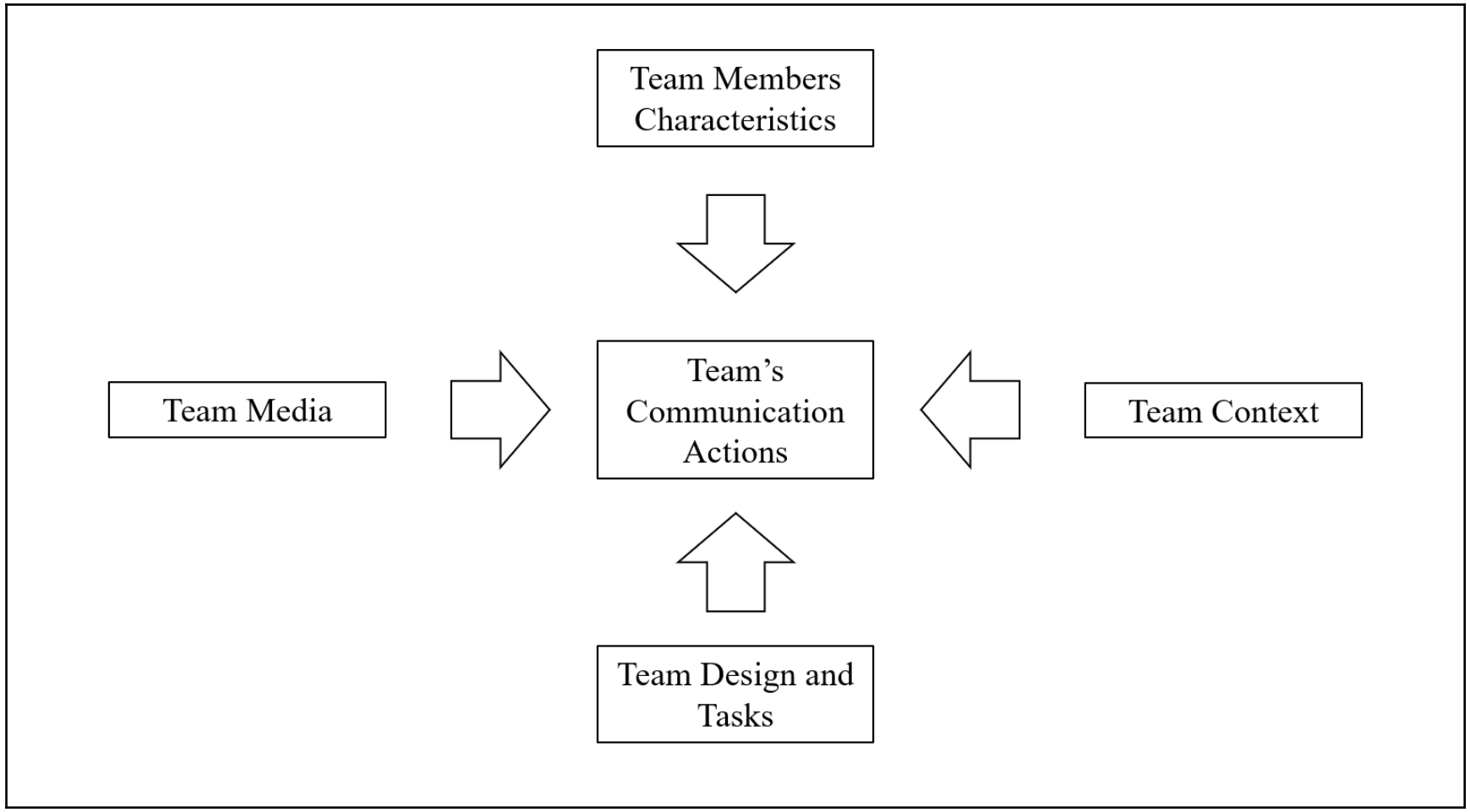


**Figure 3**

*Adaptation of Ilgen's (2005) IMOI model including the concept of Team's Communication Actions*